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MASTER THESIS

(EXPLANATORY NOTES)

OF GRADUATE OF ACADEMIC DEGREE

«MASTER»

THEME: **«Integrated logistics activities management of an engineering company»**

Speciality 073 «Management»

Educational and Professional Program «Logistics»

Done by Sofiia I. Zhyhula
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I certify that in this master thesis there are no borrowings from the works of other authors without appropriate references *Sophia Zhigula.*
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Kyiv 2023

МІНІСТЕРСТВО ОСВІТИ І НАУКИ УКРАЇНИ
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Київ 2023

NATIONAL AVIATION UNIVERSITY
Faculty of Transport, Management and Logistics
Logistics Department

Academic Degree Master

Speciality 073 «Management»

Educational and Professional Program « Logistics »

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«02» October 2023

TASK

FOR COMPLETION THE MASTER THESIS OF GRADUATE

Sofiia I. Zhyhula
(surname and name)

1. Theme of the master thesis: «Integrated logistics activities management of an engineering company» was approved by the Rector Directive №1952/ст. of September 27, 2023.

2. Term performance of thesis: from October02, 2023to December 31, 2023.

3. Date of submission work to graduation department: December10, 2023.

4. Initial data required for writing the thesis: general and statistical information about logistics activity, concept of integrated logistics, role of integrated logistics activity management of engineering companies in Ukraine, information of the company Steiner Ukraine, production and financial indicators of the company Steiner Ukraine, literary sources on information logistics and warehouse processes, Internet source.

5. Content of the explanatory notes: introduction, the essence of the information system; the specifics of integrated logistics management in the modern market; analysis of the activity of the company Steiner Ukraine; identification of logistics processes and management systems; construction the algorithm and improving of the warehouse operations in business process in the company; 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	02.10.23-18.10.23	Done
2.	Collection of statistical data, timing, detection of weaknesses, preparation of the first version of the analytical chapter	19.10.23-09.11.23	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	10.11.23-30.11.23	Done
4.	Preparing the final version of the master thesis, checking by standards inspector	01.12.23-08.12.23	Done
5.	Approval for a work with supervisor, getting of the report of the supervisor, getting internal and external reviews, transcript of academic record	05.12.23-09.12.223	Done
6.	Submission work to Logistics Department	10.12.23	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.	02.10.23	02.10.23
Chapter 2	Associate Professor, Karpun O.V.	19.10.23	19.10.23
Chapter 3	Associate Professor, Karpun O.V.	10.11.23	10.11.23

9. Given date of the taskOctober02, 2023.

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

Task accepted for completion: _____ Zhyhula S.I.
(signature of graduate) (surname and name)

ABSTRACT

The explanatory notes to the master thesis «Integrated logistics activities management of an engineering company» comprises of 109 pages, 21 figures, 22 tables, 1 appendix, 66 references.

KEY WORDS: LOGISTICS ACTIVITY, INTEGRATED MANAGEMENT, ENGINEERING, CUSTOMER RELATIONSHIP MANAGEMENT, WAREHOUSE MANAGEMENT SYSTEM, OPTIMIZATION

The purpose of the research is to study the theoretical foundations and problems of integrated logistics activity management in engineering companies and to develop project recommendations for conducting reengineering of business processes in logistics operations of the engineering company.

The subject of the investigation is the integrated logistics activity management of the company, process engineering, operational activities and warehouse processes in the logistics system of Steiner Ukraine, the coordination in the business processes of the company and coordination among participants of logistics process.

The object of the research is the business activity of the engineering and consulting company Steiner Ukraine.

Methods of research are scientific inquiry, empirical, analysis and synthesis, modeling, expert assessments, induction, deduction, generalization.

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

AI – Artificial Intelligence

API – Application Programming Interface

AR – Augmented Reality

CRM – Customer Relationship Management

CSRP – Customer synchronized resource planning

D2C – Direct to Consumer

DDP – Delivered, Duty Paid

DDT – Demand-driven techniques

DPP – Discounted Payback Period

ECP – Effective customer response

EDI – Electronic Data Interchange

ERP – Enterprise Resource Planning

IoT – Internet of Things

IRR – Internal Rate of Return

JIT – Just-in-time

MRP I – Material requirements planning

MRP II – Manufacturing resource planning

NPV – Net Present Value

PE – Private Enterprise

PI – Profitability Index

RFID – Radio Frequency IDentification

ROI – Return on Investments

SaaS – Software as a Service

SRM – Supplier Relationship Management

TMS – Transport Management System

TNC – Transnational Corporation

TQM – Total Quality Management

VL – Virtual Logistics

VMI – Vendor-Managed Inventory

WMS – Warehouse Management System

UAH – Ukrainian Hryvnia

INTRODUCTION

In the modern world issues related to the provision of trade organizations with necessary material resources are of great importance, as well as their effective use, improving the management of warehousing and inventories, marketing and transport management flows. The company should be able to manage resources and flows properly in order to make the business effective.

The use of digital technologies such as AI, IoT, and cloud computing also drives the market. These technologies are used to gather, process, and analyze massive volumes of data in real-time to make better decisions. Architectural design and engineering services are being transformed by new technology. Engineering businesses must examine and adopt these relevant technological innovations to remain competitive [18]. There a lot of new technologies that appear on the market and engineering companies help other enterprises to implement these know-how at their plants.

Nowadays most businesses make shift to improved operational efficiency, for this all enterprises try to cut down the unnecessary costs while increasing revenue. Efficient operations are cost– and time-effective, while quality and service are maintaining on the same level or even higher. Thus improved operational efficiency can make the company more flexible, agile and competitive on the market.

One of the major barriers to operational efficiency is unnecessary manual processes. In the new age of automation technology, there is no excuse for these time-consuming, labor-intensive activities. So, the quickest and the most reliable way to reach efficiency is to implement automation systems, because they help save time and allow employees to focus on mission-critical duties.

Factors that impact operational efficiency include relationship and interaction with the clients, resource utilization, manufacturing and inventory management. It is important to maintain constant contact with the client and be his reliable partner. To achieve this goal business use customer relationship management software that

enables consistent communication both within employees and with clients, also it can track some processes and automate key tasks. Since customer loyalty and revenue are both qualities that affect a company's revenue, CRM is a management strategy that results in increased profits for a business. The main aim of implementing a CRM strategy is to create a single ecosystem for attracting new and developing existing customers. Managing relationships means attracting new customers, turning neutral buyers into loyal customers, forming business partners from regular customers.

Companies use enterprise resource planning systems to organize their various business processes, as ERP systems have a database shared by all departments. It is advisable to deploy a warehouse management system (WMS) to more effectively control warehouse flows. WMSs also collect data on procedures and supervise and optimize everything that occurs along the supply chain. This software has to be integrated with the ERP system so that the departments in the firm can access and share information. Customer relationship management system also help to control the work with clients, leads to increased sales, detailed analytics, automated sales reports and better customer retention. This module objectively gauges operational performance by means of KPIs (key performance indicators). With the help of these KPIs, businesses can control their processes and, consequently, understand and improve them.

In order to implement all these systems in the activity of the company integrated logistics is used. Integrated logistics is defined as a supply-chain organization and business model in which departments, processes, resources, and flows are coordinated to all operate in the same direction. Logistics is an interdepartmental process, that is, it involves practically all the departments within a company. When they work in sync, operations are much more seamless, and orders, thus, can be dispatched more quickly.

The concept of integrated logistics came about in response to the evolution of the market. Changes in demand and the appearance of competitors have forced companies to look for formulas that optimize their operations, speed up cycles and minimize costs. Coordination between the various departments that make up an

organization makes it possible to have flexible, agile operations that help it to respond quickly and accurately to new trends.

Warehousing and distribution are critical components of integrated logistics, as they involve the storage and movement of goods within the supply chain. An integrated approach to warehousing and distribution ensures that these activities are closely coordinated and aligned with other supply chain functions. This can lead to significant improvements in inventory management, order fulfillment, and overall customer satisfaction.

Coordinating and optimizing a company's processes, resources, and departments allow the company to accurately address customer demands and dispatch orders more rapidly. Technology advances have fostered the implementation of integrated logistics in organizations and good communication between departments, optimally connecting the links that make up the supply chain.

Engineering is the main consulting service that is used for the creation of enterprises and objects. Engineering is an important method of increasing the efficiency of capital invested in an object. It is considered as a certain form of export of services (transfer of knowledge, technology and experience) from the country of the producer to the country of the customer. Engineering covers a complex of works on conducting preliminary studies, preparation of technical and economic justification, a set of project documents, as well as development of documentation on the organization of production and management, operation of equipment and sale of finished products.

The rapid growth of international operations in trade in engineering and technical services led to the formation and development of the international market of engineering services. Studying the theory and practice of engineering, one can pay attention to the fact that the implementation of the largest number of engineering projects is concentrated in the economically developed countries of Europe, North America and Asia [54].

An engineering firm is a firm that specializes in providing engineering services. These firms have the status of formally independent, they are able not only

to provide services simultaneously in several areas, but also to involve various equipment suppliers and various subcontractors in the performance of tasks.

The engineering services outsourcing is the practice of hiring nonphysical engineering functions from a third party, such as prototyping, design, and testing. These services are required at the beginning of the product development and design process and make use of variety of information technology-based databases and tools. The engineering services outsourcing is used in the communications and networks industries to hire network design services, inventory management, and geographic data analytics.

The relevance of the chosen topic is justified by the importance of integrated logistics in the whole supply chain, the work of which operation has a great impact on the activities of the entire enterprise. By streamlining operations and improving visibility, integrated logistics enables businesses to provide a higher level of customer service. This can lead to increased customer loyalty, repeat business, and positive word-of mouth, all of which are vital for long-term success.

The purpose of the qualification work is the generalization of theoretical, practical analysis and development of scientific and methodological recommendations for the formation of integrated management of the logistics activities of the engineering company.

The object of the research is process engineering, operational activities and warehouse processes in the logistics system of Steiner Ukraine.

The subject of the research is integration of the business processes of the company and coordination among participants of logistics process.

To achieve the goal the following tasks have been performed:

– study the tasks and functions of logistics activity;

– study the concepts and types of integrated logistics;

– analyze the principles of integrated management in logistics activity;

– study the peculiarities of logistics activity management in engineering company;

– analyze the financial and economic condition of PE Steiner Ukraine;

– consider the organization of logistics activities in PE Steiner Ukraine and identify key problems;

– characterize methods of processes optimization;

– develop measures to improve integrated management of logistics activity in the organization.

The scientific innovation consists in the formation of the model of formation of integrated logistics activities management for the engineering company. This model includes the architectural structure of an integrated logistics management system in an engineering company, which ensures correct management of warehouse, transport and procurement of materials. The use of the proposed model will contribute to the improvement of customer service, as well as increasing their involvement with the help of integrated logistics management.

The research method includes analysis, synthesis, induction, deduction, modeling, generalization.

In the process of writing the qualification paper, materials from the company's internal reporting, data from statistical directories, and materials from practitioners in the field of logistics and management, published in periodicals, monographs, textbooks, and electronic sources, were used.

CHAPTER 1
THEORETICAL ASPECTS OF INTEGRATED MANAGEMENT OF LOGISTICS ACTIVITIES OF ENTERPRISES

1.1 The essence of the concepts «logistics activity» and «logistics activity management»

Logistics in a broad sense is understood as an integrated system of formation and control of physical processes of the flow of products aimed at achieving the most favorable ratio between the level of services provided (the level of customer service) and the level of the corresponding cost structure. The use of logistics concepts and systems allows companies to reduce all types of product stocks in production, supply and sales, accelerate the turnover of capital, reduce the cost of production, and ensure full satisfaction of consumers in terms of goods and services. There are different understandings of the logistics activity concept. Table 1.1 shows different interpretations of the concept of «logistics».

According to different definitions of logistics activity it becomes clear that the potential of logistics activity allows to increase the organizational and economic stability of the enterprise on the market. Logistics activity is one of the most important components of the production and economic activity of any enterprise, which directly includes the performance of logistics functions, the flow of logistics processes and the implementation of logistics operations. Khadzhinova O.V. [30] believes that it is a repetitive mechanism, which is considered from the side of process, structural and functional approaches, which closely interact with each other. While Krykavskyi E.V. believes that logistics management involves achieving an appropriate level of satisfaction of the economic interests of all participants in business processes through targeted influence on logistics flows with the aim of synchronizing their interaction and achieving the effect of synergy [15].

Table 1.1–Different interpretations of the concept of «logistics»

№	Author	Definition
1	2	3
1	Council of logistics management [53]	The process of planning, implementing and controlling the efficient, effective flow and storage of goods, services and related information from point of origin to point of consumption for the purpose of conforming the customer requirement.
2	Martin C. [47]	The process of strategically managing the procurement, movement and storage of materials, parts and finished inventory (and the related information flows) through the organization and its marketing channels.
3	Waters C.D.J. [52]	The function responsible for the flow of materials from suppliers into an organization, through operations within the organization, and then out to customers.
4	Amitan V. [1]	The science of planning, organizing, managing, controlling and regulating the movement of material and information flows in space and time from their primary source to the end user.
5	Banko V.[3]	The science of planning, controlling and managing transportation, warehousing and other tangible and intangible operations, carried out in the process of bringing raw materials and supplies to the production enterprise, in-plant processing of raw materials, supplies and semi-finished products, bringing finished products to the consumer, taking into account the interests and requirements of the latter, as well as the transfer and processing of relevant information.
6	Herelytsia R. [8]	A new scientific direction, the doctrine of planning, control and observation (tracking) during the movement of material and information flows in production and energy systems.
7	Klimova I. [12]	The process of planning, implementing and managing the efficient, cost-effective movement and preservation of raw materials, work in progress, finished goods, and related information from the point of origin to the point of consumption to ensure compliance with customer requirements
8	Konishcheva N. [13]	The science of optimal management of material, information and financial flows in economic adaptive systems with synergistic relationships.
9	Palasyuk B. [22]	An integral management tool that contributes to the achievement of strategic, tactical or operational goals of a business organization by managing material and/or service flows, as well as related information and financial flows, efficiently in terms of reducing overall costs and meeting end-user requirements for the quality of products and services.
10	Christopher M. [37]	Scientific and practical direction of management, which consists in the effective management of material flows in the areas of production and circulation.

According to Fig. 1.1, the logistics management organization depends on natural, human, financial and informational resources for incoming flows.

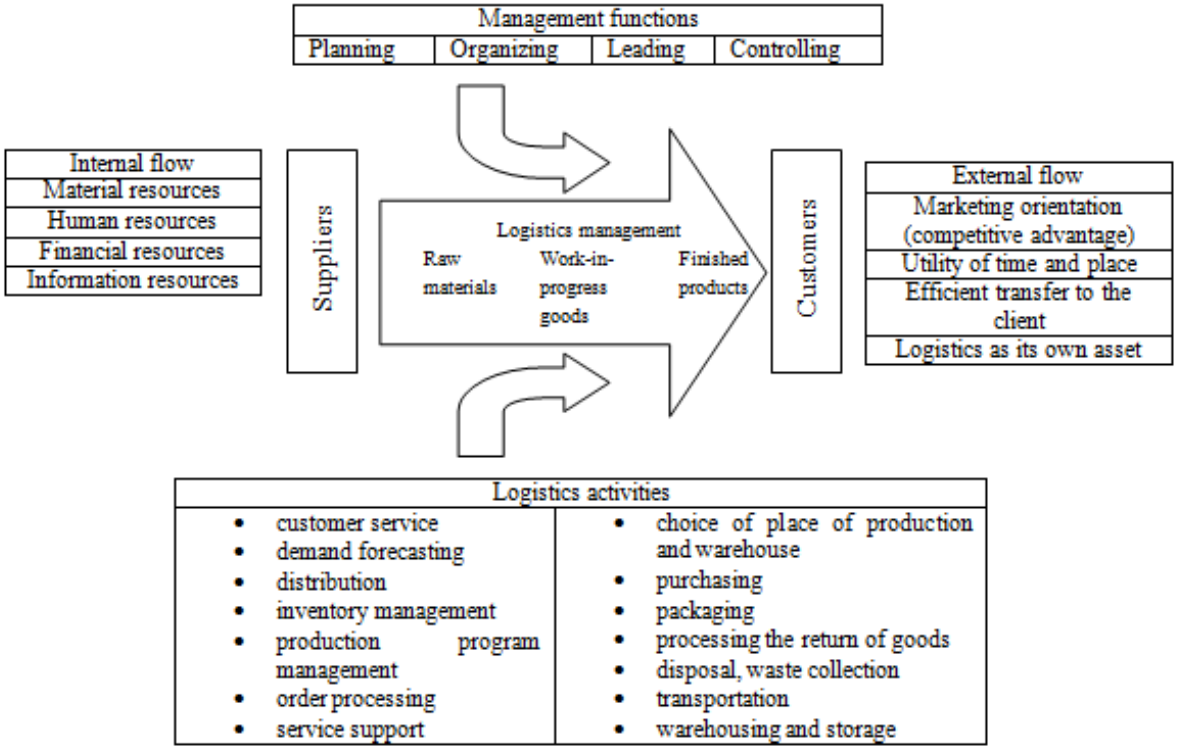

Figure 1.1 – Process of logistics activity management based on its components

Management actions create the basis for logistics activities through planning, implementation and control of activities. The results of the formed logistics system are a competitive advantage, the usefulness of time and place, efficient movement to the client and the provision of a complex of logistics services in such a way that logistics becomes the organization's own asset. These results become possible thanks to the efficient and effective work of logistics operations [5].

The organization of logistics activity is the coordination and optimization in time and space of all its material and labor elements of the logistics process to achieve the set goals with the minimum expenditure of resources [40]. Thus, a mandatory component of the organizational structure of a successful enterprise is the logistics department. The logistics service of the enterprise includes the following functions: operational calendar planning of the release of finished products; operational

management of technological production processes; planning of material resources supplies; product quality control; maintenance of product and service quality standards.

The organization of logistics activities is possible according to two scenarios: outsourcing and insourcing [19].

Outsourcing (contract logistics) refers to the transfer of part of the production or logistics processes to other enterprises, for example, the purchase of ready-made components, components for assembling products or the use of services provided by transport or warehouse companies. The range of use of outsourcing in the supply chain can be different: narrow (limited to the purchase of some functions) or wide (complex agreements related to the management of the entire supply chain).The level of outsourcing is determined by the level of logistics specialization acceptable at the enterprise.

Insourcing is the opposite of the previous scenario and means performing processes in-house, such as outsourcing a project to an employee instead of hiring an outside contractor or company to do the work.

In particular, Prof. E.V. Krykavsky proposes to classify types of logistics activities by two criteria [16]: phase and functional as shown in Table 1.2.

Table 1.2 – Classification of logistics activity types

№	Main types of phase logistics activities	Main types of functional logistics activity
1	2	3
1	Supply logistics	Order management
2	Production logistics	Transportation
3	Sales (distribution) logistics	Warehousing
4	Recycling logistics (reuse and utilization)	Packaging
5	Financial logistics	Inventory management
6	Information logistics	Logistics services

According to the first criterion of this classification of logistics activities, within the economic object there are logistics of material, financial, service and information flows in logistics. For further division, the phases of transformation of the logistics flow corresponding to the functional areas of logistics (i.e., those areas

of activity in which logistics actions are performed: functions and operations) are taken into account.

The material flow within the enterprise may undergo the following transformation phases [10]: supply of materials, manufacturing of products, their sale, return of containers or defective products, disposal and recycling of used products, waste, containers and packaging. Supply, distribution and recycling logistics involve the planning, management and physical handling of the material flows, finished products, waste products, packaging and waste, respectively. Production logistics covers the planning, management and implementation of intra-production transport and intermediate storage in production units [46].

According to the second classification criterion, types of functional logistics activities are determined in accordance with the fulfillment of logistics tasks and the content of logistics processes, and thus represent logistics functions (Fig. 1.2).

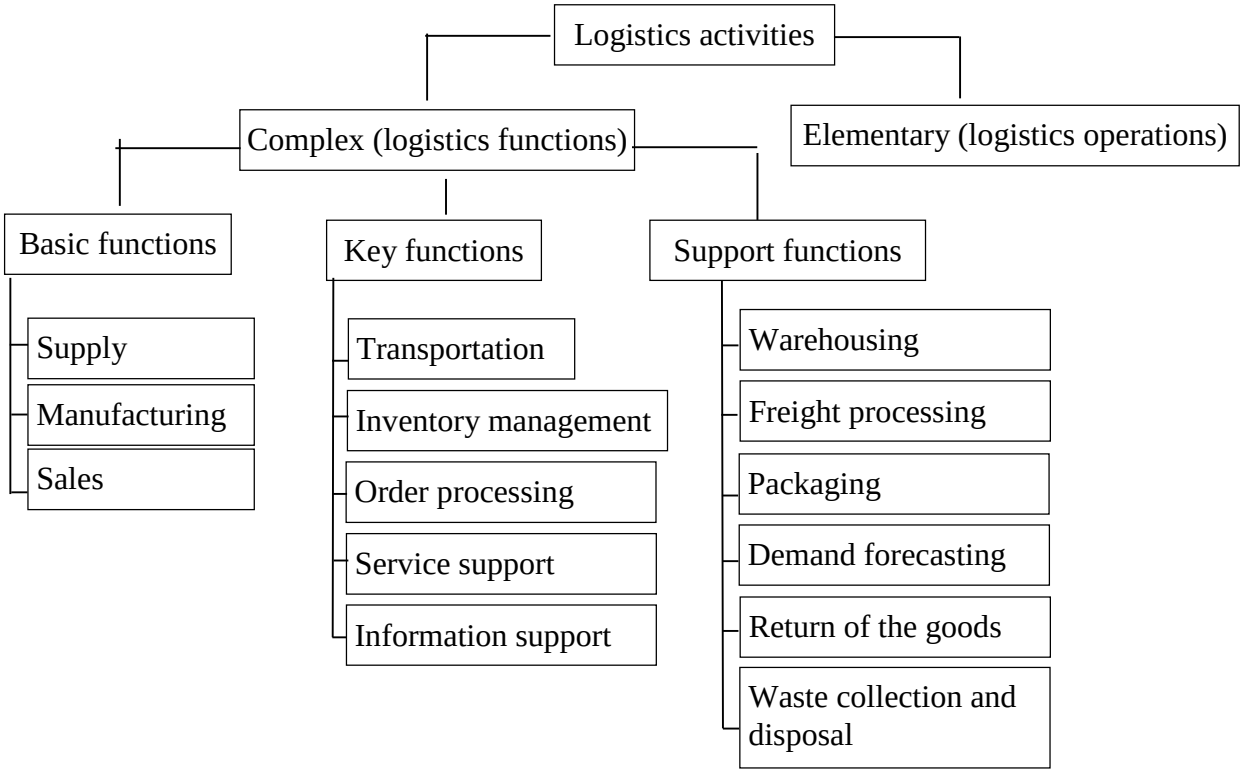

Figure1.2 – Classification of logistics activities

Anikin A.G. [2] distinguishes two types of logistics functions: operational and coordination. The operational nature of the functions is the direct management of the

movement of material resources in the areas of supply, production and distribution. The functions of logistics coordination include: identification and analysis of production needs for material resources; analysis and forecasting of markets; processing of information on orders and customer needs.

So, logistics encompasses a lot more than just physical distribution. It has a lot of other functions as well. The main logistics functions are the following:

1. Processing Orders.

A critical part of logistics functions is order processing. There are various ways to submit an order, such as through mail, telephone, salespeople, or computers. However, orders must be processed as soon as they are received. Business organizations and customers both reap the benefits of efficient order processing. Some major order processing activities include the following:

– checking the order for any changes in negotiated terms;
– payment and delivery terms;
– checking the availability of stock;
– production and material scheduling to cater to shortages.

2. Transportation.

Transportation is the most crucial and essential function of logistics in supply chain management since it allows items to move from the provider to the buyer. When a customer places an order, the purchase is not complete until the products are physically delivered to their location. Transportation consumes 60 to 70% of logistics costs, particularly for low unit-priced and mass-consumed products. Various transportation modes are used to physically move items, such as rail, truck, water, and air.

Firms select methods of transport based on the state's or area's transportation systems. When choosing a form of transportation, the most important factor to consider is the price. However, the necessity of the product at the customer's end might occasionally outweigh the economic issue. Regardless of the expense, the goods are sent through the fastest route.

3. Managing Inventory.

Inventory management is one of the most important logistical functions that is also considered the worst offender in a company's entire supply chain because of its high carrying cost, which eats into profits indirectly. It includes costs such as inventory funding, security, warehousing, damages, repairs, and thefts. Inventory management is all about having enough inventory on hand to meet customer requirements while keeping carrying costs low. It's a delicate balancing act between offering exceptional customer service while minimizing market share loss and the associated costs.

4. Warehousing.

The storage of finished items until they are delivered is known as warehousing, which is significant to a company's logistics functions. The right warehousing decisions determine the efficacy of a company's marketing [44].

With the recent developments in technology, warehousing has improved significantly. Single-storied automated warehouses have replaced older multi-storied warehouses with a limited number of employees.

In logistics, warehousing is a critical decision area. With right and modern warehousing, you can reduce labor costs and have greater inventory control.

5. Packaging.

Packaging is a critical element of logistics management functions. It impacts the effectiveness of the logistics system by influencing the physical flow of a product. It's not the same as package design, which is focused on marketing goals.

However, logistical packing is necessary for breakage prevention, handling of materials, and storage space efficiency. In terms of packing cost, load utilization significantly impacts logistical packaging.

6. Handling Materials and Storage.

Material handling is considered influential among other logistical functions because it affects how inventory moves along the distribution chain. Product breakage, delivery delays, and incidental overhead expenses will increase because of incorrect material handling.

Advanced manufacturing technologies and material handling increase the efficiency of the logistics system. The numbers to be managed, the speed necessary

for material transportation, and the degree of service to customers are all factors to consider when choosing a material handling system.

The storage system is critical for maximum space utilization in a warehouse of a particular size. For quick movement (holding and retrieving) of items to and from the warehouse, the supply chain strategy should work in tandem with the storage system.

7. Monitoring.

Businesses must keep inventory control, transport, and warehousing all up to date. Each site needs to know about its present supply chain situation, future obligations, and restocking capacity regularly.

Similarly, a company must study the various means of transportation available, their prices and appropriateness for services and additional features before choosing a carrier. Storage space, labor schedules, order demands, and delivery must be monitored and tracked. Also, businesses can enhance their efficiency by keeping a check on services and reviewing total delivery efficacy.

According to the stages of logistics development, the following stages are distinguished [66]:

– operational coordination (for example, coordination of transport and warehouse processes in the physical distribution of products in order to reduce costs)

– holistic coordination of the processes of physical distribution of goods (e.g., transportation, warehousing, packaging, order processing, customer service) and cross-functional coordination (e.g., logistics with marketing, finance, human resources, etc.;

– strategic integration of all links of the complete logistics chain (e.g., from the source of material resources to the consumer of the final product) based on information technology to obtain strategic effects.

The tasks of logistics in the activity of a modern enterprise should be the following [13]:

– end-to-end planning and control of flow processes in logistics systems;

– modernization of methods and system of organization and flow management;

– multi-scenario forecasting of stocks, production, transportation, etc.;

– detection of an imbalance between the needs of production and the possibilities of its material and technical support, as well as the needs of logistics services and the possibilities of their satisfaction;

– standardization of requirements for the quality of logistics services and operations;

– smart – organization of business relations;

– identification of "points" of loss of time and resources;

– determination of resource movement strategies and organization of transport and storage complexes.

Given that the goal of logistics activities is to harmonize the interests of producers, suppliers and consumers, its main directions are: improving the parameters of incoming resource flows through improved relations with suppliers; improving internal flows, i.e., the results and coordination of actions of enterprise units; improving relations with consumers, ensuring the most accurate match of outgoing flows of goods and services with their requirements [38].

1.2 Conceptual foundations of integrated logistics

Integrated logistics is a business management model that is increasingly used to accelerate product delivery and improve customer service. In this model, all departments, processes and resources are aligned to work in perfect synchronization and operate as one cohesive unit. This results in seamless operations and ensures that customer orders are dispatched quickly. As logistics involves several departments, the integrated model emphasizes the need for teamwork to optimize performance. Cross-functional collaboration also gives companies a competitive advantage and helps them adapt quickly to changes in consumer demand.

The all-encompassing aspect of integrated logistics has modified how organizations prepare for heightened efficiency and competitive edge. Ultimately, integrated logistics amalgamates inbound and outbound logistics to form a comprehensive and easy-to-control whole.

1. Production.

The production or procurement phases involve material handling, purchase planning, supplier communication, and inventory transportation to warehouses or fulfillment centers. Integrated logistical solutions direct the production plan, inventory, and warehousing operations.

The function of integrated logistics is optimizing planning and real-time inventory management with technology and automated workflows. This allows for advanced forecasting, on-time stock replenishment, production lead time planning, and preventing stockouts and wastage [51].

2. Fulfillment and Dispatch.

Integrated logistics enables eCommerce organizations to micromanage order processing, picking, packing, distribution, and shipping. Firms can strategically distribute products to retail partners and distribution centers with enhanced visibility and demand forecasting [49]. With all the stakeholders in communication, firms can manage storage, automate fulfillment, and leverage technology like IoT and AI for order accuracy and fast dispatch.

Along with warehouse management, integrated logistics simultaneously streamlines shipping. When all systems are aligned, it becomes easier to gain complete visibility into order status and fulfillment.

3. Deliver.

Integrated logistics coordinate transport, segregation, and delivery of products. With advancements in transport management systems, strategic warehousing, and inventory management, on-time delivery has been augmented.

Integrated logistics influences every element in the logistics department to work in cohesion, reducing variations in transit and processing times. Furthermore, it can be beneficial if firms move towards a just-in-time manufacturing business model.

4. Marketing.

The marketing function involves coordinating requisite packaging to strengthen logistics processes. Furthermore, integrated logistics coordinates marketing departments with the rest of the organizations. This allows for creating effective marketing campaigns that impact inventory and product design [21].

The marketing function also includes publicizing correct information on services and expanding the business' presence among customers and partners.

5. Technology.

Whether AI, IoT or SaaS tools, integrated logistics brings together processes, technology, suppliers, vendors, and carriers to maintain accurate data and complete visibility of the supply chain. Eventually, it sets the stage for omnichannel fulfillment, multichannel and D2C logistics.

E-commerce companies can improve inventory distribution, pick accuracy, and meet personalized customer demands with a cohesive system. It also helps better coordinate the international supply chain and positively impacts ROI. A central component of integrated logistics is EDI and API connections for broadening communication capabilities across channels [32].

The concept of integrated logistics is to consider logistics as a certain synthetic management tool integrated by material flow to achieve business goals. This concept reflects a new understanding of business, where individual firms, organizations, and systems are viewed as centers of logistics activity, directly or indirectly linked into a single integrated process of managing the main and related flows to meet demand in the most complete and high-quality manner in accordance with their specific needs and business goals [48].

The ideology of integration and interaction of partners in supply chains has determined the emergence and development of new concepts/technologies, including the following:

1. JIT – an inventory management method in which goods are received from suppliers only as they are needed. The main objective of this method is to reduce inventory holding costs and increase inventory turnover.

2. Lean Production – analyzes and removes non-value-added operations in order to enhance the flow of commodities and save expenses. The goals of lean logistics include waste elimination and quality enhancement. Lean logistics allows for the streamlining of logistical procedures across all industries, not simply those of manufacturing firms.

3. Time-based logistics is an approach to supply chain management that focuses on reducing the lead time of products and services, the goal of time-based logistics is to improve customer satisfaction by delivering goods or services on time, within budget, and with minimal disruption.

4. Value added logistics is a combination of logistics and industrial activities. Typical value-added services are Picking, packing, labeling, returns management and shelf service.

5. KANBAN – a system for communicating both production and materials replenishment orders. Kanban is used in production models that respond directly to demand (pull system, whereby manufacture of the product doesn't begin until the production plant receives a firm order from the customer)

6. Material requirements planning (MRP I) – is a strategy by which a manufacturer optimizes the acquisition, storage and deployment of materials needed in its production runs. MRP 1 keeps track of a manufacturer's inventory of incoming raw materials and supplied components.

7. Manufacturing resource planning (MRP II) is a method for the effective planning of all resources of a manufacturing company. Ideally, it addresses operational planning in units, financial planning, and has a simulation capability to answer «what-if» questions and is an extension of closed-loop MRP I.

8. Enterprise resource planning (ERP) is a platform companies use to manage and integrate the essential parts of their businesses. Many ERP software applications are critical to companies because they help them implement resource planning by integrating all the processes needed to run their companies with a single system. An ERP software system can also integrate planning, purchasing inventory, sales, marketing, finance, human resources, and more.

9. Customer synchronized resource planning (CSRP) – includes a complete cycle from designing the future product to customer requirements, to warranty and after sales service. The essence of CSRP is to integrate the buyer into the enterprise management system.

10. Demand-driven techniques (DDT) – a technology-enabled method of rapid production that can introduce massive efficiencies into the production process by delivering enormous speed and flexibility.

11. Effective customer response (ECP) – a strategy to increase the level of services to consumers through close cooperation among retailers, wholesalers, and manufacturers.

12. Vendor Managed Inventory (VMI) – a wholesale inventory management system where inventory is replaced for the buyer or retailer without them having to initiate a purchase order. The buyer or retailer shares their inventory data with a vendor and the vendor determines order size and frequency.

13. Virtual logistics (VL) – the concept of outsourcing specialized logistics operations to a third party, managed under one system.

These basic logistics concepts cover various areas of enterprise logistics, as well as the company's relationships with suppliers and customers. In addition, the concepts of total quality management (TQM) and customer relationship management (CRM) and supplier relationship management (SRM) are used in logistics.

Based on the basic principles of logistics and management processes, the main principles of integrated logistics can be identified as following [6]:

– the principle of a systematic approach;

– the principle of sustainability and adaptability;

– the principle of logistics coordination and optimization;

– the principle of a single information space;

– the principle of integrated quality management;

– the principle of integration efficiency, aimed at studying integration preferences and patterns in logistics systems;

– the principle of modeling and information support;

– the principle of total logistics costs accounting;

– the principle of technological processes humanization;

– the principle of emergence;

– the principle of parity.

Integrated logistics compiles technological improvements, fluid business practices, and procurement advancements at all stages of a product system.

Procurement and material management involve production planning, sourcing, handling, and optimization. It also includes selecting suppliers, monitoring supplier contracts, and planning purchases.

Integrated logistics work towards adopting strategies for decreasing lead times in eCommerce with improved replenishment, storage, and shipping systems. By triggering automatic processes and establishing connections with suppliers, it increases efficiency in sourcing, be it for dropshipping or omnichannel retail.

Integrated logistics has two critical subsets: inventory and warehouses. Integrated logistics work by coordinating inventory data, reviewing storage and logistical budgets, and analyzing sales history for demand. Thereby, inventory can be strategically placed in warehouses closer to demand hotspots and split accordingly among carriers with lowered costs. Similarly, by taking recourse to smart warehouse management systems and tools like inventory scanners, firms can enhance multiple processes. These include order processing, picking methods, loading and unloading, and stock replenishment [23].

Integrated logistics pulls together the strengths of warehouse personnel, sales operations, and order processing. With data on demand forecasting and transport management, firms can distribute SKUs faster in high-demand areas. With efficient order management, integrated logistics can anticipate customer demand and needs.

Integrated logistics optimizes shipping and delivery with speed and accuracy. This is done through workforce digitization, route planning, and real-time collaborations across the supply chain network. It manages numerous endpoints like product handling, payments, delivery scheduling, customs clearance, and reverse logistics. Integrated logistics also makes it possible to implement intermodal and

multimodal freight forwarding. With dynamic routing, multi-carrier integration, and a centralized transport team, integrated logistics advance shipping and delivery.

Integrated logistics promotes systemic planning with control and management phases working together. With process integrations and secure coordination, fault tracing becomes easier. When eCommerce companies incorporate integrated logistics management, they build systems to predict error predictions and detect risk. They can do so in three ways. First, they can identify existing application flaws for immediate correction. Second, they can predict risks. Third, they can visualize contingencies in finances, material acquisition, productivity, and customer satisfaction.

The adoption of integrated logistics owes immensely to technological advances and system integration like ERPs (Enterprise Resource Planning), EDI, WMS, and more. Using technology, integrated logistics established open communication channels, shared databases across departments, and warehouse management.

It is expected that companies will adopt integrated logistics in their businesses to keep pace with changing customer demands and global forces. The benefits of lowered costs, streamlined business operations, and quick escalations with technology make it an ideal supply chain solution [25].

1.3 The specifics of logistics management in engineering companies

The organization of logistics activities is the coordination and optimization in time and space of all its material and labor elements of the logistics process to achieve the company`s goals with minimal resource costs. Logistics and manufacturing are interrelated and have a significant impact on one another. Strategically managing the procurement of raw materials, freight transport and storage of materials, production, and dispatch of finished products, maintaining production and information flows into and throughout the organization, planning and executing standard logistics procedures to meet the requirements of manufacturing

operations as well as consumer demands. All these activities and tasks come under efficient logistics management to achieve sustainable profit levels and cost-effective order fulfillment.

In the process of organizing logistics activities at enterprises, a logistics management structure is formed; logistics functions and operations are distributed among various departments and services of the enterprise or a decision is made to outsource; the sequence and methods of performing logistics operations are determined. A possible variant of the distribution of functions within the enterprise is shown in Table 1.3.

Table 1.3 – Distribution of logistics functions between divisions of the enterprise [42]

№	Department/ Logistics function	Logistics	Marketing	Finances	Production Planning
1	2	3	4	5	6
1	Planning of goods needs	X	X		X
2	Planning of services needs	X	X		
3	Packaging	X	X		X
4	Supply of production with raw materials, materials, components	X			X
5	Replenishment of stocks in the distribution system	X			X
6	Control over production processes	X			X
7	Design and development of warehouse management	X		X	X
8	Financing the purchase of equipment	X		X	
9	Transport management	X		X	
10	Inventory management	X		X	X

The logistics activities of an enterprise take place in the logistics environment and are under its influence. The logistics environment is divided into external and internal, as well as into macro and micro environments. The logistics macro-environment is the external environment of indirect influence (influence factors:

political, economic, legal, technological, socio-cultural, geographical and environmental). The effect of these factors on logistics activities is similar to the effect on any other activity that takes place at the enterprise. The micro-logistics environment of the enterprise consists of the external logistics environment of direct influence and the internal environment. The factors of the external logistics environment of direct influence include: the state of the external logistics infrastructure and the entities participating in the enterprise's logistics network, its territorial location, the structure of distribution chains, the availability of energy resources, and the competitive environment. Factors of the internal logistics environment of the enterprise are determined by its economic performance, the state of internal logistics infrastructure facilities; the level of logistics management of the enterprise, personnel qualifications, technology, organization of logistics activities in the internal links of the logistics network, communication and corporate culture.

Fig. 1.3 shows an example of the distribution of logistics operations of material flow between the divisions of a manufacturing enterprise [24].

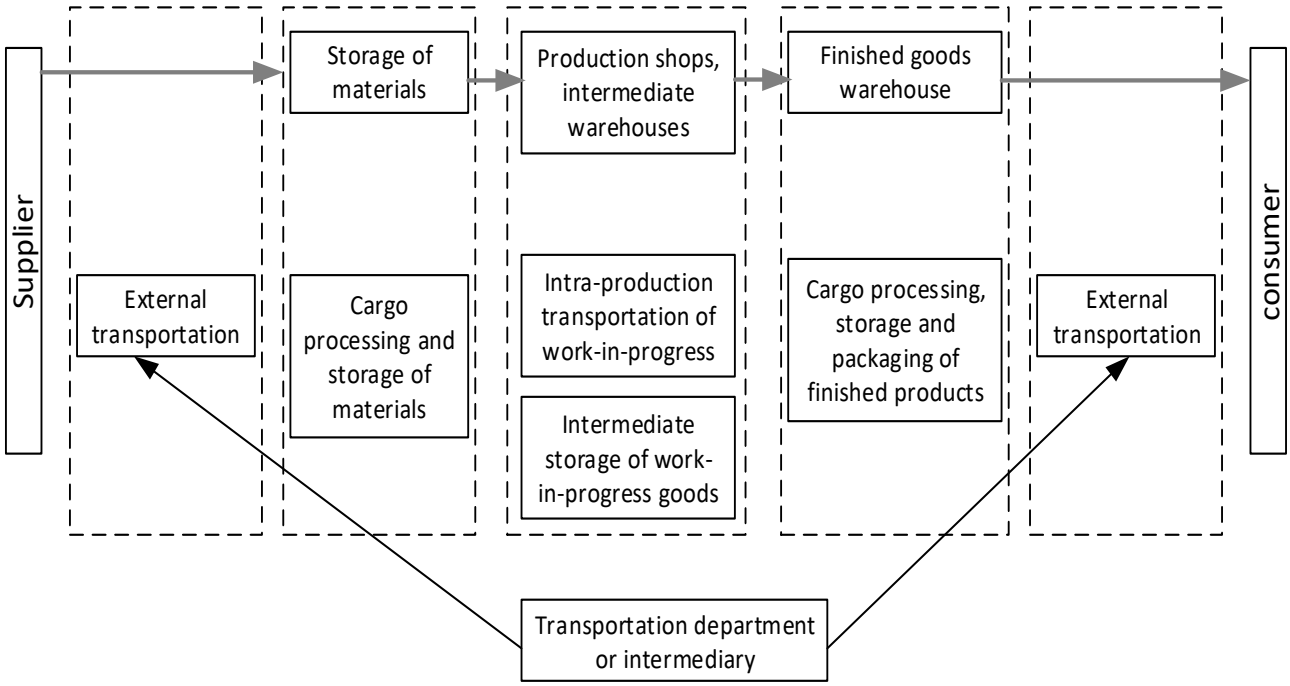

Figure 1.3 – Distribution of logistics operations of material flow between the divisions of a manufacturing enterprise

The role of logistics in a company makes it a strategic lever to better manage its production, to satisfy its customers more and more, and to reduce its costs. By optimizing its logistics function, the company manages to organize each task in order to take care of it more efficiently and to save time. This is made possible by the automation of processes. This is a win-win situation: employees are freed from recurring low value-added tasks and have better tools to work with, while management can control product quality more efficiently and rationalize costs.

By virtue of the fact that logistics in a company is concerned with supplying given products to targeted users, this process is naturally the lever par excellence of customer satisfaction. A quality product, in stock, that arrives in good condition and in the best possible time, is the assurance of satisfying the customer, but also of building loyalty [36]. Optimizing the logistics process in a company helps to make significant savings at all levels: purchasing management (comparing product and raw material prices), inventory management (reducing the invoice by limiting the space needed to store goods), and delivery management (finding distribution solutions at the best price, without cutting back on quality).

Quite often in the companies, there is no structuring, in which certain departments are strictly responsible for performing a narrow range of tasks or even individual processes. Most enterprises do not develop and implement a logistics strategy for the enterprise, which necessitated a comprehensive analysis of the issues under study [26].

Due to the fact that the most important components of the selling price of products sold are transportation costs, warehouse costs, and the cost of logistics services, each enterprise strives to reduce the time of delivery of products to the end user at the lowest cost. An effective system for managing and monitoring the company's logistics and the introduction of modern IT to track the movement of products and goods will minimize logistics costs.

Optimization of logistics business processes is a procedure that will minimize costs and risks, reduce expenses, improve the quality of work and increase the competitiveness of the enterprise. The result of optimizing logistics processes will be:

– acceleration of solving typical problems;

– reduction of production costs;

– increase in the speed of production of products and improvement of their quality;

– optimization of work with clients;

– reduction of employee training costs [29].

To optimize logistics business processes in warehouses, the following tools are used: process modeling; audit; management; reengineering and standardization of warehouse business processes; lean technologies, staff education and training; warehouse dispatching systems (status information); network schedules; process maps (information about modules and technical processes); operational work planning.

Effective organization of the logistics system at the enterprise will allow the manager to avoid the following consequences:

– increase in production costs, decrease in production profitability;

– mismatch of inventory with production needs;

– decrease in the quality of customer service;

– increase of the time period for delivery of goods;

– inefficient organization of material flows [43].

Modern manufacturing systems are increasingly complex and capital-intensive. Besides Industry players diversify their procurement with new approved suppliers from around the world, particularly the emerging countries. They are being led to reengineer logistics processes in order to reduce overall costs while keeping the production line up and running. Overseas sourcing makes it necessary to synchronize multiple vendors in a just-in-time and build-to-order logic. Volatile freight markets, complex customs regulations are additional constraints when designing a lean and reliable supply chain organization.

An engineering firm is a business made up of professional engineers and consultants. These firms often specialize in construction, transportation, and environmental services. They offer consulting and technical services to contractors,

architects, and municipalities. Some engineers may also specialize in other disciplines, including food industry, aerospace, industry, military, and genetics. In general, these specialty engineers work for private companies or government organizations, and not for engineering firms [59].

Engineering firms also help negotiate and evaluate business contracts with vendors and manufacturers. A consulting firm that has worked with and built products for other companies in different sectors and industries already has a reliable and accurate vendor database. This database can act as a great reference and inform critical material costing and design decisions.

The services an engineering company provides can be grouped into these 4 categories:

- consultation and investigation;
- drafting and design;
- construction management;
- forensic engineering and expert witness testimony.

Consultation and investigation involve conducting research, studies, and investigation to collect data to be interpreted and reported. Then to be able to come to a conclusion and recommendation for the client company.

Engineering drafting and design services include the work of specialized draftsmen. This is where the design is detailed in 2D drawings and diagrams before being turned into a 3D model using a computer-assisted design (CAD) program. Similar to engineering disciplines, the drafting and design team can also be segregated into specialized practice areas.

Many engineering companies also provide construction management services for projects. This involves liaising with the construction contractor to answer any questions related to the IFC drawings and plans. This service involves coordination on the final design and specifications. It may also involve assisting the construction contractor with field inspections and governmental requirements for the approval of the design [34].

Some engineering firms also offer forensic engineering and expert witness services. This may include sampling, analysis, tests, and demonstrations to provide an expert report on a particular investigation. If the investigation is tied to a court case, a designated engineer may also provide expert witness testimony in court to back up the finding of the report [57].

Engineering companies in Ukraine usually include the equipment from foreign manufacturers in its projects, so to deliver this equipment to Ukraine there is a need to use some logistics operations for it. The most important ones are order processing, transportation, customs clearance and warehousing. In order to organize all these processes properly, it is necessary to clearly understand the specificity and functions of these operations.

For example, transport logistics in Ukraine occupies an important place in the activities of each enterprise. This is the part of science that focuses on transportation management. Delivery of products to customers can be carried out by personal transport or by transport of a logistics company. In general, transport logistics is a field of activity that is responsible for organizing the delivery of goods when moving it from the place of production to the place of final consumption along the optimal route for the approved time with the lowest cost [41]. That is, it is a well-organized transportation of goods.

The task of transport logistics is to distribute and provide goods at the lowest possible cost in the production process. The goal is to optimize transports in terms of loading, unloading, capacity utilization, handover and identification.

The next important logistics process is customs clearance. Customs clearance is the set of requirements and formalities related to the entry and exit of goods from a particular national territory, to control and approve this movement. It process is based on the declaration of information related to commercial operations to the customs authority.

This procedure applies to all goods imported or exported from Ukraine, regardless of what type of transport (road, rail, sea, air) is used for their delivery. In

order for the products to pass customs clearance correctly and get all the necessary permits, a large range of work is required.

– experience in creating a foreign economic agreement. This is a mandatory condition for customs clearance of goods that determine the terms of interaction between the seller and the buyer;

– prepare the customs declaration, calculate payments, submit documents for registration to the customs system, and monitor the implementation.

Warehouse logistics also plays a crucial role in the operation of engineering company, as there is a need to have some stock of spare parts for the clients, also it is necessary to keep the tools and some additional equipment that can be needed for construction of new projects. Anikin B.A. noted that warehouse logistics has a great value in the contemporary global environment the questions connected with maintenance of processes of trade with necessary material resources have a great meaning, as their effective use have great value [2]. Therefore, the warehouse is an integral part of the entire logistics system, which helps to determine the strategic benefits: service and economic. It is an element of the supply chain, designed for acceptance, placement, storage, assembly and delivery of products and has the necessary material and technical base to perform these functions (buildings, structures, devices, etc.).Main functions and tasks of warehouse logistics are summarized in Table 1.4.

Implementation of the function of temporary storage of inventories means the need for work on the placement of goods for storage, providing the necessary storage conditions, removal of goods from storage [45]. The transformation of material flows occurs by disbanding some cargo batches or cargo units and forming others through the following actions: unpacking cargo, completing new cargo units, their packaging.

Layout design is another important object that should be considered during building the warehouse. It is about the process of distribution of both the external and internal space of the facility drawn on a plan.

Table 1.4 – Tasks and functions of the warehouse

№	Task	Function
1	2	3
1	Storage, reception, accounting and shipment of finished goods	– Acceptance, sorting and assembly of finished products. – Establishing the need for mechanized loaders warehouse space. – Preparation of reports on production volumes
2	Creating conditions to preserve goods that are in temporary storage	– Organization of internal transportation, rational storage, preparation and packaging of goods for shipment. – Ensuring the safety of goods. – Preparation of documents on the state of stocks of products in the warehouse. – Preparation of documents (certificates, acts, letters, information) on damage to goods. – Ensuring the proper level of automation and mechanization of transport and storage movements, the use of computer systems and labor protection conditions
3	Accounting and inventory of goods, which are in temporary storage	– Accounting for goods in the warehouse. – Formation of invoices, cards, descriptions, accounting orders arrival, availability and balances of goods in the warehouse. – Accounting for the execution of unloading orders and shipment of goods. – Generation of reports on loading of warehouse areas

Source: updated from [9]

This is a complex task that greatly impacts the supply chain, which may be motivated by the acquisition of a new warehouse, an expansion or a partial remodeling of the warehouse [55]. The most crucial factors to consider in warehouse layout design are budget consideration, space available, flow, accessibility, equipment.

Example of warehouse layout design is shown in Fig.1.4. Logistics occupies a very special place in a company.

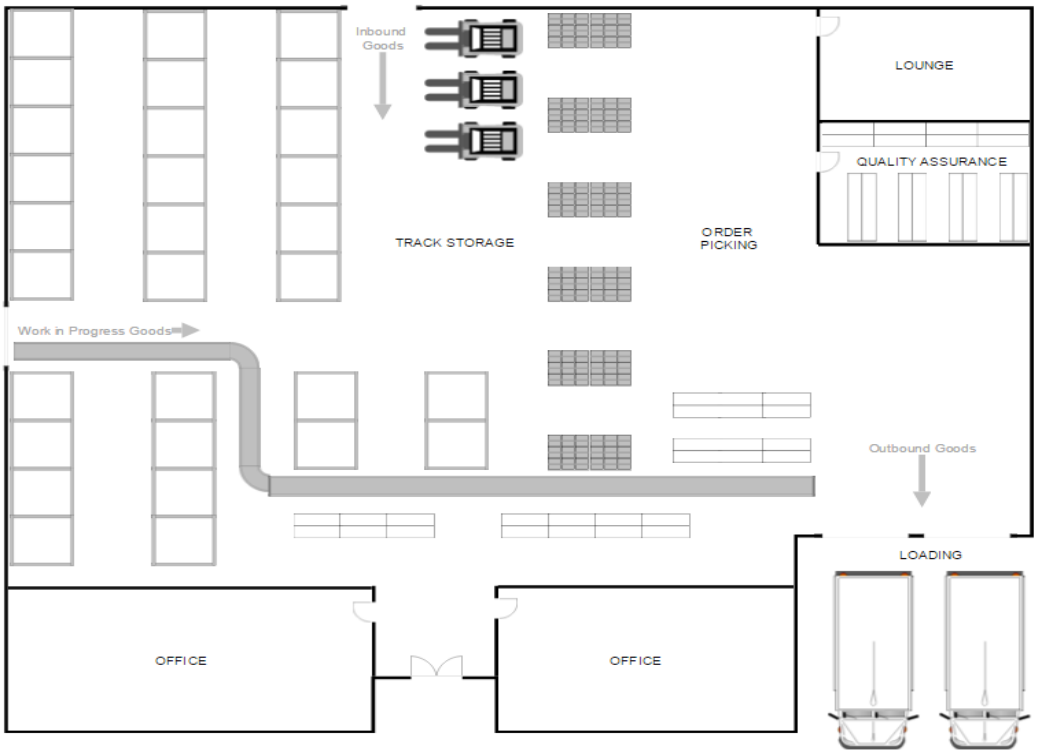

Figure 1.4 – Example of warehouse layout design [39]

Firstly, because it is essential when the organization is based on material flows. Secondly, because it is an integral part of the value chain. Finally, because logistics is also a function, in the sense that it is transversal and concerns all departments.

Chapter 1 summary

Modern realities have led to the strategic focus of logistics. Implementation of the corporate strategy with optimal resource consumption in the management of material and related flows is the strategic vision of logistics [4]. Since logistics is indirectly involved in the creation of value at the enterprise, this fact provides the potential for cost optimization, and therefore for increasing the profitability of all

areas of the enterprise. In a competitive environment, freight forwarders seek to attract customers to more favorable terms of cooperation.

It is obvious that only new principles of organizing management processes can create long-term advantages and ensure a significant gap from competitors [33]. It should be noted that only strategic approaches to management will allow to formulate and effectively implement management decisions in the field of logistics based on the methods of strategic analysis of the environment of enterprises.

The competitiveness of an enterprise depends not only on the level of costs associated with the operation of the enterprise itself, but also on the level of costs of suppliers and distribution channels. Therefore, the practical tasks of resource optimization in logistics systems should be solved with the help of information and computer support within the corporate management system of the company, in the presence of sufficiently powerful modeling tools (for example, SADT methodology, technologies for dynamic modeling of complex objects CASE and CALS) and optimization solutions (for example, within MRP II/ERP systems) in conditions of high dimensionality and high level of uncertainty [11].

Resource optimization can be carried out at different levels of the logistics system hierarchy, for example, within a functional area, subsystem, or a separate logistics function. At the same time, the principle of global optimization must be fulfilled, i.e. local optimization criteria and decisions based on them should not contradict the global optimum of the logistics system as a whole.

Summarizing the above, there can be made the conclusion that the task of the manager is to interconnect the management of transport, warehousing, human resources, information flows, and commercial activities into a single material handling system and to find effective solutions in the field of the company's logistics policy. Optimization of various processes at the enterprise and cost reduction are directly related to logistics, which is the main goal of financial security of any commercial organization.

CHAPTER 2
MARKET RESEARCH OF ENGINEERING SERVICES AND LOGISTICS ACTIVITIES MANAGEMENT IN UKRAINE AND WORLDWIDE

2.1 The role of Ukraine in the world market of engineering services

Engineering is the main consulting service that is used for the creation of enterprises and objects. Engineering is an important method of increasing the efficiency of capital invested in an object. It is considered as a certain form of export of services (transfer of knowledge, technology and experience) from the country of the producer to the country of the customer. Engineering covers a complex of works on conducting preliminary studies, preparation of technical and economic justification, a set of project documents, as well as development of documentation on the organization of production and management, operation of equipment and sale of finished products.

The rapid growth of international operations in trade in engineering and technical services led to the formation and development of the international market of engineering services. Studying the theory and practice of engineering, one can pay attention to the fact that the implementation of the largest number of engineering projects is concentrated in the economically developed countries of Europe, North America and Asia [27].

An engineering firm is a firm that specializes in providing engineering services. These firms have the status of formally independent, they are able not only to provide services simultaneously in several areas, but also to involve various equipment suppliers and various subcontractors in the performance of tasks.

The engineering services outsourcing is the practice of hiring nonphysical engineering functions from a third party, such as prototyping, design, and testing.

These services are required at the beginning of the product development and design process and make use of variety of information technology-based databases and tools. The engineering services outsourcing is used in the communications and networks industries to hire network design services, inventory management, and geographic data analytics.

In today's globalized society, there is a need for engineering services that are constantly improving and diversifying. As a result of these processes, international markets for engineering services are being created. Their relevance is driven, firstly, by the rapid development of scientific and technological progress, which leads to an increase in trade in related types of equipment, secondly, by the growth of investment, which allows engaging in activities that require engineering services, and thirdly, by the availability of free capital placed in the market of engineering services, which, in turn, are in high demand in developing countries. There is also a desire of transnational corporations (TNCs) to expand their business. To do this, they provide engineering services to countries whose markets they want to enter, and subsequently this leads to the supply of equipment, the cost of which is many times higher than the cost of the services that led to their supply [28].

Other trends in the development of international engineering include the fact that small companies predominate among exporters of engineering services, and the services themselves are of a national or regional nature. Europe has the most developed engineering consulting service. The region has all categories of firms providing engineering services of various kinds. The main export destinations for engineering services from the EU countries are the EU countries themselves, the United States, Switzerland, and Japan, i.e., highly developed countries. For developed countries, it is common to perform works and provide services in the form of integrated engineering, i.e. the full range of services and supplies required for the construction of a new facility [17].

Another important feature of engineering activities in economically developed countries is that engineering companies act as general contractors for the modernization and construction of new production facilities. Sometimes, engineering

clusters are created. Management decisions by Western engineering companies are made on the basis of thorough feasibility studies. Such companies employ intellectuals who are able to formulate and implement various creative projects.

The rate of development of engineering service market in the world is shown in Fig. 2.1.

Figure 2.1 – Development level of engineering service market in the world [54]

At a high level, in economically developed countries, engineering companies use modern tools for business intellectualization, including the protection of intellectual property rights, and a set of relevant works is often a mandatory component of an engineering contract. Foreign engineering companies have a strong information base of technology and equipment suppliers, as well as subcontractors and licensors, organize high-level project financing of all necessary engineering works, use effective tools for protecting trade secrets, modern specialized software, form flexible organizational structures for managing engineering projects, quickly

form project teams if necessary, and use constant monitoring of each stage of the project.

Ukraine's integration into the global economic space contributes to the development of engineering activities as the number of international transactions increases, trade in goods and services intensifies, and there is constant interaction in various forms of international economic relations. All this leads to the formation of the engineering services market, which Ukraine is gradually entering.

A market share of Ukraine in the world market of engineering services is low enough, as more than 80% of domestic engineering companies occupy less than 0.5% of the market share. Modern problems of Ukrainian engineering services market include a shortage of qualified personnel, poor performance of works, an outdated regulatory framework, an imperfect system for determining the cost of project works, corruption phenomena at the stage of approval and examination of documentation, a low level of automation of project works and many others [31].

To ensure the further development of engineering consulting activities in Ukraine, the following main organizational and economic measures should be implemented:

– creation of world-class engineering centers of competence, which will make it possible to reduce Ukraine's dependence on foreign experts;

– conducting professional forums of the international level;

– adaptation of know-how to the specific conditions of Ukraine by local engineering companies;

– formation of a professional education system for training specialists in the field of engineering and ensuring free access to professional literature;

– regulation of the legal framework;

– improving the quality of engineering services by involving specialists in certain branches of science and industry.

2.2 General characteristics of the enterprise PE Steiner Ukraine

Steiner Ukraine is a dynamically developing engineering company, a representative of leading European and world manufacturers of production packaging equipment. Mission of Steiner Ukraine is to increase the level of technical equipment of industrial enterprises by introducing advanced technologies. Values of company include variety of technical solutions and readiness to assist and be responsible to customers under any circumstances [63].

The strengths of a company include well-known Steiner brand, history and acquired achievements, numerous plans for the future. In addition, Steiner guarantees the continued existence and prosperity of the company by formulating only clear goals, providing for the creation of a dealer network, controlling the execution of assigned tasks, contributing to the personal development of employees, setting an example of fair and honest business conduct [64].

The main activities of Steiner Ukraine are the following:

– analysis of existing processes;

– improvement of technological processes;

– supply of equipment and components;

– integration of new equipment, modernization of existing production;

– technical consultations and remote support;

– installation and dismantling of equipment, electrical installation works, automation and programming.

The main advantage of the organizational structure of the company is its simplicity. Despite the significant number of processes in the enterprise, the work is organized in such a way that the exchange of information is very fast. The organizational structure of Steiner-Ukraine consists of departments: Department of Packaging Equipment, Department of Technological Equipment, Department of

Pumps and Systems, Service Department, Department of Spare Parts. Fig. 2.2 depicts the departments of Steiner-Ukraine.

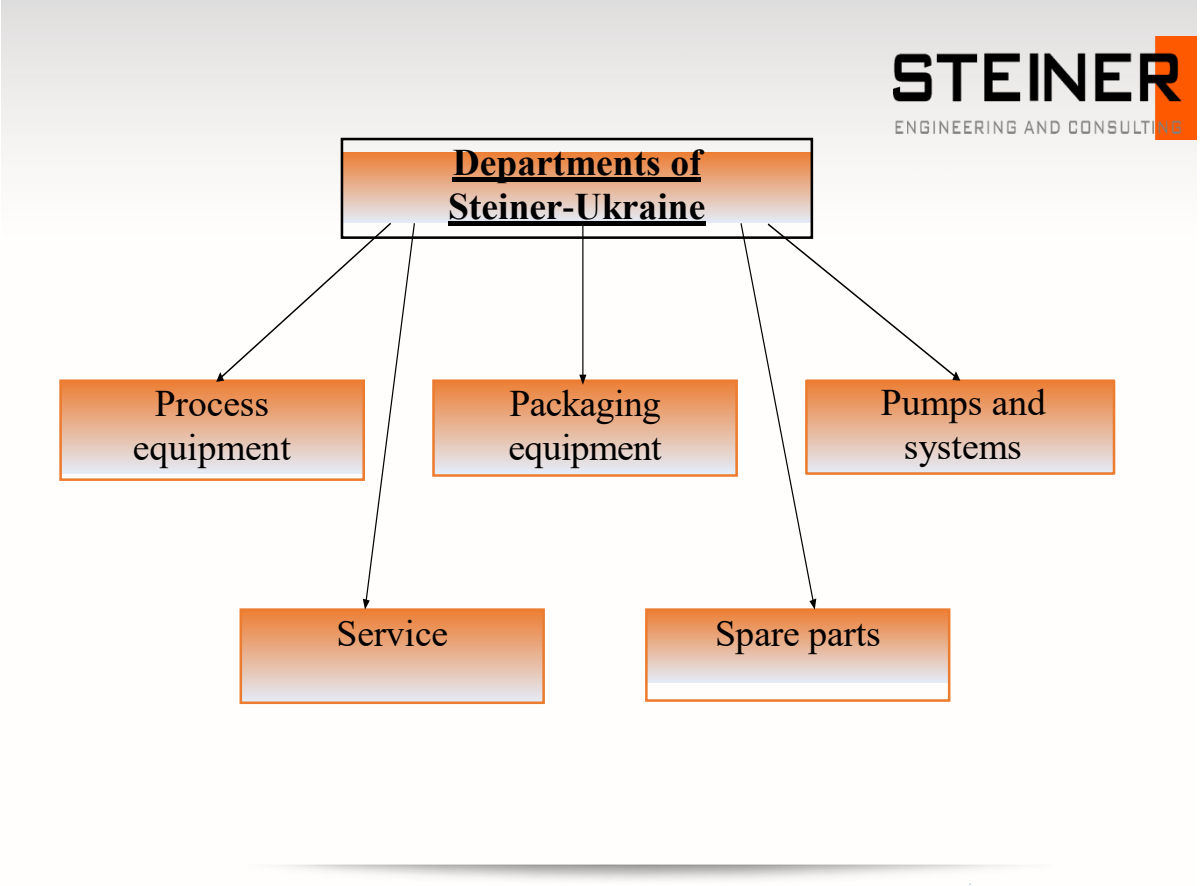

Figure 2.2 – Departmental structure of Steiner-Ukraine

The company provides a full range of services for the sale and maintenance of equipment used for the following industries: food, chemical, pharmaceutical and cosmetics. Also, Steiner has its after-sales department, which provides commissioning and technical support of equipment. Steiner Ukraine can design the plant (including all necessary equipment) on a "turnkey" basis.

The company experiences a specific pattern of seasonality. The majority of clients budgets at the end of the calendar year, so new plant construction projects start in January. While the construction period is from March to October. The demand period for spare parts consumption begins in March-April and ends in September-October. Therefore, the drop in the demand for spare parts falls on August, because businesses are preparing for the end of the season.

Steiner Ukraine provides the loyalty programs for clients through implementing a set of incentives. Using the services of the company the client concludes only one standardized agreement with Steiner without any separate agreement with each equipment supplier (the absence of language barriers is also an advantage). Another benefit obtained by the client is the direct contact with service engineer and the ability to invite engineer to the enterprise for technical inspection (local maintenance).

Steiner understands that engineering and constant development of production equipment simplifies and reduces the process of products' production, automates it as much as possible. Manufacturers of the products, in turn, to function successfully in the market, need to respond in a timely manner to the needs of consumers and update the technological base in accordance with current trends. Thus, environmental analysis was conducting by analyzing competitive, economic, political, legal and regulatory, technological, sociocultural forces.

1. Competitive Forces.

Viravix Group OÜ is an engineering company that provides its services to the food industry in the fields of liquid processing, mixing and dosing of dry ingredients and dust explosion protection. We have knowledge and experience in implementing technological solutions and projects for FMCG companies. Our clients are international companies in the markets of Europe, Eastern Europe and the Middle East. This company is mostly focused on providing solutions for the brewery and for the dairy industry.

S-Engineering is another competitor of Steiner, it has many years of practical experience in the development and implementation of power supply systems and the development of automatic control systems for oil extraction plants, port and linear elevators and other production enterprises of the food industry.

UBC Armaturen is a CIS engineering company that operates in the food and processing industry. It designs and installs equipment and implements new technological processes.

The competitors in supply of pumps in systems is ASKO PUMPS LLC, which offers a full range of pumping equipment that can almost completely satisfy the needs of your production facilities for pumping equipment, spare parts for pumps, filters, valves and mixers, including installation and service. The second competitor is LOGRUS company, which was founded in 2002. From that moment on, its formation and strengthening of its position in the market takes place. Throughout its existence, the company has gone through several milestones in its development.

The structure of the industry affects competitive forces significantly. The substitute product performs the same or similar function as the product in the industry in which the company operates, but in a different way. Sometimes the novelty threatens not the product, but the product of the client, thus it is possible to lose the client and the income from him. The influence of suppliers is also a critical factor, because suppliers can either drive up prices or reduce quality. Customers are also pushing for lower prices and better quality, insisting on additional service, and playing to compete with competitors. Rivalry with direct competitors leads to price wars, discounts, new assortments, advertising campaigns and improved service quality, etc.

2. Economic Forces.

The biggest buying power may be seen in multinational enterprises, such as Monsanto (Buyer Group), Torchyn (Nestle), Coca-Cola, PepsiCo, Lactalis, Carlsberg. Also, there are some companies which tend to enter foreign market and the quality of the equipment is a key element for maintaining quality at the right level, also high-quality equipment lets companies receive FDA certification. Small companies lose their share of the market over time, because they are often not competitive compared to companies with foreign investments. Accordingly, small companies lack budgeting, so companies use domestic or second-hand equipment.

At 2022, for all enterprises, there was the trend of lack of funding for new equipment and updating the material and technical base due to an increase in gas costs. It becomes clear that with the beginning of a war, crisis situation, a pandemic, an increase in gas prices for commercial enterprises consumers are buying less. Lack

of working capital in enterprises, uncontrolled growth of prices for goods and services of raw materials, energy resources, Unfavorable business environment, complicated tax regime are the main economic problems for every Ukrainian industry.

3. Political Forces.

Business perspective on government is that government should favor businesses and incentivize business performance and investment because businesses are the main source of jobs, innovation, and societal economic well-being, and therefore government should support businesses with grants, tax credits, and subsidies. In order to make government relations effective there is a need to:

- represent a client and their interests from a wide variety of sectors;
- provide knowledge in legislative developments;
- offer targeted messaging to reach government bodies and officials;
- conduct direct lobbying on behalf of a client's concerns.

4. Legal and Regulatory Forces.

Steiner Ukraine is highly influenced by legal regulations of customs control, as Steiner supplies products from leading European manufacturers, so there is a need to control all regulations in sphere of customs clearance. Management needs to monitor the situation on the international market. It is necessary to follow the policy of governments of other countries, which includes efforts to protect or expand the national market as a whole or individual industries.

5. Technological Forces.

Steiner is focused in increasing the level of technical equipment of industrial enterprises through the introduction of advanced technologies. Most companies that follow the latest trends in technology are the potential clients for Steiner, because company can offer innovative solutions from the leading European enterprises. Technological innovations can bring new services, so there will be a need to learn in the proper provision of these services in order to be competitive in the market and meet the needs of customers.

Also, with emergence of 3D printing some equipment or some separate spare parts can be printed, so every client will get its printer and drawings of spare parts, so there can be a decrease in supply of spare parts, but this technology can only be considered in the long term perspective.

Technology has transformed marketing by making campaigns more personalized and immersive for people and creating ecosystems that are more integrated and targeted for marketers. New products and services are possible because of new technologies. Companies also use new technologies to do business differently and more effectively. As Steiner Ukraine is focused on bringing different technological innovations to producers which operate in food and non-food markets, any technological innovations cannot interfere the activities of Steiner.

6. Sociocultural Forces.

Demographic change can influence the underlying growth rate of the economy, structural productivity growth, living standards, savings rates, consumption, and investment; it can influence the long-run unemployment rate and equilibrium interest rate, housing market trends, and the demand for financial assets. Public trust in engineering requires that the profession considers its impacts on human safety. There is widespread consensus in the codes of ethics of engineering professional societies worldwide that engineering has a primary duty to protect public safety, health, and welfare.

Supply of qualified equipment, technical support greatly influences the quality of the end product, so customers` attitude to the industry where Steiner operates and to Steiner in particular is very good, because clients understand that it has a direct impact on the products they use. Reduction of the working population, lack of theoretical basis for training and retraining, outflow of highly qualified personnel, lack of personnel in engineering specialties as a consequence of their low prestige directly influence the operational activity of the company, because unavailability of qualified personnel can intervene in the cooperation between company and clients, also there may arise some misunderstandings with engineers of enterprises, which are clients of Steiner.

In accordance with environmental analysis it is possible to make SWOT analysis which is used to evaluate a company's competitive position and to develop strategic planning. SWOT analysis assesses internal and external factors, as well as current and future potential. SWOT analysis is designed to facilitate a realistic, fact-based, data-driven look at the strengths and weaknesses of an organization, initiatives, or within its industry.

Strengths:

1. Well-established reputation achieved through partnership with European manufacturers. Steiner strives to be the best out of the best in the eyes of partners by providing all necessary certificates of quality gives the company itself a good position on the market. Also this provides more trust for customers.

2. Highly skilled workforce through successful training and learning programs – Steiner is investing huge resources in training and development of its employees resulting in a workforce that is not only highly skilled but also motivated to achieve more. Well-trained employees provide better services to the customers, it increases customer satisfaction, and highly qualified workers directly influence on the success of the company.

3. Wide assortment of services – Steiner provides such services as selection and delivery of process and packaging equipment, pumps, spare parts, after-sales service, also company is able to make turnkey projects, thus client does not need to look for supplier of every separate equipment, customer can just contact Steiner and Steiner team will do everything itself.

4. Spare parts warehouse that can reduce the time of delivery for the clients, also it may shorten the total delivery costs, as delivery to Steiner warehouse will be in big batches. It is necessary to find appropriate building for the warehouse, calculate the forecasted demand in order to order the right amount of spare parts or some small equipment, new employees should be hired for new warehouse facility.

Weaknesses:

1. Underdeveloped product demand forecasting – Steiner provides insufficient product demand forecasting that leads to higher rate of missed opportunities which

compared to its competitors. In addition it has a negative impact on the reputation and unsatisfied customer demand.

2. Insufficient level of internal communication between departments which significantly slows down the resolution of many issues, distracts employees] empowerment, provokes conflicts of interests between the departments. Good internal communication is very important, as it allows to establish role interactions and distribute the responsibility of employees.

3. High rate of employees turnover in work force in comparison with other engineering and consulting companies which unfavorably influences the reputation and profitability of the company, slows down the process of closing a deal, worsens communication with the client.

Opportunities:

1. Entering the market of CIS, Baltic countries which significantly expand the market and increases the demand. its services among other countries, provide more companies with Steiner services. Steiner can reduce risk by diversifying the business.

2. Simplified customs clearance structure can effect on possibility to make a customs clearance of goods around the clock; reduction of clearance time and clearance costs; payment of customs debt at the moment of lodgment of supplement customs declaration

3. New advanced technologies – new technology provides an opportunity for Steiner to practice differentiated pricing strategy in the new market. It will enable the firm to maintain its loyal customers with great service and lure new customers through other value oriented propositions. Company should spend more money on R&D, provide appropriate investments in the sphere of new technologies, as it may increase productivity, shorten some costs, increase customer satisfaction.

Threats:

1. Currency fluctuations – as company pays to the manufacturers mostly in USD or EUR and receives money from clients in UAH, currency fluctuations are very risky for the company, as Steiner may lose its profit on it. Also, currency

fluctuations influence on the final price for customer, what is undesirable for client.It is necessary to diversify globally and invest in countries with strong currencies.

2. Shutdown of supply chains can stop all logistics processes, thus Steiner cannot make the delivery of spare parts or pumps to the client at the right time, it entails penalties for non-compliance with the deadlines in accordance with the Contract. It is necessary to conduct end-to-end supply chain risk assessments and prioritize critical focus areas, develop a robust risk management process and diversify supplier network, implement digital and automated manufacturing capabilities paired with strong manufacturing excellence.

3. Entrance of new competitors on the market – new entrants brings innovation, new ways of doing things and put pressure on Steiner through lower pricing strategy, reducing costs, and providing new value propositions to the customers. Company should innovate its products and services, try to build economy of scale so that it can lower the fixed cost per unit, spend more money on research and development to prevent the entrance of new competitors from limiting the capabilities of the organization.

The company's strengths can be matched to its opportunities to create capabilities. For example, own warehouse can help the company to provide faster delivery to the client, which can increase customer satisfaction and convert this opportunity into strength; entering a new market can be extremely rewarding and can allow business to move to the next level and achieve new growth; new technologies can bring easier, faster and more effective communication, better, more efficient manufacturing techniques, less wastage.

Steiner may convert its weaknesses into strengths by ensuring proper demand forecasting in order to optimize the supply chain, thus convert the weakness into strength. Proper communication between departments may lead to provision of accurate information or guidance, which helps avoid misunderstandings. In order to make the attrition rate lower it is necessary provide motivation system for employees and provide proper relationships between employees, thus it will lead to the success of the company on the whole.

In order to convert Steiner's threats to opportunities there is a need to perceive competitors as an incentive to be more creative, and as information that there are unmet needs in the market that Steiner will gladly satisfy. The company should diversify their markets in a global scope which can bring new opportunities for the company.

Target market and needs analysis are also important in order to have a broader impression of the company's activities. Steiner works in B2B (business to business) segment and identifies its target market according to such indicators as field of company`s activity, clients' turnover, revenue from the clients.

Industry, field of activity – Steiner works with companies from both food and non-food markets. More detailed information about industries where Steiner operates is shown in Table 2.1.

Table 2.1 – Industries served by Steiner Ukraine

№	Food industry		Non-food industry	
1	2		3	
1	Meat production	145	Agrarian industry	13
2	Non-alcohol drinks manufacturers	127	Building industry	21
3	Milk industry	92	Explosives production	7
4	Bulk products	82	Mining industry	32
5	Oil industry	70	Painting production	27
6	Confectionary industry	56	Petro-chemical industry	12
7	Alcohol manufacturers	53	Cosmetics production	15
8	Canning industry	48	Household chemicals	46
9	Fruit processing	26	Pharmaceutical industry	11
10	Fish industry	22	Paper industry	30
11	snack production	18		
12	Sugar production	18		
13	Semi-finished food production	10		
14	Pet food production	6		
15	Ready meals	5		

Graphical representation of the information above regarding food production industries is shown in Fig. 2.3.

The share of industries in non-food production is presented in Fig. 2.4.

Steiner continues to expand its services to other companies, which are operated in the industries which are specified in Table 2.1 and to other industries.

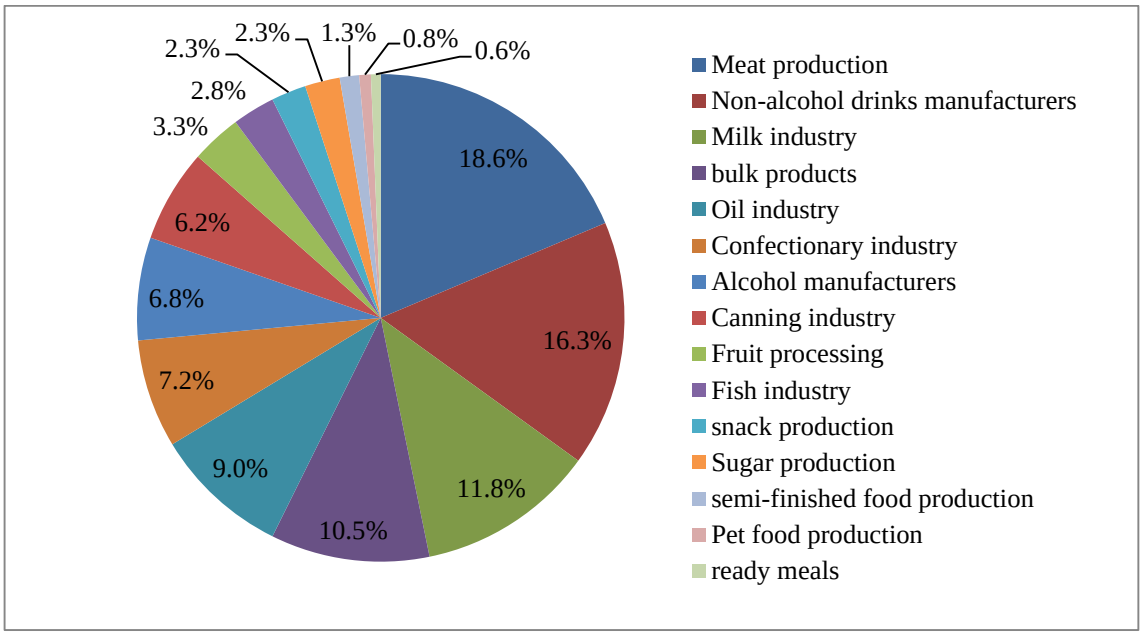

Figure 2.3 – Share of industries in food production

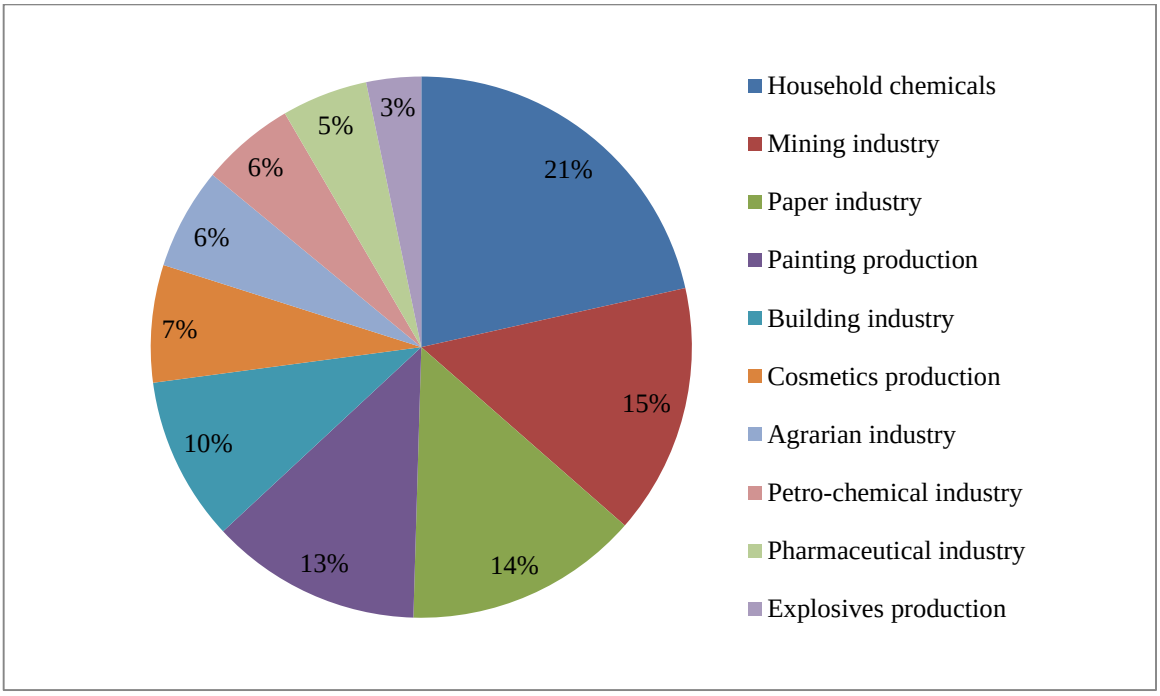

Figure 2.4 – Share of industries in non-food production

Turnover – Steiner provides services and equipment from leading European and world manufacturers, the quality of their products is high enough, so the price of this equipment corresponds to it. It is important to understand that only companies with a certain level of income or investment can allow such equipment. So mostly Steiner focuses on multinational companies (Nestle, Procter&Gamble, Unilever, Danone, IDS Borjomi, Coca-Cola, PepsiCo, Lactalis) and big national manufacturers (MHP, Inagro, Kormotech, Obolon). Less amount of attention is focused on small national manufacturers, which provide their products all over Ukraine and abroad, the least amount of attention is for small manufacturers, which distribute their products only in one-two regions.

Revenue from the clients – Steiner team always try to find out the consumer potential in order to understand future needs and approximately what types and types of equipment the client focuses on. Steiner divides the existing clients according to ABC analysis, which is based on the Pareto principle. That is, 20% of the entire range of goods gives all 80% of the company's income. Conversely, 80% of products provide only 20% of the company's revenue. Table 2.2 shows the division of clients according to the revenue they bring to company.

Table 2.2 – ABC-analysis of clients

№	ABC	Number of clients	Number of clients(%)	Revenue from clients(%)
1	2	3	4	5
1	A	203	21%	75%
2	B	327	33%	18%
3	C	462	46%	7%

There is a constant need for the supply of spare parts for equipment, as repairs or upgrades of equipment take place quite often compared to equipment upgrades. Some companies annually update equipment, order new technological, packaging lines, bottling lines, there are new companies on the market which focuses on high

quality equipment in order to provide quality product. Many companies are interested in equipment maintenance and commissioning, as modern equipment requires professional maintenance.

In order to meet the current needs of the market Steiner has Spare parts department that is responsible for order of spare parts from foreign manufacturers and supply of spare parts to the customer, there is also a small warehouse of spare parts in which clients have urgent needs sometimes. About 4-6 companies annually update equipment, order new technological, packaging, bottling lines from Steiner. Steiner has service engineers, they had special trainings on the plants of manufacturers of equipment, so they understand all the subtleties of this equipment and how to properly set up their work.

There are a lot of competitors in the same sphere where Steiner operates. In Ukraine most companies are focused only on one service, like only supply of spare parts or pumps. Some competitors are focused to work only in one industry, like providing equipment and spare parts only for meat industry. Most companies do not have local maintenance, so for repair of the equipment clients should invite engineers from Europe, that is costly enough.

Industry where Steiner operates is very fast-moving and dependent on innovative solutions, so the needs of target market can change in accordance with global changes. With the introduction of martial law in Ukraine, one can notice a trend of increasing demand for equipment for the canning industry, as enterprises have felt the acute need of end customers for finished products that have a long shelf life. There was also a demand for equipment for the meat and dairy industry, as the markets for raw materials were closed to some countries, so it is necessary to process raw materials and prepare the product in Ukraine, then distribute it to the territory of Ukraine or to European countries. Most companies are now focusing on supplying the finished product abroad, rather than raw materials, as they understand that this can bring large revenues, so demand is expected for turnkey projects for certain plants.

2.3 Analysis of the economic and financial state of the enterprise`s activity

To conduct analysis of the economic and financial state of the enterprise`s activity, the following groups of indicators are used:

– analysis of logistics assets;

– liquidity of the company;

– financial stability of the company;

– business activity of the company;

– profitability of the company.

The first group of indicators is the analysis of logistics assets that make up the elements of the logistics infrastructure. Table 2.3 represents the logistics assets analysis of Steiner.

Table 2.3 – Analysis of the logistics assets of the company

№	Indicators	2022	2021	2020	Dynamics (absolute deviation)	
					2022/2021	2021/2020
1	2	3	4	5	6	7
1	Share of intangible assets in the structure of non-current assets	71,386	59,470	51,237	11,916	8,234
2	Share of tangible assets in the structure of non-current assets	28,614	40,530	48,763	-11,916	-8,234
3	Investments in logistics infrastructure	40,290	100,088	6,873	-59,798	93,215
4	Fixed assets turnover ratio	72,023	66,537	43,171	5,486	23,366
5	Depreciation trend	0,035	0,051	-1,801	-0,016	1,851
6	Return on assets	7,5%	51,1%	2,4%	-43,6%	48,7%

According to the calculations, it is possible to identify increasing in the share of intangible assets in the structure of non-current assets of a logistics company. Share of intangible assets in the structure of non-current assets of a logistics company

has increased in 2022 compared to 2021 by 11,92%, in 2021 there was an increase on 8.23% compared to 2020. It could be a result of changes in the business model of the company. The main thing is that this asset structure is effectively used and generates enough profit. Therefore, it is always necessary to analyze the structure of assets and return on assets.

Decreasing investment in logistics infrastructure in 2022 is a negative trend, it may be caused by war in Ukraine. However in 2021 there was increase in logistics infrastructure investments, as efficient business processes performance requires tangible and intangible resources that are needed to be renovated, modernized, and added to new assets.

The fixed asset turnover ratio is a metric that measures how effectively a company generates sales using its fixed assets. The recommended value of this indicator, the higher the better, therefore, there is constant increase during last 3 years, which is a positive trend. Based on data in the table, an increase in the depreciation growth rate indicates more intensive use of the company's assets, and if a logistics company does not increase investments in logistics infrastructure, then in the future it will lead to a decrease in the efficiency of their use.

Liquidity ratio analysis is the use of several ratios to determine the ability of an organization to pay its bills in a timely manner. Liquidity analysis of Steiner Ukraine is shown in Table 2.4.

Table 2.4 – Analysis of liquidity of the company

№	Indicators	Recommended value of coefficient	2022	2021	2020	Dynamics (absolute deviation)	
						2022/2021	2021/2020
1	2	3	4	5	6	7	8
1	Absolute liquidity ratio	>0,1	0,109	0,113	0,071	-0,003	0,042
2	Quick ratio	>0,7	0,630	1,278	0,252	-0,648	1,027
3	Working capital ratio	>2	1,342	1,681	0,904	-0,339	0,777

Absolute liquidity ratio is more than a norm in 2021 and 2022, which is a positive trend. There was a decrease in absolute liquidity ratio by 0,042 in 2020. Quick ratio is less than a norm in 2022 and in 2020, in 2021 there was a significant increase by 1.027 in comparison with 2020. Working capital ratio is less than a norm, but the trend tends to reach this value in 3-5 years, as in 2021 there is increase on 0,7 compared to 2020, in 2022 there is a slight decrease, but it is not so low as was in 2020.

Stability analysis investigates how much debt can be supported by the company and whether debt and equity are balanced. If the company is financially stable, it has a number of advantages over other companies of the same profile to obtain loans, attract investment, in the selection of contractors and in the selection of qualified personnel. The higher the financial stability of the company, the greater it is regardless of changes in market conditions and, consequently, the lower the risk of bankruptcy. Table 2.5 represents the analysis of financial stability of Steiner Ukraine.

Table 2.5 – Analysis of financial stability of the company

№	Indicators	Limits	2022	2021	2020	Dynamics (absolute deviation)	
						2022/2021	2021/2020
1	2	3	4	5	6	7	8
1	Equity ratio	<0,5	0,280	0,460	0,029	-0,179	0,431
2	Equity multiplier	1,67-2,5	3,565	2,175	34,962	1,390	-32,786
3	Debt to Equity Ratio	<1.0	2,565	1,175	35,962	1,390	-34,786
4	Debt ratio	0,5-0,7	0,720	0,540	1,029	0,179	-0,488

Bottlenecks are equity multiplier (bigger than a norm), debt ratio (bigger than a norm). In order to make these indicators better it is necessary to decrease total debt and make the equity higher.

Table 2.6 shows the analysis of business activity of the company. Business activity analysis is the act of identifying all regular processes in an organization and determining what changes need to be made to increase its value.

Receivable turnover ratio measures the efficiency with which a company is able to collect on its receivables or the credit it extends to customers. The deviation between 2022 and 2021 is 2.868 with a negative dynamic.

Days sales outstanding is the average number of days it takes a company to receive payment for a sale. In case of Steiner Ukraine it is growing up to 70 days that is higher than in 2021 by 25 days.

Table 2.6 – Analysis of business activity of the company

№	Indicators	2022	2021	2020	Dynamics (absolute deviation)	
					2022/2021	2021/2020
1	2	3	4	5	6	7
1	Receivable turnover ratio	5,099	7,967	14,049	-2,868	-6,082
2	Days Sales Outstanding	70,599	45,187	25,625	25,412	19,561
3	Accounts Payable Turnover Ratio	6,761	12,675	10,649	-5,914	2,026
4	Days Payable Outstanding	53,250	28,403	33,805	24,847	-5,403
5	Operating Cycle	70,599	45,187	25,625	25,412	19,561
6	Cash Conversion Cycle	17,349	16,784	-8,180	0,565	24,964
7	Inventory turnover ratio	27,763	45,735	16,374	-17,972	29,361
8	Days Inventory Outstanding	12,967	7,871	21,986	5,095	-14,114
9	Total Asset Turnover	1,901	4,976	2,563	-3,075	2,413

Accounts Payable Turnover Ratio indicates to creditors the short-term liquidity. A high ratio indicates prompt payment is being made to suppliers for purchases on credit. In 2022 it is lower than in 2021 by 5,9.

Days payable outstanding is a financial ratio that indicates the average time (in days) that a company takes to pay its bills and invoices to its trade creditors, which may include suppliers, vendors, or financiers. In general, high values are looked at favorably; it indicates that the firm is able to use cash to other uses for an extended period of time. In 2022 this indicator increased on 25 days compared to 2021, in 2021 this value was decreased by 5 days compared to 2020.

The asset turnover ratio measures the value of a company's sales or revenues relative to the value of its assets. The higher the asset turnover ratio, the more efficient a company is at generating revenue from its assets.

Profitability ratios are used to measure and evaluate a company's ability to generate income (profit) relative to revenue, balance sheet assets, operating costs, and shareholders' equity during a specific period of time. Analysis of profitability of Steiner Ukraine is presented in Table 2.7 and Fig. 2.5.

Return on Sales is a ratio used to evaluate a company's operational efficiency. This measure provides insight into how much profit is being produced per dollar of sales. The indicator increased in 2021 identifying positive trend, while in 2022 there was slight decrease.

Table 2.7 – Analysis of profitability of the company

№	Indicators	2022	2021	2020	Dynamics (absolute deviation)	
					2022/2021	2021/2020
1	2	3	4	5	6	7
1	Return on Sales (ROS)	0,039	0,103	0,009	-0,063	0,093
2	Return on Equity (ROE)	0,267	1,111	0,823	-0,844	0,289
3	EBITDA Margin	0,368	0,302	0,237	0,066	0,065

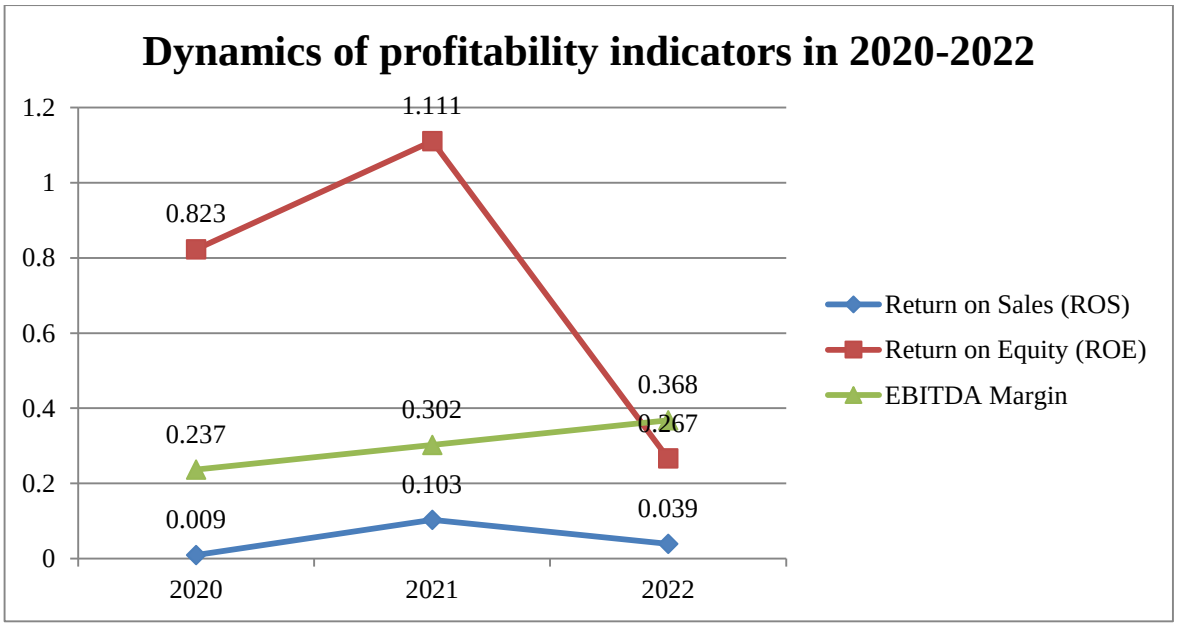

Figure 2.5 – Dynamics of profitability indicators of the company

Return on Equity-essentially measures the rate of return that the owners of common stock of a company receive on their shareholdings. In 2021 ROE has bigger value than in 2020, but in 2022 there is again decrease in this value.

EBITDA Margin measures a company's operating profit as a percentage of its revenue, revealing how much operating cash is generated for each dollar of revenue earned. There is a positive trend through 2020-2022, as this margin increased each year.

2.4 Comprehensive analysis of the organization of logistics business processes

In Steiner Ukraine the crucial role in process management plays transport logistics, customs logistics, warehouse logistics and logistics service. In order to understand the operating process of Steiner Ukraine there is a need to consider the process or customer's order fulfillment.

Logistics service may be divided into 3 categories: pre-sale service, services during sale, after-sales services

In order to have good pre-sale service it is needed to make forecast of its further sales in order to make right distribution of goods into the stores where the products of Steiner are presented.

Steiner provides advertising information and documentation to the potential consumers:

– customer magazine;

– product catalogues, brochures and flyers.

Services during sale include: order processing, packaging of the order, labeling, transportation to the distribution point and then transportation to the final customer if it is needed.

After-sales services: Specialists of Steiner designed special programs and made videos, which help engineers to install the equipment or spare parts correctly.

The whole business process of getting and execution the order has the following structure:

1. Planning of orders. Steiner has its own Spare parts Department, usually customer wants spare parts urgently as there is a damage in equipment and during this time production is idle and loses profit. Not all enterprises buy spare parts for their warehouse, many buy when needed, so requests for spare parts are very urgent and unpredictable.

2. Transfer of the order. Steiner receives orders from customers and sends it to the supplier of equipment of spare parts. Supplier may resend this order to the manufacturing company if spare parts are not in supplier's stock, then the manufacturer or supplier sends spare parts or equipment to Steiner Ukraine and Steiner Ukraine sends the order to the client.

3. Order processing consist of:

– checking the order information for completeness and accuracy;

– put the order into service system;

– order fulfillment;

– transfer of the order to the customer;

Steiner cares about its customers. As the company has new software that minimizes errors when processing orders. All goods are checked and well packed before shipment to avoid damage during transportation to customers.

4. Performance of the order. This is the main stage of the process of executing client order. Since Steiner cooperates with manufacturers, the quality of this stage will depend on their work too. Steiner does not work with unreliable companies so as not to have problems with performance of the order.

5. Delivery of the order. Steiner usually offers Nova Poshta courier delivery, as it is convenient and fast enough.

Some bottlenecks may appear during the process. During the checking of completeness and accuracy of information there may arise some problems if the

given information is not full, so it will be needed to disturb the client once more and distinguish the necessary points, but the manager should learn all the details at once.

The another bottleneck is availability of products, as sometimes client's order is urgent, he expects the quick response and quick order fulfillment, otherwise he may come to another producer.

Order fulfillment is the another bottleneck, it may not even depend on the producer, there may be some problems with suppliers or transportation of raw material, which makes all the process longer.

The another bottleneck may appear during the checking the quality and quantity of the goods, as the supplier may send incorrect number of spare parts or the broken spare parts. Then there is a need to contact with the supplier and agree all necessary nuances. The supplier should prepare the spare parts for shipment. But, at the time, the time for waiting the order becomes longer for the client. Thus client may become dissatisfied with the company service.

As Steiner Ukraine cooperates with foreign equipment manufacturers, the supply of spare parts to equipment is not a short process, since international transportation and customs clearance are required, so this may take longer than the client expects. Steiner does not have its own transport, so it outsources and cooperates with logistics companies. If it is necessary to transport big equipment, usually company hires separate machine for such transportation, if there are only some pallets, Steiner has a contract with Nova Poshta Global and DHL to transport such cargo.

Steiner has its own warehouse in order to respond quickly and efficiently to needs of consumers and achieve the following purposes:

– increase of the storage space;

– reduction of order cycle time;

– protection of production and consumers from various unforeseen circumstances;

– consolidation of consignments;

– formation of the level of logistics service.

The function of a spare parts warehouse is to stock all critical inventory parts, materials, and tools necessary to maintain and keep a manufacturing line up and operational. The warehouse is closed, non-mechanized, unheated and accessible via a motorway. Storage technologies: warehouse is non-mechanized, all the work is done manually, sometimes a minimum amount of equipment is used, such as hand trucks. One of the important characteristics of the warehouse is a well-developed infrastructure, since most of the costs are for transportation, so the Steiner warehouse is accessible via motorways. The features of the site: the spare parts warehouse has a lot of racks, as the assortment of goods stored is large enough. From a product/SKU storage perspective, the size of the spare parts range from large assemblies and subassemblies down to the smallest bolts, nuts, and washers. The inventory includes multiple levels of bill of material and have parts, materials, and tools which are used across multiple pieces of machinery on the production line. Necessary engineering communications and the method of their laying are sewerage, heating, ventilation, fire safety equipment. Relationship between inventory and consumption of spare parts is shown on Fig. 2.6.

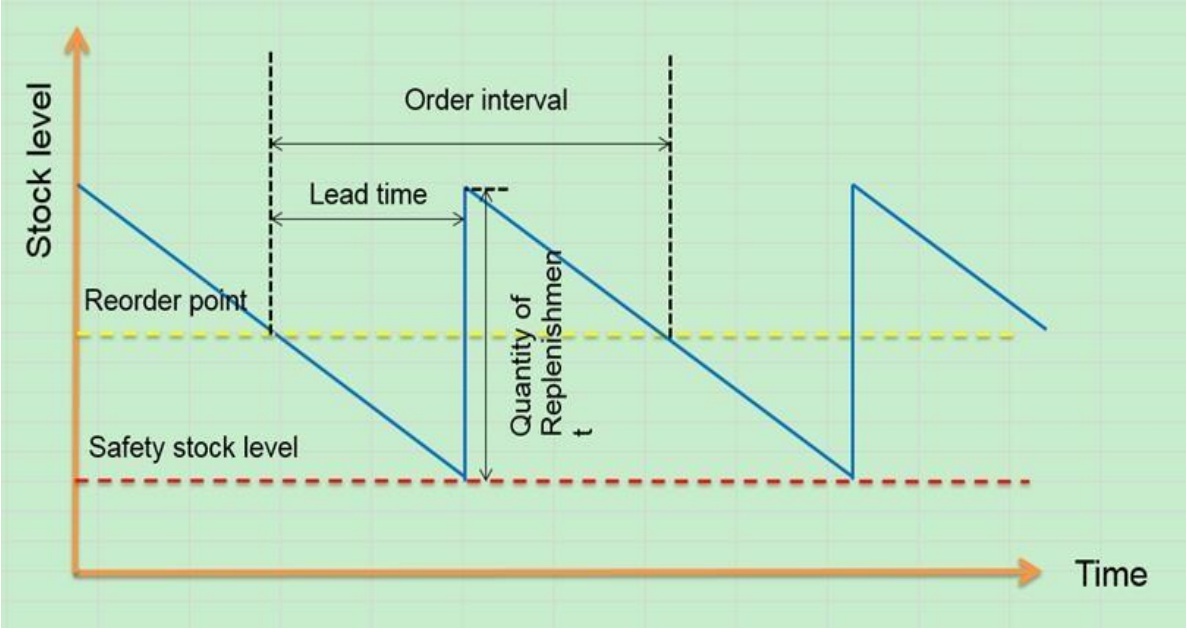

Figure 2.6 – Relationship between inventory and consumption [35]

The figure visualizes the relationship between the inventory level and the consumption rate and helps to identify the reorder points based on the inventory level.

Warehouse of Steiner Ukraine has the following areas: unloading/loading area, reception area, storage area, order picking area, dispatch area. Existing warehouse has combined receipt/shipment area. Sometimes it can cause some problems, as the unloading/receiving works and the shipment work are carried out at the same time, thus time delays may occur. Repackaging area is absent in the warehouse, it creates inconveniences, because spare parts come in batches, while then they are sold in pieces, so before transferring the goods to storage area the spare parts should be repacked and it will shorten the time of order picking. Storage area does not have enough space for storing all necessary spare parts, so space requirements should be recalculated according to the quantity and cubic volume of goods that will be stored when combining facilities. As warehouse is non-mechanized, technical zone is required for storing of manually controlled devices: these include traditional forklifts, order pickers and pallet trucks. Fig. 2.7 represents the layout of existing warehouse zoning.

The layout should be designed in a way that makes it easy for personnel to navigate throughout the facility while conveniently locating and picking items without having to move other products.

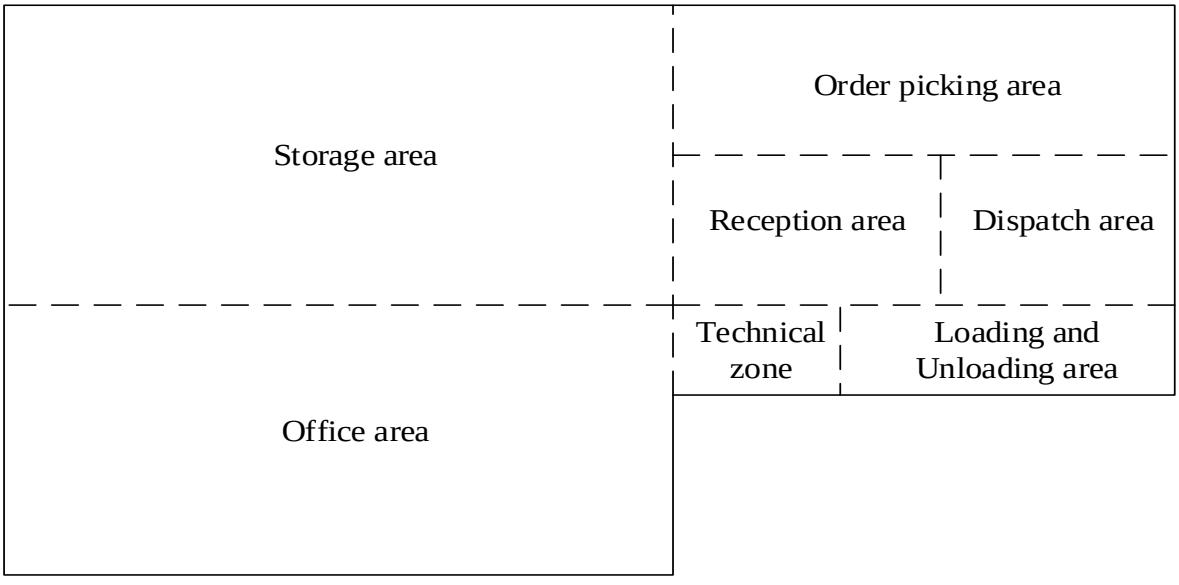

Figure 2.7 – Layout of warehouse areas

The planned layout can help streamline operations, boost productivity, and reduce expenses. Effectively utilizing the warehouse space available can help improve inventory visibility, reduce travel time, and increase overall operational efficiency. When designing the warehouse layout, it is crucial to allocate maximum space to storage and inventory processing purposes while minimizing space for office areas, empty pallets, charging stations, etc.

Chapter 2 summary

Steiner-Ukraine is an engineering company that operates on the territory of Ukraine for more than 15 years. Steiner-Ukraine is engaged in the supply of spare parts for technological, pumping equipment and packaging equipment both food and non-food enterprises. This company works directly with equipment and spare parts manufacturers for such well-known brands as Coca-Cola, Danone, Veres, Kormotech. Steiner-Ukraine provides a full range of services for the sale and maintenance of equipment, commissioning and technical support of equipment, design of the plant on a "turnkey" basis. The most profitable marketing season usually lasts from April to October. The main benefits for the clients provided by the company are single contract with representative of manufacturers, service-engineer, transactions in national currency.

Financial analysis showed that in 2022 almost all indicators have negative trend compared to 2021, as in 2022 war and pandemic situation greatly influenced Steiner Ukraine company in particular.

In Steiner Ukraine the crucial role in process management plays transport logistics, customs logistics, warehouse logistics and logistics service. Steiner Ukraine

usually uses outsourcing logistics companies for the transportation and shipment of the cargo. Steiner has its own spare parts warehouse in order to respond quickly and efficiently to urgent needs of consumers.

The main problem of the company is the poor performance of the spare parts warehouse, which affects the increase in delivery times and the increase in logistics costs. Other weaknesses of the company include underdeveloped product demand that leads to higher rate of missed opportunities compared to the companies which work in the same sphere, insufficient level of internal communication between departments which significantly slows down the resolution of many issues, high rate of employees turnover which unfavorably influences the reputation and profitability of the company, slows down the process of closing a deal, worsens communication with the client.

CHAPTER 3
DEVELOPMENT OF PROPOSALS FOR THE FORMATION OF INTEGRATED LOGISTICS ACTIVITIES MANAGEMENT FOR THE ENGINEERING COMPANY

3.1 The model of formation of integrated logistics activities management for the engineering company

The integrated logistics management system should be based, in up-to-dates companies, on the process management principles applied across particular enterprise functional fields. The design or the application of the integrated logistics management system should be realized continuously together with the actualization or the implementation of the enterprise information system. The enterprise management system should have, in context of the enterprise management systems integration across the supply chains, a module for collaborative planning, forecasting and replenishment – as a foundation for other management modules.

The integrated logistics management system of an industrial company should be formed by the sub-systems of the planning, management and control, the particular functional areas. Those functional levels, namely purchasing, manufacturing, distribution and reverse material flows, are crosscut by the material flows.

Proposed model of formation of integrated logistics activities management for the engineering company is presented in Fig. 3.1.

This model includes the architectural structure of an integrated logistics management system in an engineering company, which ensures correct management of warehouse, transport and procurement of materials. The use of the proposed model will contribute to the improvement of customer service, as well as increasing their involvement with the help of integrated logistics management.

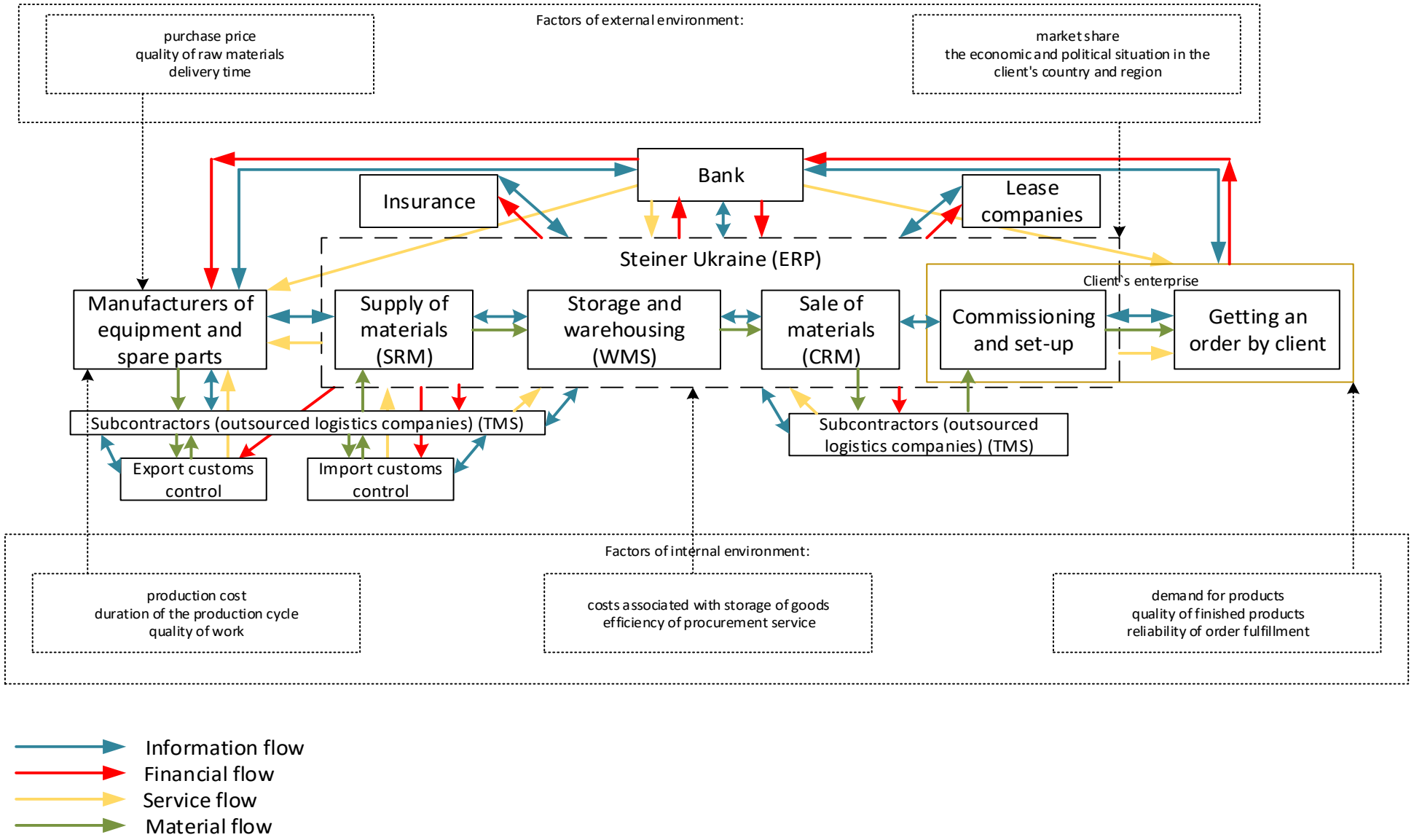

Figure 3.1 – Proposed model of formation of integrated logistics activities management for the engineering company

Integrated management of logistics activities also contributes to increasing operational efficiency.

Business process modeling accurately describes all the processes involved in the production and their constituent elements. The model of the process means its formalized (graphic, tabular and verbal) description that reflects the actual or expected activities of the organization. The main principles of business process modeling are clearly defined goals, small size of process models, reflecting only the necessary aspects to achieve the goals of modeling; though some aspects of the modeled subject area can be ignored [12].

In order to improve the efficiency of logistics activities and the functioning of the company as a whole, it is necessary to pay increased attention to the human factor. There is a need to prescribe clear job descriptions and formalize all business processes of the enterprise. In order to be efficient in managing the business process Steiner has CRM system (Fig. 3.2).

Customer relationship manager is a system that allows you to make work with clients more efficient through automation. This software allows to collect and analyze huge amounts of customer information into a database. Thanks to Steiner CRM, it becomes possible to easily study the needs of customers, quickly adjusting sales to their needs.

The main goal of implementing a CRM strategy is to create a single ecosystem for attracting new and developing existing customers. Managing relationships means attracting new customers, turning neutral buyers into loyal customers, forming business partners from regular customers. In order to understand the operations that are in the company, it is necessary to understand its business process. Steiner Ukraine is an engineering company that has five departments:

- Packaging department;
- Technological department;
- Pumps and Systems department;
- Spare Parts Department;
- Service Department.

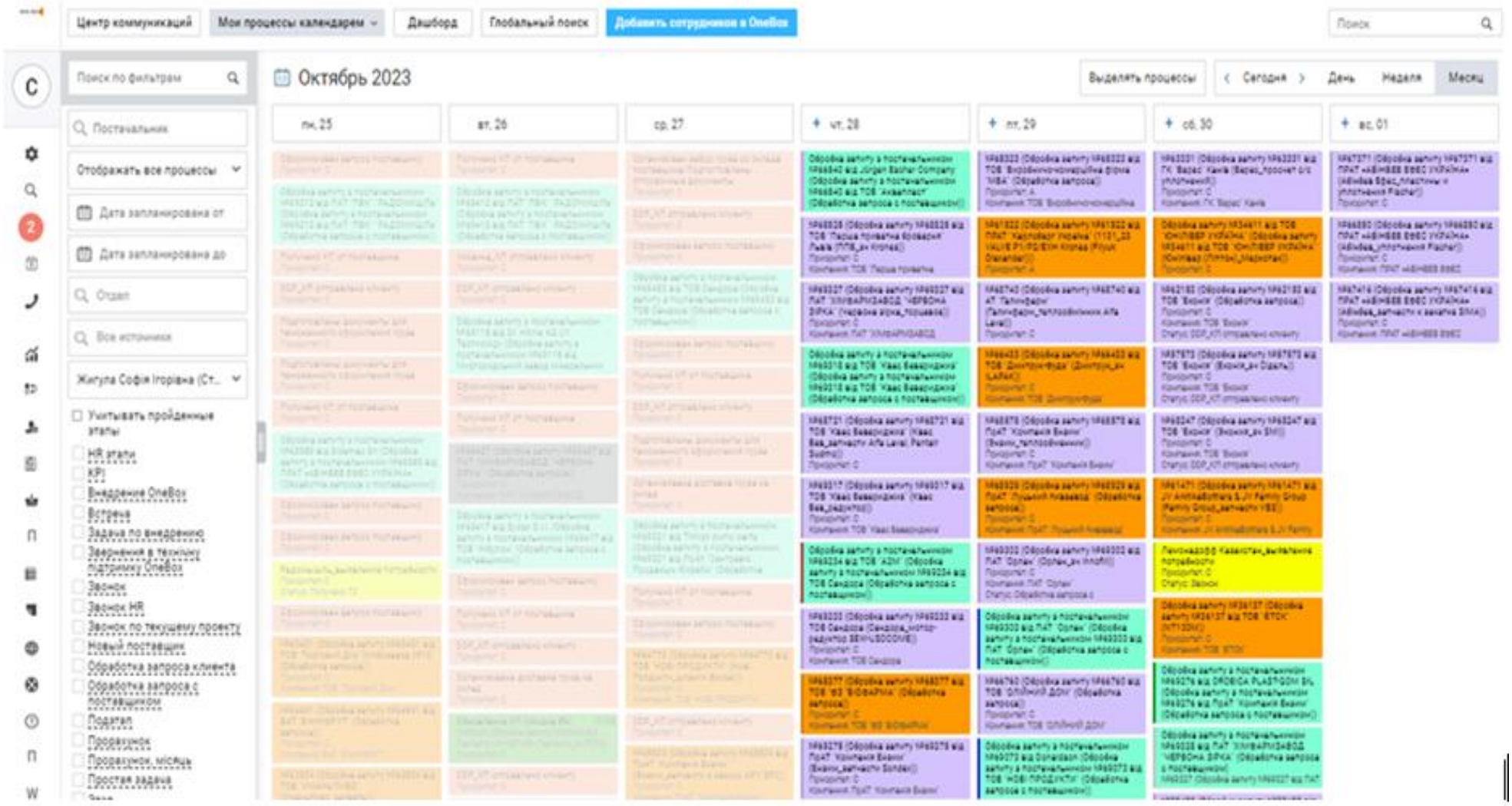

Figure 3.2 – Example of display of business processes in Steiner CRM system

First three departments can create new engineering projects and solutions, thus they make turnkey projects (designing of plants that specialize on food and non-food production). Spare parts and Service Departments are considered as after-sales departments, as they operate with already manufactured equipment.

As the company specializes on the sale of its equipment and projects, it operates according to the sales funnel. Fig. 3.3 shows the sales funnel of Steiner Ukraine.

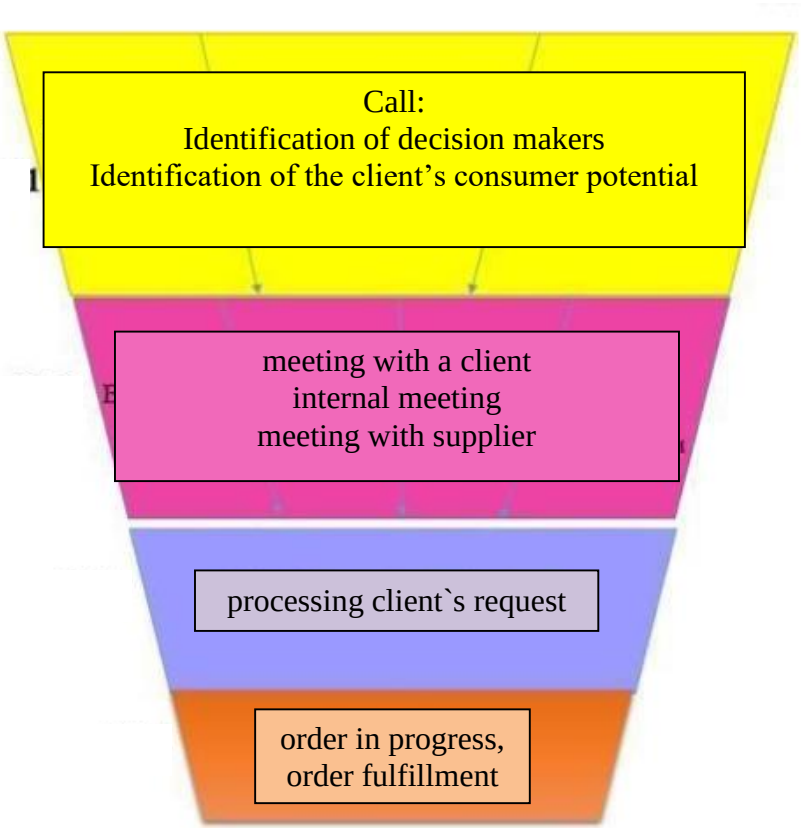

Figure3.3 – Sales funnel of Steiner Ukraine

According to the figure above, business process of Steiner Ukraine is created. Basically it consists of the following stages:

1. Identification of decision makers – calling clients over the industries in order to effectively develop the database, investigate people who have the influence to make the decisions about new projects.

2. Identification of the client's consumer potential – identifying equipment that is already installed in production, what quality and what price segment the client is targeting, how large the production capacity is.

3. Identification of needs – understanding existing customer needs, receiving applications for the next projects or request for the supply of spare parts.

4. Request processing – processing an application from a client, creating a quotation and protecting it over the client in order to receive the order.

5. Processing a request with a supplier – contacting the supplier to obtain a price, delivery time information and a more detailed technical description of the equipment or spare parts that are needed to complete the project.

6. Customer order – receiving the confirmation from the client, signing Agreements/ Contracts with the client and supplier for the supply of equipment or spare parts, receiving advance payment, making the payment to the supplier, searching for transport, processing customs documents, arranging the delivery to the warehouse of Steiner Ukraine, shipment from the Steiner warehouse to the client's warehouse.

7. Receiving payment.

8. Order completed.

Table 3.1 describes all types of business processes that company has and the result of each process that should be achieved.

Table 3.1 – Description of business processes and their results

№	Business process	Result
1	2	3
1	Call	
2	Identify the decision makers, fill in company card	Decision maker is identified
	Identify of the client’s consumer potential	Consumer potential is detected(type, quantity, equipment are included in the client's card)
	Identify the need	Request is received
3	Meeting	
4	Preparation for the meeting	Approved goals of the meeting with the manager
	Meeting with the client	The report on the meeting with the client is approved (describe the progress of the meeting in detail, specify the results of the meeting – a description of the meeting goals achieved, next steps)
	Internal meeting	The report on the internal meeting is approved
	Exhibition	The report on the exhibition is approved

The end of the Table 3.1

1	2	3
5	Meeting with the supplier	The report on the meeting with the supplier is approved (describe the progress of the meeting in detail, specify the results of the meeting, describe the next steps)
6	Processing the client's request	
7	Send a request to the supplier	A request has been sent to the supplier
	Get a quotation from the supplier	Quotation is received
	Make an offer for client on DDP terms	Offer is formed and sent to the client
	Offer protection	Technical and economic justification of offer
	Get order confirmation	Order confirmation received
	Sign the Contract/Specification with the client	Contract/Specification signed with the client
	Sign the Contract/Specification with the supplier	The Contract/Specification with the supplier is signed
	Get confirmation of the order from the supplier	Received order confirmation from supplier
	Prepare shipping documents from the supplier's warehouse	Prepared shipping documents from the supplier's warehouse / Organized cargo pickup
	Prepare documents for customs clearance of cargo	Documents for customs clearance of cargo have been prepared
	Draw up the accompanying documents	The accompanying documents have been drawn up
	Send the cargo to the client	The cargo has been sent to the customer
	Make the commissioning	The set-up and commissioning is done
	Close the order	Order is done

Finally, when the order is completed, the tree of business processes looks like on the Fig. 3.4.

During all these stages CRM system is integral part of business process that helps managers to contact the client, create projects in the system and track the stages of their implementation. Especially it is important for Spare parts Department, it is one of the most important departments of the company. Maintaining partnerships with clients after the implementation of large projects is an integral part of business in any field, this department has many projects, since these are projects for the

purchase of spare parts that support the functioning of existing plants, these projects are the most relevant and the delivery time is quite fast, since they often do not require waiting for production at the supplier's plant.

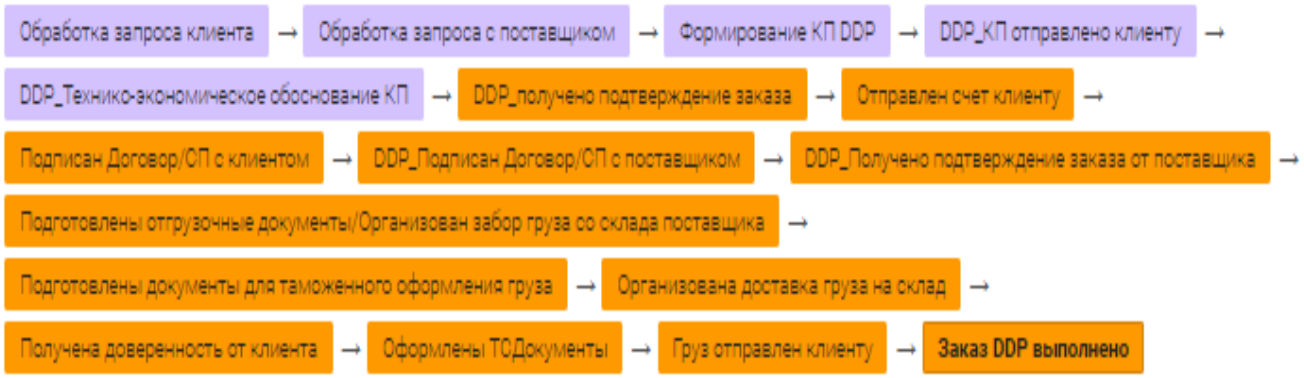

Figure 3.4 – Processes involved in order fulfillment

The spare parts supply cycle begins with a written customer request. The following must be indicated: spare parts articles, catalog numbers, their photographs and drawings. The request is then sent to the, after which the foreign partner must respond to the receipt of the application and send a commercial offer. Most companies offer corporate discounts right away, but sometimes the manager need to further agree on prices with the supplier. Having received the final price of spare parts, the manager need to create a commercial proposal and send it to a potential buyer, after which the manager must contact the client by phone to inform that the package has been sent and agree on a time for repeated contact to discuss the price. Having agreed on prices with the customer and convinced him to buy our product, the manager of Steiner Ukraine confirms the order to the supplier and send a Contract, if it has not previously been signed, and an additional agreement to the contract as shown on Fig. 3.5.

After the foreign partner has sent the signed appendix, it is necessary to make a request for an Invoice or Proforma Invoice. In parallel with this, it is necessary to conclude an agreement for the supply of spare parts with the client (if one has not yet been concluded) and sign an additional agreement, after which an invoice is issued to the buyer for prepayment.

Додаток №92
До контракту № 0512/13 від 05.12.2013 г.
м. Київ 02 грудня 2022 р.

Appendix № 92
to Contract Nr. 0512/13 dated 05.12.13
Kyiv December 02nd, 2022

Компанія **VBS s.p.r.l.**, м. Тубіз, Бельгія, надалі "Продавець", в особі Комерційного директора Пилипа Керкса, з одного боку, і **ПП "ПІТАЙНЕР-УКАЇНА"**, надалі "Покупець", особі Генерального директора Колодченко О. Б., що діє на підставі Статуту,з іншого боку,уклали цей контракт про наступне:

The Company **VBS s.p.r.l.**, Tubize, Belgium hereinafter referred to the "Seller" represented by Phillip Kercks, Commercial Manager from one part and **PE STEINER UKRAINE** hereinafter referred to the "Buyer" represented by Olexiy Kolodchenko, General Manager from another part have concluded the present agreement as follows:

1. Пункти№ 3.1, 4.1, 4.2. викласти в наступній редакції:

3.1. Покупець сплатує за дану партію Товару за наступною схемою:

- 100% - протягом 45 календарних днів з моменту відвантаження товару Продавцем.

1. The articles № 3.1, 4.1, 4.2 to state as follows:

3.1. The Buyer will pay for the parcel of the Goods as follows:

- 100% - within 45 calendar days after the date of shipment from the Seller side.

4.1. Товар поставляється Продавцем протягом 1 тижня з моменту отримання замовлення в письмовій формі. Кількість товару, що поставляється з цією партією становить :

1. 35309-085 Форсунка – 1 шт.
2. 35309-110 Форсунка – 1 шт.
3. G3 шток дозувального клапана для форсунки - 1 шт.

Загальна партієть 1 [illegible] доларів США.

4.1. The Seller delivers the Goods within 1 week upon receipt the Buyer order made in writing form. The amount of goods delivered by this parcel is as follows:

1. 35309-085 Nozzle (with seal) size 0.085" – 1 pc.
2. 35309-110 Nozzle (with seal) size 0.110" – 1 pc.
3. 74003 G3 dosing valve stem for nozzle+0.090 – 1 pc.

Total value is [illegible] 02 USD

4.2. Товар поставляється на умовах EXW Сент, Бельгія відповідно до Інкотермс 2020.

2. Решта умов контракту №0512/13 від 05.12.2013 р. залишаються незмінними.

4.2. The goods are delivering on EXW Saintes, Belgium basis according to the INCOTERMS 2020.

2. Other terms and conditions of the contract №0512/13 dated 05.12.2013 are available.

ПОКУПУЦЬ / BUYER

[illegible] / ПІТАЙНЕР-УКРАЇНА

Olexiy K[illegible]ko / Колодченко О.Б.
GeneralMana[illegible] / Генеральний директор

ПРОДАВЕЦ / SELLER

VBS s.p.r.l.

Phillip Kercks / Пилип Керкс
Commercial Manager / Комерційний директор

VACUUM BARRIER SYSTEMS
VBS SRL
Avenue Landas 17
B-1480 SAINTES
Tel + 3223547177
www.vbseurope.com

Figure3.5 – Example of signed Appendix with supplier

The invoice, translation of the invoice, foreign economic contract with the supplier and appendix, as well as shipping documents with customs marks received from the transport company, must be sent to the customs broker to determine the customs code and calculate the amount of duties. Once the broker informs the manager of the amount required to be paid to customs, it is advisable to make the payment as soon as possible to avoid delays in cargo clearance. Once the money is transferred to customs, the customs clearance process begins. As soon as the cargo is registered, the broker sends a customs declaration – a document confirming the import of goods to Ukraine.

Then the goods are sent to the warehouse of Steiner Ukraine, then, it is needed to request a power of attorney from the client to receive inventory items, in this case, parcels. This power of attorney, together with the customs declaration, air waybill, invoice, invoice for transport and invoice for brokerage services, is sent to the accountant to prepare shipping documents. Then the goods are sent to the client`s warehouse together with the shipment documents. After that client pays for the supplied goods and order is considered completed.

A CRM system aims to improve customer experience by providing better customer service, personalized communication, and targeted marketing. By understanding customer needs and preferences, businesses can tailor their products and services to meet customer demands and improve customer satisfaction. By using CRM System it can be possible to set key performance indicators, as they will help measure success, identify areas for improvement, monitor progress toward achieving the goals that can be tracked through CRM system. The following metrics can be calculated with the help of CRM system for the enterprise:

– customer acquisition metrics could include the number of leads generated, conversion rates, and customer acquisition costs;

– customer retention metrics could include the number of active customers, churn rate, and customer lifetime value;

– sales metrics could include the number of sales, average deal size, and sales cycle length;

– marketing metrics could include the number of marketing campaigns, conversion rates, and ROI;

– customer service metrics are used by the customer service team for measuring customer satisfaction scores, response times, and resolution rates;

– revenue metrics could include total revenue, revenue per customer, and revenue growth rate;

– team performance metrics: this could include individual and team performance metrics, such as the number of calls made, deals closed, and response times.

The following KPIs can be calculated for Spare Parts Department of Steiner Ukraine using its CRM system, these indicators will be calculated taking into consideration results of the last year:

1. Average sales value shows the average value that a single customer or user generates for the company.

$$\text{Average sales value} = \frac{\text{Total sales value}}{\text{number of customers}}$$

$$\text{Average sales value} = \frac{30\,406\,962}{81} = 375\,394.60 \text{ UAH}$$

So, the average annual revenue that the client receives from each client is 375 394,60 UAH. This baseline metric is essential for more accurate forecasts, it also helps set a precedent for how much should be earned per purchase.

2. Sales Growth Rate is a key performance indicator that measures the percentage increase or decrease in sales revenue over a specific period of time. It is a crucial metric for assessing the effectiveness of a company's sales strategy.

$$\text{Sales Growth Rate} = \frac{\text{Current sales revenue} - \text{previous sales revenue}}{\text{previous sales revenue}} * 100$$

$$\text{Sales Growth Rate} = \frac{30\,406\,962 - 22\,545\,610}{22\,545\,610} * 100 = 34.87\%$$

So, during the last year revenue of Spare Parts Department of Steiner Ukraine was increased by 34.87%.

3. Average deal size is a key performance indicator that measures the average value of deals closed by the sales team within a specific period of time. It is an essential metric for understanding the sales team's performance and revenue potential.

$$\text{Average Deal Size} = \frac{\text{Total sales revenue}}{\text{total number of deals closed}}$$

$$\text{Average Deal Size } = \frac{30\ 406\ 962}{221} = 137\ 588{,}10 \text{ UAH}$$

Due to calculations the average deal size is 137 588,10 UAH.

4. Win rate is a key performance indicator that measures the percentage of deals the sales team successfully closes out of the total number of opportunities. It is an essential metric for evaluating the effectiveness of a company's sales process and the sales team's ability to convert opportunities into closed deals.

$$\text{Win Rate } = \frac{\text{total number of deals won}}{\text{total number of opportunities}} * 100$$

$$\text{Win Rate } = \frac{345}{1344} * 100 = 25{,}67\%$$

Steiner Ukraine gets only 25,67% of the potential orders, this is the every fourth order, the value can be increased, it is necessary to identify why projects are lost or rejected.

5. Customer lifetime value is a key performance indicator that measures the total value a customer is expected to generate for a company over their entire lifetime as a customer. It is an essential metric for evaluating the long-term profitability of a company's customer base.

$$\text{Customer lifetime value } = \text{ average annual revenue per customer}$$
$$\times \text{ expected number of years that the customer will remain a customer}$$
$$\text{Customer lifetime value } = 375\ 394{,}60 \times 10 = 3\ 753\ 946{,}00 \text{ UAH}$$

In average, every client can bring 3 753 946 UAH to the company annually in 10-years perspective. If the number of won projects will be increased, this value also will increase. Interaction of new clients also will lead to increased revenue for the company.

3.2 Recommendations regarding the implementation of a new model in the activities of the Steiner company

Most business processes in CRM are connected with supply of spare parts. In order to meet the need of clients fast, Steiner has its own warehouse. In order to understand the process design for Steiner warehouse, it is necessary to define where and how products are moved. Well-designed warehouse management process flow saves business time and money. It defines all the stages in the warehouse operations, so company can focus on getting work done. A warehouse management system process flow is a visual chart or diagram that shows the main activities of the warehouse. It is a subcomponent of warehouse organization. A process flow illustrates how goods are received, processed, shipped, as well as indicates all intermediary stages. A warehouse system flow chart illustrates the movement of warehouse goods in a visual format. Warehouse flow charts can be broken down into at least three stages: receiving, storage, and shipping. Fig. 3.6 shows the materials and information flow.

A WMS, or warehouse management system, is another software that helps companies manage and control daily warehouse operations, from the moment goods and materials enter a distribution or fulfillment center until the moment they leave. WMS software systems are a key component of supply chain management and offer real-time visibility into a company's entire inventory, in warehouses and in transit. In addition to inventory management, a WMS offers tools for picking and packing processes, resource utilization, analytics, and more.

Steiner does not have WMS software, but a good WMS system can help by streamlining every facet of warehouse management – from receiving, put-away, and pick, pack, and shipping processes to inventory tracking and replenishment. And it organizes all of these activities from a single interface. Warehouse management systems also integrate with other tools, including basics like bar code scanning and RFID labeling, more advanced robotics and augmented reality (AR) wearables, and

other mission-critical solutions, such as transportation management systems (TMS), ERP, and logistics software.

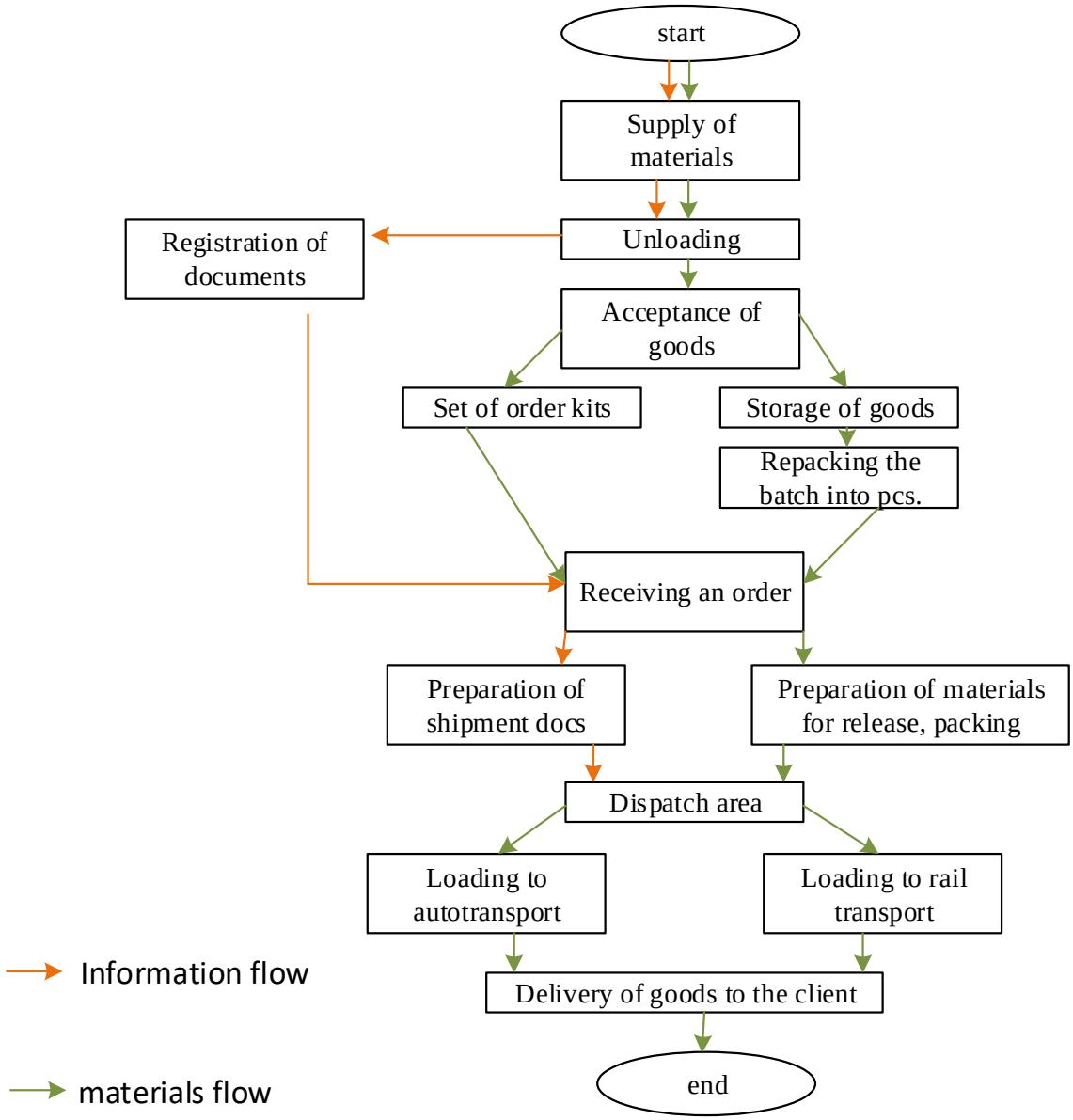

Figure 3.6 – Flowchart of warehouse processes

A robust, digital warehouse management system is essential for any business with on-hand inventory – and can help save money and gain new efficiencies in many areas.

The scheme (Fig. 3.7) shows the order process through the warehouse and its main areas.

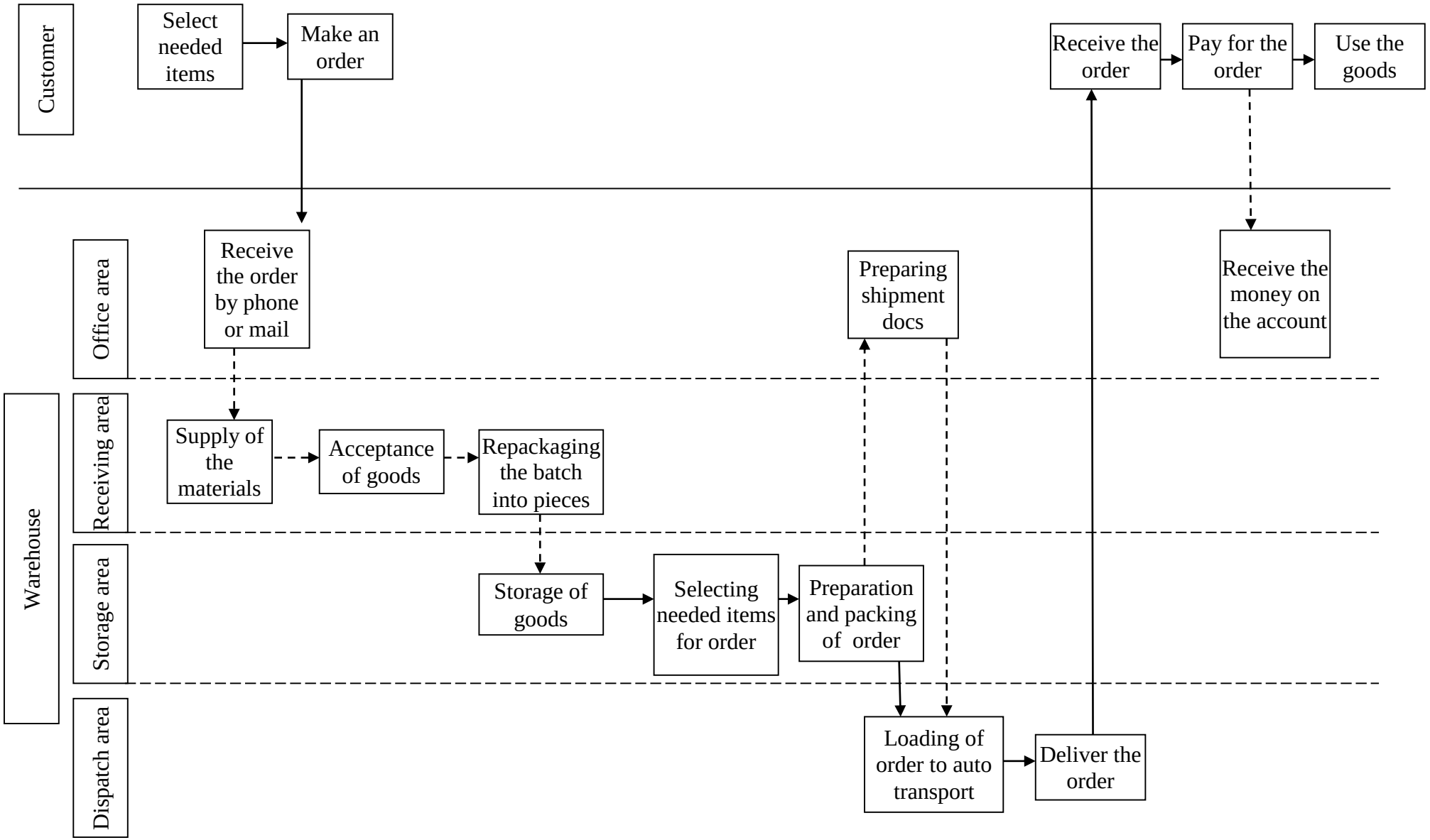

Figure 3.7 – The order process through the warehouse and its main areas

It is necessary to implement WMS systems as Steiner Ukraine has the following features of business processes:

1. Low speed of turnover, which creates a large amount of goods in the warehouse.

2. Wide range of production. The more different materials needed to create a product are in the warehouse, the more difficult it is to distribute them across the territory.

3. The large amount of warehouse space requires the implementation of a system for the operational use and distribution of warehouse resources.

WMS systems automate and streamline warehouse processes from inbound receipts to outbound deliveries – for improved efficiency, smoother operations, and the ability to handle higher volumes. They reduce errors in picking and shipping goods and eliminate duplicate and unnecessary work [60].

WMS software can identify which items need to be picked first, or which might need a sales push, to minimize waste. It can also help to determine the most effective use of warehouse space, from inventory placement to optimal travel paths.

Using barcoding, RFID tagging, sensors, or other location tracking methods, a WMS system gives you real-time insight into your inventory as it moves into your warehouse, around it, and on to the next location. With this visibility, you can create more accurate demand forecasts, run a just-in-time inventory strategy, and improve traceability – which is especially important in the event of a recall.

A good WMS system can also assist in boosting employee morale by creating a more relaxed, organized, and safe environment where workers feel their time is valued and being used wisely. With a WMS, customers enjoy improved order fulfillment, faster deliveries, and fewer inaccuracies – which increases their satisfaction and loyalty and improves brand reputation. Suppliers can also experience reduced wait times at loading bays and docks, for improved relations [20].

Any WMS system has a specific implementation algorithm. This is a rather complicated process, as each company has its own peculiarities and characteristics.

Thus, the implementation procedure is individual, but usually consists of the following stages that are shown in Table 3.2.

Table 3.2 – Stages of WMS implementation procedure

№	Stages of implementation	Characteristics	Duration
1	2	3	4
1	Survey	Inspection of the warehouse complex. Analysis of business processes.	1 month
2	Approval of the technical specification	Selection of equipment. Drawing up a scheme of equipment placement in the warehouse.	14 days
3	Development of an individual plan	Finalization of the system in accordance with the terms of reference. Testing. Setting up the system and eliminating errors. Customization of the interface.	Up to 1 month
4	Preparing the system for launch	Installation of equipment. Installing the system on the server. Adding data of employees, organizations, and inventory. Creating a warehouse topology. Labeling of racks. Collecting and entering barcodes.	1-2 months
5	Training of employees to work with the system	Training of system maintenance specialists. Training of dispatchers and warehouse workers to work with the system and equipment.	3-5 days
6	Launching the system into operation	Test run, detection of failures. Setting up the system, putting the WMS into operation.	3-7 days
7	Technical support	Operational work, troubleshooting.	1 month

According to the data in the table, the average time of system implementation is from 2 to 4 months. Depending on the size of warehouse and the scope of operations that should be done by Warehouse Management System the duration of implementation and launching the system can be bigger and can last up to 1 year. In case of Steiner Ukraine, the warehouse is not big, but there is a big list of stock keeping units, so the process of WMS implementation can take around 6 months.

In general terms, the implementation of a warehouse management system consists of the following distinct phases:

1. Project launch: initial stage in which the client's requirements, the tasks to be executed, and the chronology of the project are identified. In this phase, the operational processes and objectives must be documented by both the client and the WMS software provider.

2. Solution design: the provider's team of engineers designs a detailed solution based on a previous analysis of the client's needs, goods flows, and operations performed in the facility, among many other factors. This phase requires full coordination between the client and the provider to define the software application as well as the configuration of the hardware and all equipment connected to the WMS.

3. System configuration: prior to running the solution, the software provider must prepare the warehouse thoroughly. This ranges from properly configuring the terminals and workstations to training the employees and designating the number of available licenses.

This stage includes the checks of all the preset functionalities, e.g., putaway rules, adequacy of workflows, the different statuses available for each SKU, and the correct warehouse design. Before going into production, the provider does a dry run to make sure the solution is ready to coordinate the processes performed in the facility.

In this stage it can be necessary to modernize the warehouse layout and make the analysis of the goods that are stored. Spare parts are made separately and in smaller volumes, they are inevitably much more costly. There are many part numbers for spare parts, so this should also be taken into account during storage and warehousing. Long lead times also mean that businesses often stock up on these expensive spare parts to avoid the high price of downtime. Companies rack up storage costs for parts that are rarely used or end up becoming obsolete. Table 3.3 summarizes the types of spare parts which are stored in the warehouse of Steiner.

Table3.3 – Spare parts classification methods used in Steiner Ukraine

№	Classification	Characteristics	Target Number	Target value	Risk
1	2	3	4	5	6
1	Consumable parts	The probability of fault is 100% and the frequency of replacement is very high.(e.g. the frequency of replacement less than1year).	45%	15%	100%
2	Wear parts	The probability of fault is 100%, but the frequency of replacement is not so high.(e.g. the frequency of replacement more than1year).	35%	25%	100%
3	Insurance parts	The probability of fault is from 20% to 100%,and will be used after 5years.	15%	30%	95%
4	Accident parts	Normally, these parts will never be used except the reason of quality, design, accident and so on.	5%	30%	unknown

So, it is necessary to organize warehouse in such manner where all the spare parts will have space and will have its own place. Also, there should be special place for loading/unloading and for repackaging of orders. Layout design of the warehouse with furniture and equipment is presented on Fig. 3.8.

Before starting the construction it is necessary to buy all the materials, such as building materials, electronics, shelves and racks, equipment, all detectors for the security of warehouse. Sheets of metal that will form the roof and walls of the warehouse will be placed on this skeleton. These sheets will be secured to the skeleton and then have a thick layer of insulation installed on the interior. Then the doors and windows should be installed and all trim work finished. With the exterior finished, the interior work begins. The first thing installed will be the sprinkler system, followed by any heating and air units. The warehouse racking is ready to be installed and the travel aisles and pathways clearly marked. Before starting the work of warehouse it is necessary to make sure that all systems operate correctly, so there is a need to check everything. The final step in the construction process is to

decompose all the materials in accordance with spare parts units. The detailed Work break-down structure of the warehouse construction project is shown in App. A.

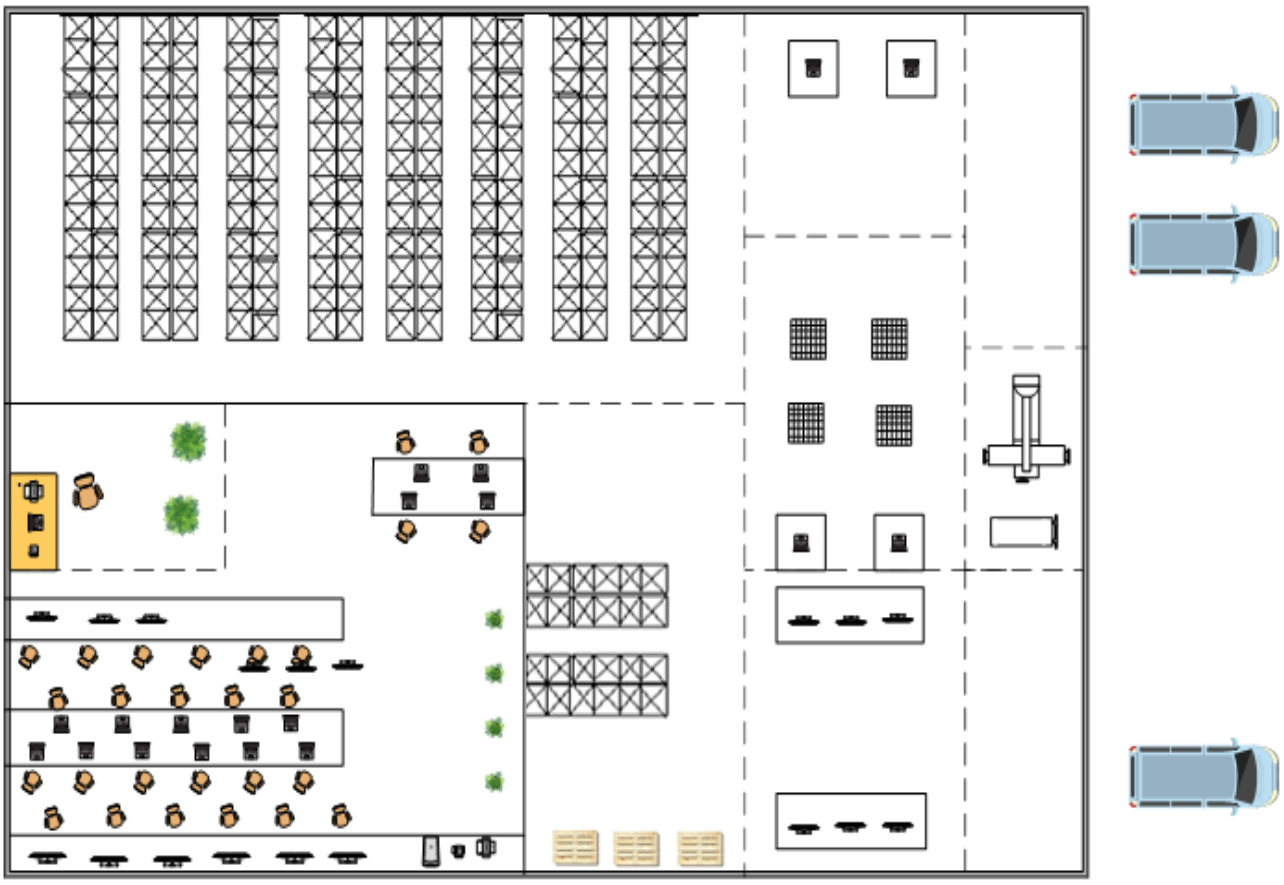

Figure 3.8 – Layout design with equipment and furniture

When choosing a system, there is a need to consider the following criteria:

– reliability of warehouse management systems and warranty service conditions;

– professionalism of warehouse management system supplier specialists;

– wide functionality of WMS solutions.

The practice of implementing and operating a WMS system shows that the payback period of such investments is no more than 2-4 years. Today the following WMS systems exist and are used in business:

– Fishbowl Inventory;

– Increff WMS;

– STOR: WMS;

– Magaya Supply Chain;

– ShipHero;

– Vector 11.WMS BOOK: Warehouse complex;

– Distribution Center solution for Microsoft Dynamics;

– Aldata warehouse management;

– AVARDA.WMS and SV: Warehouse (WMS).

In order to choose the right system, there is a need to select several options and compare them. For Steiner Ukraine the following WMS options have been selected for comparison: Fishbowl Inventory, Increff WMS, Magaya Supply Chain, ShipHero.

Tables 3.4 – 3.9 show the comparison of WMS systems chosen for warehouse of Steiner Ukraine, the comparison is made considering the following factors: assessment of the clients after usage of system, assessment of warehouse operations, quality of logistics operations, analytics, management platform features.

Table 3.4 – Assessment of WMS by consumers

№	Indicator	Fishbowl Inventory	Increff WMS	Magaya Supply Chain	ShipHero
1	2	3	4	5	6
1	Meets requirements	7,6	8,3	8,8	7,9
2	Ease of use	7,7	8,4	8,8	8,3
3	Ease of setup	6,6	8,7	7,7	8,1
4	Ease of Admin	7,7	9,2	8,1	8,5
5	Quality of support	8,1	8,3	8,3	7,7
6	Average rating	7,54	8,58	8,34	8,1

Table 3.5 – Assessment of warehouse operations

№	Indicator	Fishbowl Inventory	Increff WMS	Magaya Supply Chain	ShipHero
1	2	3	4	5	6
1	Locations	7,6	8,8	8,9	8,5
2	Visualization	7,6	Not available	8,6	7,8
3	Warehouse slotting	7	8,1	8,7	7,9
4	Average rating	7,4	8,45	8,73	8,07

Table 3.6 – Assessment of logistics operations quality

№	Indicator	Fishbowl Inventory	Increff WMS	Magaya Supply Chain	ShipHero
1	2	3	4	5	6
1	Cross-docking	5,7	Not available	8,9	7,2
2	Receiving	8,1	8,1	9,1	7,6
3	Pick & Pack	8,0	8,1	8,9	8,5
4	Average rating	8,02	8,30	8,37	7,77

Table 3.7 – Assessment of analytics for WMS

№	Indicator	Fishbowl Inventory	Increff WMS	Magaya Supply Chain	ShipHero
1	2	3	4	5	6
1	Worker performance	6,3	7,5	8,7	8,1
2	Error tracking	6,0	7,1	8,2	7,0
3	Procurement analytics	6,7	7,1	8,7	6,6
4	Average rating	6,33	7,23	8,53	7,23

Table 3.8 – Assessment of inventory management platform features that are proposed by WMS

№	Indicator	Fishbowl Inventory	Increff WMS	Magaya Supply Chain	ShipHero
1	2	3	4	5	6
1	Centralized inventory database	8,5	8,0	8,7	7,9
2	Inventory level dashboards	7,8	7,7	8,3	7,6
3	Stock history reporting	7,6	8,0	8,4	8,5
4	Low stock notifications	6,8	8,1	8,6	8,2
5	Inventory forecasting	6,6	7,9	8,8	7,3
6	Data Exporting/Importing	7,3	8,2	8,5	8,2
7	Average rating	7,43	7,98	8,55	7,95

Table 3.9 – Summary assessment of WMS

№	Summary	Fishbowl Inventory	Increff WMS	Magaya Supply Chain	ShipHero
1	2	3	4	5	6
1	Consumer rating	7,37	8,09	8,53	8,08
2	Warehouse operations	7,37	8,09	8,53	8,08
3	Logistics operations quality	8,01	8,23	8,30	8,08
4	Analytics	7,58	8,14	8,45	8,08
5	Inventory Mangement	7,58	8,14	8,45	8,08
6	Average rating	7,58	8,14	8,45	8,08

Total assessment of WMS for Steiner Ukraine is presented in Fig. 3.9.

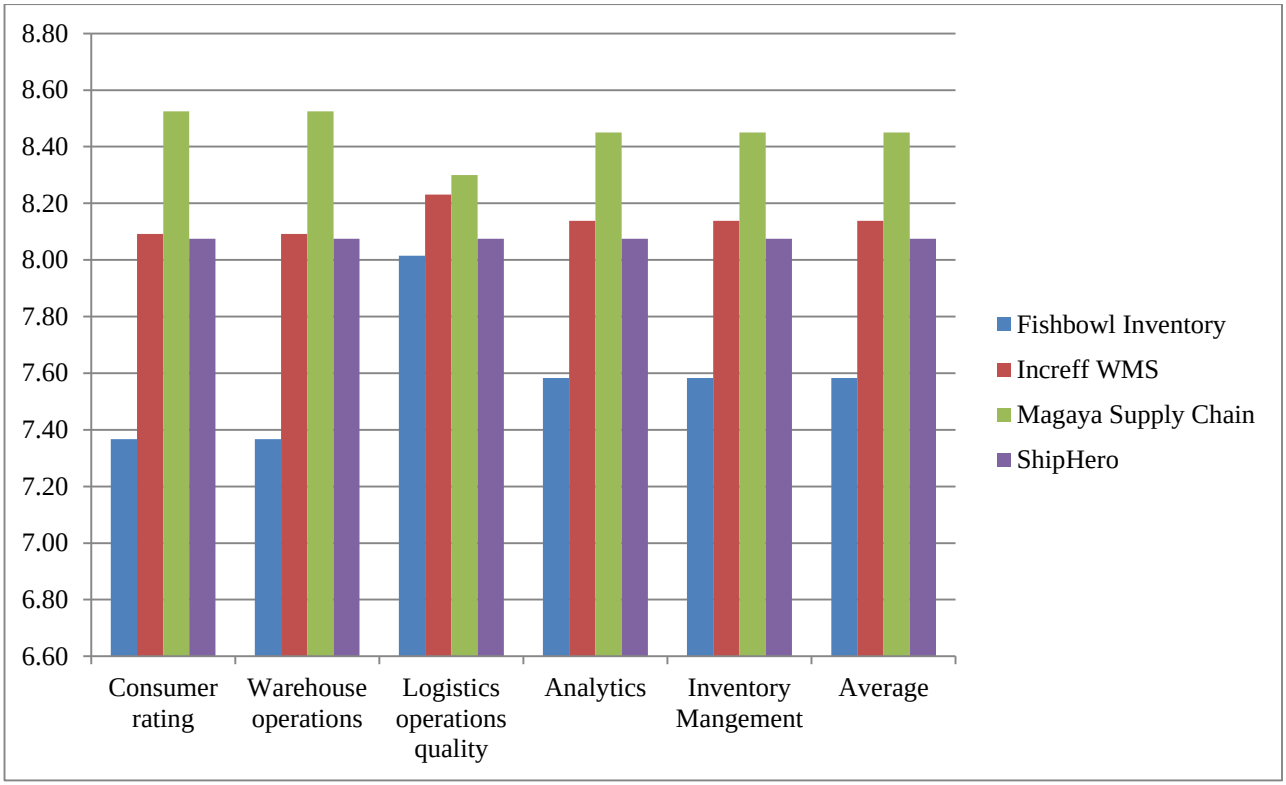

Figure 3.9 – Total assessment of WMS for Steiner Ukraine

Based on the above assessment Magaya Supply Chain should be chosen for Steiner Ukraine, as it has best results in comparison with other systems. The price aspect also plays an important role in the selection of an automation system for a warehouse. Therefore, it is necessary to understand what costs the WMS includes.

The total costs of warehouse automation includes the following components:

– total cost of WMS licenses, comprehensive implementation and system support services;

– operational costs of implementation consultants;

– the price of peripheral equipment;

– the cost of licenses of other manufacturers;

– costs of services and works related to bringing the warehouse infrastructure in compliance with the system operation.

The cost of the WMS implementation project also includes additional software programs, configuration of the equipment itself, creation of server rooms, stationary workstations, purchase of terminals, printers, organization of the warehouse infrastructure itself (for example, radio terminals will not be able to work without a special network). Total cost for each warehouse management system is calculated in Table 3.10.

Table 3.10 – Annual cost of WMS implementation

№	Indicator	Fishbowl Inventory	Increff WMS	Magaya Supply Chain	ShipHero
1	2	3	4	5	6
1	License	31440	27000	26400	25740
2	Server	4500	4500	4500	4500
3	Installation and customization	5100	4700	4800	5600
4	Maintenance and support	6000	6200	5750	6000
5	Training the staff	4200	3900	4000	4450
6	New devices	15000	15000	15000	15000
7	Additional equipment	3500	3500	3500	3500
8	Total costs	69740,00	64800,00	**63950,00**	64790,00

Total cost of WMS implementation is presented in Fig. 3.10.

Based on the calculation of total costs and assessment of WMS by different indicator, the best option is to choose Magaya Supply Chain.

The Magaya Digital Freight Platform is a cloud-based software platform for warehouse operators and other logistics service providers. Magaya Supply Chain includes a complete WMS with billing, receiving, reporting, put away, inventory management, picking, packing, shipping, and so much more. Magaya software enables you to create seamless workflows between warehousing and shipping, allowing you to load cargo directly onto outbound shipments. The Magaya mobile WMS application even allows users to scan for inventory counts, view real-time inventory data, and track units via barcode scan [56]. Many Magaya solutions, like

Magaya Supply Chain, offer API capabilities to integrate with third-party systems such as ERP, TMS, and accounting software.

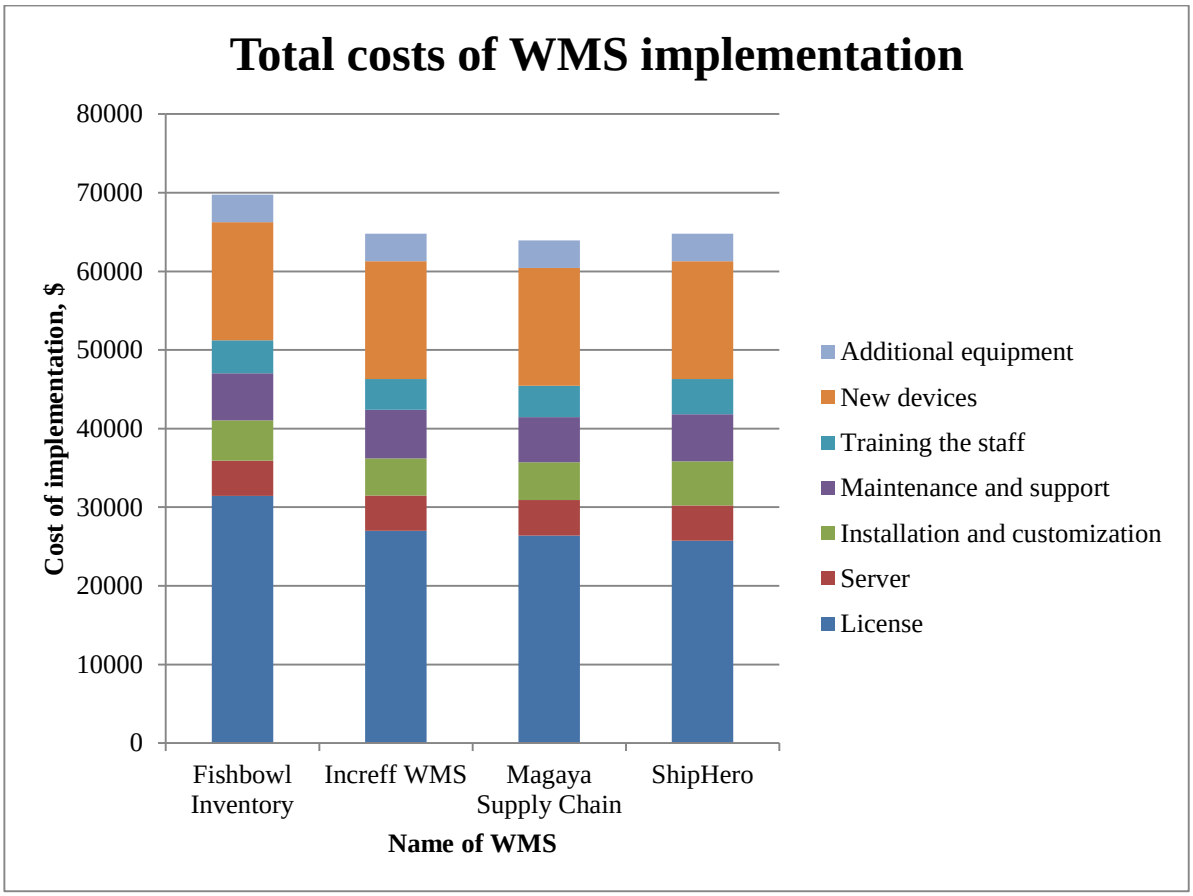

Figure 3.10 – Total cost of WMS implementation

There are five main apps available with the Magaya Warehouse Management System:

1. WMS Mobile – Run the WMS solely from a mobile device.

2. POD Mobile – Facilitate the pickup and delivery of parcels using handheld devices.

3. Barcode Scanner – Log inventory information via barcodes.

4. Scale Integration – Capture the weight and dimensions of packages.

5. LiveTrack – Allows users to track packages in real-time.

Magaya also offers a range of other services to integrate with the WMS, including; supply chain solutions and e-Commerce.

Magaya WMS also enables users to control and manage their cargo inventory before it arrives in the warehouse using tracking software. Further key features include picking and loading, automated billing, online transaction tracking, remote label printing, reporting, and warehouse sequencing.

Magaya is a cloud-based WMS; wireless handheld devices enable users to manage their business processes from any location with an internet connection. Or users can opt for the system to be installed onto computers.

A range of support services is available, including tech support and setup, plus implementation and training. Magaya WMS is a modular system, meaning that packages are selected according to the individual business requirements.

Software features:

– Barcoding/Serial Tracking;
– Inventory Management;
– Order Management;
– Picking & Packing;
– Real-Time Data;
– Receiving & Putaway;
– Shipping Management;
– Staging;
– Third Party Plugins;
– Yard Management.

WMS implementation enables companies to digitize their logistics operations, eliminate errors, and coordinate all processes taking place inside and outside their facilities. Investing in supply chain digitalization is a competitive advantage in addition to an effective solution in responding to the complexities of Logistics 4.0[50]. Trends such as free product returns, omnichannel, and SKU proliferation call for digitized and automated management to maximize efficiency in logistics facilities.

3.3 Economic effect of project proposals

To implement warehouse management system company plans to make capital investments which is equal to $63950. It is expected that the 100% production capacity company will reach by the sixth year, and the cash flow will amount to $12000, $13100, $15400, $18150, $20300 and $22050 accordingly. The discount rate is 10%. To evaluate the investment project NPV, PI, DPP, IRR should be calculated.

Net present value is a financial metric that seeks to capture the total value of a potential investment opportunity. NPV is used in capital budgeting and investment planning to analyze the profitability of a projected investment or project. Table 3.11 shows the calculation of NPV for construction project.

Table 3.11 – Calculation of NPV for Project with discount rate of 10%

№	Years	Cash Flow, $	Discount Factor:$1/(1+r)^n$	Present Value, $
1	2	3	4	5
1	1	12000	0,9091	10909,09
2	2	13100	0,8264	10826,45
3	3	15400	0,7513	11570,25
4	4	18150	0,6830	12396,69
5	5	20300	0,6209	12604,70
6	Present Value of Future Cash Flows, $			70753,83
7	Initial Investment, $			63950
8	NPV, $			6803,83

The profitability index (PI) is a measure of a project's or investment's attractiveness. The PI is calculated by dividing the present value of future expected cash flows by the initial investment amount in the project.

$$PI = 70753,83/63950=1,11.$$

The discounted payback period is a capital budgeting procedure used to determine the profitability of a project. A discounted payback period gives the

number of years it takes to break even from undertaking the initial expenditure, by discounting future cash flows and recognizing the time value of money.

$$DPP = 5+(63950-(10909,09+10826,45+11570,25+12396,69+12604,70)) /$$
$$/12446,65 = 5,45 \text{ years} \approx 5 \text{ years } 5 \text{ months } 12 \text{ days}.$$

The internal rate of return (IRR) is a metric used in financial analysis to estimate the profitability of potential investments. IRR is a discount rate that makes the net present value of all cash flows equal to zero in a discounted cash flow analysis.

$$IRR=13,53\%.$$

The project of WMS implementation should be accepted, as Net present value has a positive value and Profitability index is greater than 1, profitability index of 1,11 suggests that for every $1 of initial investment, Steiner Ukraine can create additional $0,11 in value. Discounted payback period is equal to 5 years 5 months, this is a period that the project takes to generate cash flows when the cumulative present value of the cash flows equals the initial investment cost.

By using WMS Steiner can get the following advantages for its activity:

1. Maximum control over the warehouse in real time. Thanks to automation, the customer has accurate information about where the required goods are and in what quantity.

2. Reducing the number of employees in the warehouse complex to the optimal minimum. The staff spends much less time entering product information into the database, and the time required to find materials is also reduced.

3. Reducing the number of errors in receiving, picking and distributing goods. Errors in purchasing an excessive amount of material resources are eliminated. The system automatically compares the actual availability of goods with the plan. This also helps to eliminate theft in the warehouse.

4. Absolutely all actions in the warehouse are coordinated in accordance with the tasks issued by the WMS system.

5. When accepting or unloading goods, employees of the employees receive the necessary information about the properties of the goods and the specifics of their handling.

6. The dependence of the human factor on the quality of work is reduced. Due to the simplicity and clarity of this technology, the work can be performed by low-skilled personnel.

7. Customer satisfaction increases due to the increased speed of work.

8. Low-turnover goods are identified, which improves the use of warehouse space.

9. Automatic calculation of piecework wages for warehouse workers based on the data received on the operations performed.

10. All warehouse work processes are recorded, which allows you to quickly find the culprit of the plan violation in case of unexpected situations [4, p.56].

In addition, it is possible to integrate WMS and CRM systems, thus Steiner can work even more efficiently. First of all it is important for customer information. CRM is great at gathering information about customers. Staff manages current customers and orders as well as advise potential new customers. This type of information though is equally beneficial to WMS. Once customer places an order their information can be used by WMS to create the order for the warehouse to fulfill on. Rather than having to switch systems, or else fill out a form that then gets sent to warehouse team, where the same information is then entered into the WMS for fulfillment, it can be possible to integrate the two systems so that the process becomes seamless without any duplication of tasks [61].

Also, WMS handles the logistics of the order fulfillment process but by integrating it with CRM, which is the main communicating tool, employees can easily make customers aware of the status of their orders. All that inventory information can be helpful for the sales department. When sales managers have a

request for some spare parts, by using integrated CRM and WMS they can easily pull the pricing and at the same time check its availability and lead times for fulfillment.

Chapter 3 summary

Based on the analysis of financial and economic indicators of the enterprise, logistical problems were identified that directly affect the activities of integrated logistics activity management. As a result of the analysis of activity of Steiner Ukraine, there were proposed and considered such organizational and economic areas of improvement of integrated logistics activity management as analysis of existing CRM system, calculation of basic KPIs of the enterprise using customer relationship management system, optimization of warehouse processes, selection and implementation of WMS system suitable for engineering company.

In order to contribute to the improvement of customer service, as well as increasing their involvement with the help of integrated logistics management there was proposed model of formation of integrated logistics activities management for the engineering company. This model includes the architectural structure of an integrated logistics management system in an engineering company, which ensures correct management of warehouse, transport and procurement of materials.

To improve operational efficiency, it is vital to ensure organization within inventory so that the company can better track products and ensure that distribution operations are accurate. For this WMS and CRM systems can be used. It is possible to integrate these systems into one, so business will run smoother by creating automated, proficient, and interconnected processes. In the stage of WMS implementation it can be necessary to modernize the warehouse layout and make the analysis of the goods that are stored. Based on it there was proposed an updated warehouse layout where all the spare parts have space and have its own place. The planned layout can help streamline operations, boost productivity, and reduce

expenses. Effectively utilizing the warehouse space available can help improve inventory visibility, reduce travel time, and increase overall operational efficiency.

For choosing correct WMS the comparison was made considering the following factors: assessment of the clients after usage of system, assessment of warehouse operations, quality of logistics operations, analytics, management platform features, total cost of system implementation. Based on the calculation of total costs and assessment of WMS by different indicator, the best option is to choose Magaya Supply Chain.

Based on the above measures, their economic justification was carried out to prove the feasibility of implementing the proposed methods of improving warehousing. During the analysis, the impact of changes on the indicators of logistics costs of the enterprise, economic and financial indicators were calculated. After a full analysis, based on the calculated indicators, it can be concluded that the proposed project is effective and has a low level of risk, as the return on investment index exceeds 1, and the payback period is around 5 years 5 months.

CONCLUSIONS AND RECOMMENDATIONS

Integrated logistics is the future of supply chain management, offering numerous benefits, including improved efficiency, greater visibility, increased flexibility, and better customer service. By adopting an integrated logistics approach and leveraging advanced technology, businesses can stay competitive in today's globalized economy and achieve long-term success.

Companies that have an integrated supply chain increase their flexibility to adjust to client requests, competitors' actions, and events within the industry.

Steiner-Ukraine is an engineering company that operates on the territory of Ukraine for more than 15 years. Steiner-Ukraine is engaged in the supply of spare parts for technological, pumping equipment and packaging equipment both food and non-food enterprises. This company works directly with equipment and spare parts manufacturers for such well-known brands as Coca-Cola, Danone, Veres, Kormotech. Steiner-Ukraine provides a full range of services for the sale and maintenance of equipment, commissioning and technical support of equipment, design of the plant on a «turnkey» basis. The most profitable marketing season usually lasts from April to October. The main benefits for the clients provided by the company are single contract with representative of manufacturers, service-engineer, transactions in national currency.

Financial analysis showed that in 2022 almost all indicators have negative trend compared to 2021, as in 2022 war and pandemic situation greatly influenced Steiner Ukraine company in particular.

In Steiner Ukraine the crucial role in process management plays transport logistics, customs logistics, warehouse logistics and logistics service. Steiner Ukraine usually uses outsourcing logistics companies for the transportation and shipment of the cargo. Steiner has its own spare parts warehouse in order to respond quickly and efficiently to urgent needs of consumers.

Also, in order to improve the efficiency, it is necessary to pay increased attention to the human factor. There is a need to prescribe clear job descriptions and formalize all business processes of the enterprise. It is important to follow the rules of working with clients, including with regard to document flow and timely acceptance and shipment of goods.

Steiner uses CRM system to manage the relationship with the customers. Main advantages of using CRM system are the consolidation of customer data, as it collects customers' contacts, demographics, and other information, making it easy to access. Also, CRM helps to track interactions and activity. System allows to track communication with clients in chats with managers, by phone, email and other channels. Measuring performance and productivity is another benefit. CRM system allows to receive reports with detailed data on the effectiveness of the company's interaction with customers. Finally, it automates the routine processes.

One of the problems of the company is the poor performance of the spare parts warehouse, which affects the increase in delivery times and the increase in logistics costs. Other weaknesses of the company include underdeveloped product demand that leads to higher rate of missed opportunities compared to the companies which work in the same sphere, insufficient level of internal communication between departments which significantly slows down the resolution of many issues, high rate of employees turnover which unfavorably influences the reputation and profitability of the company, slows down the process of closing a deal, worsens communication with the client.

In order to solve the situation with poor warehouse performance, it is necessary to implement warehouse management system. Warehouse management software provides real-time visibility into an organization's inventory across any location, including items in transit and in stores. Real-time data can be automatically collected through a WMS instead of relying on manual data collection methods, eliminating keying errors and drastically speeding up the process.

Also, it is possible to integrate WMS and CRM systems in the future, by creating automated, proficient, and interconnected processes business will run

smoother. Thus Steiner can create a more intuitive infrastructure that not only leverages business systems but makes people's jobs easier.

We proposed model of formation of integrated logistics activities management for the engineering company. This model includes the architectural structure of an integrated logistics management system in an engineering company, which ensures correct management of warehouse, transport and procurement of materials. The use of the proposed model will contribute to the improvement of customer service, as well as increasing their involvement with the help of integrated logistics management.

Warehouse of Steiner Ukraine has the following areas: unloading/loading area, reception area, storage area, order picking area, dispatch area. Existing warehouse has combined receipt/shipment area. Sometimes it can cause some problems, as the unloading/receiving works and the shipment work are carried out at the same time, thus time delays may occur. Repackaging area is absent in the warehouse, it creates inconveniences, because spare parts come in batches, while then they are sold in pieces, so before transferring the goods to storage area the spare parts should be repacked and it will shorten the time of order picking. Storage area does not have enough space for storing all necessary spare parts, so space requirements should be recalculated according to the quantity and cubic volume of goods that will be stored when combining facilities.

In addition to poor warehouse management the weaknesses of the company include underdeveloped product demand that leads to higher rate of missed opportunities compared to the companies which work in the same sphere, insufficient level of internal communication between departments which significantly slows down the resolution of many issues, high rate of employees turnover which unfavorably influences the reputation and profitability of the company, slows down the process of closing a deal, worsens communication with the client.

In order to improve the efficiency of logistics activities and the functioning of the company as a whole, it is necessary to pay increased attention to the human factor. There is a need to prescribe clear job descriptions and formalize all business

processes of the enterprise. It is important to follow the rules of working with clients, including with regard to document flow and timely acceptance and shipment of goods. To reduce threats the company entered new markets, this can be extremely rewarding and can allow business to move to the next level and achieve new growth. Different technology and techniques are present in different markets and entering them can contribute to learning more about them, new technologies can bring easier, faster and more effective communication, better, more efficient manufacturing techniques, less wastage. Efficient work of warehouse can help the company to provide faster delivery to the client, which can increase customer satisfaction and convert this opportunity into strength. Also, it will be more effectively to agree with suppliers for the delivery of spare parts to Steiner-Ukraine without prepayment, so Steiner will have an ability to supply clients with spare parts faster, as they will be in stock and only then pay to the supplier. This will decrease the transportation cost, as it will be able to deliver several repair kits or those spare parts which are highly demanded during the year at once and not waste time and money for transportation for every delivery. To improve the work of this warehouse, it is necessary to build a new process design system, optimize the layout strategy.

Moreover, warehouse optimization should make the use of time, space, and resources in a warehouse more efficient through automation and careful planning, improving customer satisfaction and experience. Business process model is very convenient way for continuous improvement of operations quality. In addition, it is necessary to conduct the revision of processes every month and get a feedback from clients for increasing the quality of warehouse services. Continuous improvement requires periodic reviews of the whole warehouse processes in order to achieve the required effectiveness and efficiency.

As a result of the analysis of warehousing logistics management of the enterprise, there were proposed and considered such organizational and economic areas of improvement of warehousing logistics management as calculation of basic parameters of the enterprise warehouse system, reconstruction of existing warehouse and its revision of the layout design. Effectively utilizing the warehouse space

available can help improve inventory visibility, reduce travel time, and increase overall operational efficiency. When designing the warehouse layout, it is crucial to allocate maximum space to storage and inventory processing purposes while minimizing space for office areas, empty pallets, charging stations, etc.

During the analysis, the impact of changes on the indicators of logistics costs of the enterprise, economic and financial indicators were calculated. After a full analysis, based on the calculated indicators, it can be concluded that the proposed project is effective and has a low level of risk, as the return on investment index exceeds 1, and the payback period is less than 5 years.

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Appendix A

The detailed work break-down structure of the warehouse construction project