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ДИПЛОМНА РОБОТА

на тему: “Реінжиніринг виробничих бізнес-процесів підприємства”

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Олена КРАСНОНОСОВА

Харків – 2023 рік

АНОТАЦІЯ

магістерської дипломної роботи на тему

“Реінжиніринг виробничих бізнес-процесів підприємства”

Робота містить 76 сторінок, 21 таблицю, 10 рисунків, список літератури з 46 найменувань (на 4 сторінках), 5 додатків (на 21 сторінках).

Мета даної роботи полягає в узагальненні теоретико-методичних наробок стосовно виробничих бізнес-процесів підприємства та розробці практичних рекомендацій щодо їх реінжинірингу.

В роботі розкриті сутність та особливості реінжинірингу виробничих бізнес-процесів підприємства. Базою дослідження є ТОВ ВК “Поліпак ЛТД”, провідний виробник поліпропіленових пакетів і гнучкої тари.

Робота передбачає комплексний аналіз існуючих виробничих бізнес процесів з акцентом на виявлення неефективності та надання рекомендацій щодо оптимізації. Було запропоновано розробити нову систему виробничих бізнес-процесів, яка підвищить продуктивність підприємства, яка була оцінена внутрішніми та зовнішніми експертами.

Результати цього дослідження мають важливе практичне значення. Завдяки застосуванню методологій реінжинірингу, дослідження пропонує конкретні стратегії вдосконалення та оптимізації виробничих бізнес-процесів. Очікується, що ці зміни призведуть до економії коштів, покращення операцій і підвищення конкурентоспроможності на ринку.

Зрештою, ця робота закладає основу для більш ефективної роботи ТОВ ВК “Поліпак ЛТД”. Узгодивши виробничі процеси з сучасними галузевими стандартами, компанія зможе досягти успіху на конкурентному світовому ринку.

Ключові слова: виробництво, процес, бізнес-процес, підприємство, реінжиніринг.

Рік виконання роботи – 2023, **рік захисту** – 2023.

ABSTRACT

master's thesis

"Reengineering of production business processes of the enterprise"

The thesis consists of 76 pages, 21 tables, 10 figures, 46 references (on 4 pages) and 5 appendices (on 21 pages).

The goal of the work is to generalize theoretical and methodical foundations regarding production business processes of the enterprise and develop practical recommendations in their reengineering.

In the study, an essence and specifics of reengineering of production business processes of the enterprise is uncovered. The basis of research is LLC PC Polypack LTD, a leading manufacturer of polypropylene bags and flexible containers. The work entails a comprehensive analysis of the existing production business processes, with a focus on identifying inefficiencies and providing recommendations for optimization. It was suggested to develop a new system of production business processes that will increase effectiveness and productivity of the enterprise; it was also evaluated by internal and external experts.

The findings of this research hold significant practical value. Through the application of reengineering methodologies, the study offers concrete strategies to refine and streamline production business processes. These interventions are expected to result in cost savings, improved operations, and heightened market competitiveness.

Ultimately, this study lays the basis for a more efficient operation within LLC PC Polypack LTD. By aligning production processes with contemporary industry standards, the company is poised to thrive in the competitive global market.

Keywords: production, process, business process, enterprise, reengineering.

Year of performance – 2023, **year of defense** – 2023.

CONTENT

INTRODUCTION

In today's dynamic business landscape, organizations face an ever-evolving set of challenges and opportunities. Among the paramount concerns is the need to enhance operational efficiency, improve product quality, and remain competitive in the global market. This necessitates a critical examination and potential overhaul of production business processes to align with the demands of contemporary industry standards. The topic of "Reengineering of production business processes" emerges as a important area of study with relevance and practical significance in the context of modern industrial operations.

The primary purpose of this master's thesis is to generalize theoretical and methodical foundations regarding production business processes of the enterprise and develop practical recommendations in their reengineering. This involves identifying inefficiencies, recommending process optimizations, and evaluating the impact of proposed changes. The study aims to deliver actionable insights that can be implemented to enhance the company's operational efficiency and overall performance.

The subject of this research encompasses the production business processes at LLC PC Polypack LTD. The object of the study is the reengineering initiatives aimed at optimizing these processes to achieve higher efficiency and productivity.

The research will employ a combination of qualitative and quantitative methods, including process modeling, morphological analysis, logical generalization, graphical method, data analysis, expert interviews, economical effect definition and literature review. Information sources will include internal company data, industry best practices, scholarly articles, and relevant case studies.

The study is grounded in the recognized need for organizations to continuously evolve and adapt to changing market conditions.

The topic of reengineering production business processes is of paramount importance in the realm of economic science. Scholars like Jacob K., Gaikwad M., Pratt M., Elazis E., Dumas M., Birt J., and Borja C. have made significant contributions

to the understanding and definition of business processes. Their insights highlight the critical role of structured activities and tasks in achieving organizational goals and objectives.

By delving into the practical application of reengineering strategies within LLC PC Polypack LTD, this study aims to not only contribute to the broader body of economic science but also offer actionable insights for businesses seeking to enhance their operational effectiveness. The research endeavors to build upon the foundational work of these distinguished scholars, aligning with their vision of fostering continuous improvement and innovation within organizational processes.

In order to achieve this goal, the following tasks were set:

– to consider an essence of the production business processes and analyze their place in the system of business processes at the enterprise;

– to study the specifics of the business processes classifications and principles of its implementation at the enterprise;

– to provide the general information of LLC PC Polypack LTD that produces polypropylene bag and flexible containers; as well as to conduct technical, economic and financial analysis of its activity;

– to analyze current production business processes of LLC PC Polypack LTD and define the strategic opportunities for development;

– to develop a new system of the LLC PC Polypack LTD production business processes and support its efficiency with expert analysis;

– to evaluate an effect of the implementation of the recommended production business processes system.

This research holds practical value as it offers tangible strategies to improve how production processes are carried out. By applying reengineering methods, companies can streamline operations, cut costs, and boost efficiency, leading to greater competitiveness in the market.

The master's thesis is organized into distinct sections, each dedicated to a critical aspect of the reengineering process. It consists of introduction, three chapters, conclusions, list of references and appendices.

1. THEORETICAL BASIS OF REENGINEERING OF PRODUCTION BUSINESS PROCESSES OF THE ENTERPRISE

1.1. Essence of reengineering of production business processes of the enterprise

Production business processes in the management system is crucial for effective work performance at any company. To truly understand its value, it's important to disclose the basic concept and how it influences the overall production process. This way, the organization can work towards improvement and progress in a cohesive manner. It will be described the previous works of different authors concerning the terms “reengineering” and “business process”.

After analyzing literature connected with definition of the term “business process” we can mark that it is mainly defined as activity or as a set of activities to achieve the goal of the organization where the business process is applied. The morphological analysis of the term “business process” is performed in tab. 1.1.

Table 1.1

Morphological analysis of the term “business process”

Author	Definition	Genus	Key words
1	2	3	4
Jacob K. [27]	well-defined system of setting goals, planning and controlling any action’s execution. It constitutes a set of interrelated operations or functions necessary to accomplish desired organisational objectives.	System	Goals, controlling, interrelated operations.
Gaikwad M. [20]	a collection of business tasks and activities that when performed by people or systems in a structured course, produces an outcome that contributes to business goals.	Tasks	Tasks, activities, system.
Pratt M. [40]	is an activity or set of activities that accomplish a specific organizational goal. It should have purposeful goals, be as specific as possible and produce consistent outcomes. It is an established set of repeatable activities.	Activity	Goal, organization, specific.

Ending of tab. 1.1

1	2	3	4
Elazis E. [18]	a set of activities or tasks triggered by an event to achieve a specific organization's goal. It carries out in a variety of flexible infrastructures and networked settings where they play important roles and allow key business activities.	Set of activities	Tasks, goal, plan, roles.
Dumas M. [17]	about managing entire chains of events, activities and decisions that ultimately add value to the organization and its customers.	Chains	Chains, events, decisions.
Birt J. [10]	procedure developed from a sequence of steps to achieve goals. Each step represents a specific assigned task. Business process workflows may involve people, materials, equipment and other elements needed for a department or individual to meet established goals.	Procedure	Steps, goal, task, element.
Borja C. [11]	a sequence of activities that starts with one or more inputs and transforms them into outputs. It helps the organization achieve its objectives and strategic initiatives. It can help change or improve an organization's performance in achieving its goals and contribute to organizational learning and flexibility.	Activities	Input, output, organization, goals, flexibility.

Jacob K. [27] definition of business process is a useful term because it accurately describes the essential elements of a business process. It is defined as a "well-defined system of setting goals, planning, and controlling any action's execution, constituting a set of interrelated operations or functions necessary to accomplish desired organizational objectives."

It emphasizes that a business process is a systematic and coordinated method to attaining company goals rather than merely a collection of acts. The phrase also underlines how crucial it is to structure company planning, decision-making, and action-taking processes in order to achieve the goals. There are no specific illustrations of what a business process might entail or how it might be used in practice in the

definition. This could make it challenging for someone unfamiliar with the idea to completely understand what it includes.

The term of business process by Gaikwad M. [20] is appropriate that states it is "a collection of business tasks and activities that, when done by people or systems in a planned course, creates an output that contributes to company goals."

Firstly, the definition places emphasis on the idea that a business process is a group of connected actions and activities that work together to produce a certain result. The management of corporate operations and the efficient utilization of resources depend on this understanding. Secondly, the concept also emphasizes the value of structure and a methodical approach when carrying out corporate operations. The notion that business processes should be continuously improved over time is not stressed enough in the definition. This is a crucial component of process management because it guarantees that the procedure will stay effective and efficient even when business requirements change.

The definition written by Pratt M. [40] of a business process as "an activity or set of activities that accomplish a specific organizational goal. It should have purposeful goals, be as specific as possible and produce consistent outcomes. It is an established set of repeatable activities" is a good term for describing what is a business process. A business process is an established set of repeatable activities that implies that the process can be optimized and improved over time, which is critical for increasing efficiency and effectiveness.

Overall, the supplied definition includes the main components of an organized approach to attaining corporate goals through a series of repetitive activities that yield consistent results. While this is a key part of a business process, it overlooks other critical factors such as the importance of technology, the necessity for continual development, and the impact of corporate culture.

The definition of Elaziz E. [18] about process " a set of activities or tasks triggered by an event to achieve a specific organization’s goal. It carries out in a variety of flexible infrastructures and networked settings where they play important roles and allow key business activities." is relatively not opened.

It shows how crucial networked environments and adaptability are to corporate processes. This acknowledges the dynamic nature of business operations and the requirement for organizations to change with the business environment. The concept also opens the significant roles that business processes play in facilitating essential business operations. It may also be flawed because it only considers an organization's internal operations without taking into account the outside influences that may have an impact on a business process, such as regulatory compliance, consumer demands, or supply chain interruptions. The significance of cooperation and communication among many stakeholders participating in a business process is not taken into consideration.

Overall, the phrase of Dumas M. [17] used to define a business process is a good one since it encompasses the key elements of an organized approach to managing a series of actions, choices, and events that eventually create value to the organization and its clients. "Business process is about managing entire chains of events, activities and decisions that ultimately add value to the organization and its customers" shows that managing a business process entails overseeing a series of actions, choices, and events. It underlines that a business process's objective is to benefit both the corporation and its clients. This illustrates how business procedures ultimately aim to increase organizational performance and create value for stakeholders. The significance of measuring and assessing process performance to pinpoint opportunity areas and enhance outcomes is not mentioned clearly in the definition.

The definition of Birt J. [10] places emphasis on fact that a business process is a systematic method of achieving particular objectives. It acknowledges that a business process is often created by a series of actions intended to produce particular results. It also shows that a business process may contain staff, supplies, tools, and other components necessary for a unit or individual to achieve predetermined objectives. On the other side, concept's categorization of business processes may be unnecessarily simplified because it implies that each stage corresponds to a certain assigned task.

Lastly Borja C. [11] suggests “business process is a sequence of activities that starts with one or more inputs and transforms them into outputs. It helps the organization achieve its objectives and strategic initiatives. It can help change or

improve an organization’s performance in achieving its goals and contribute to organizational learning and flexibility. This points out that a business process is a systematic method for obtaining particular results through a predetermined order of stages. Business procedures can enhance organizational performance and promote organizational learning and adaptability by offering a defined framework for attaining particular goals.

In conclusion, after analyzing all of the definitions and their advantages and disadvantages it is possible to form the generic one that will include all important points. A business process is a clearly defined system that includes a variety of tasks or activities that are brought on by an event and that, when carried out in a structured way, result in the accomplishment of particular corporate goals. It includes overseeing lengthy chains of actions, choices, and events that ultimately bring value to the organization and its clients. It can be intended to accomplish both short-term and long-term goals. In order to assure consistency and repeatability, a series of actions must first be identified, documented, and managed to create a business process. They can involve a range of adaptable structures and networked environments, and they can be continually monitored over and improved to maximize performance.

Concept of reengineering in terms of business processes refers to the thorough overhaul and transformation of existing workflows and procedures. It involves rethinking and redesigning how tasks are carried out to achieve significant improvements in efficiency, quality, and overall performance. This often involves adopting innovative technologies, revisiting organizational structures, and implementing new strategies to streamline operations and drive positive outcomes [42].

"Reengineering" in the context of business processes refers to the fundamental overhaul and transformation of existing workflows and procedures within an organization. This approach advocates for a radical rethinking of how tasks are executed, aiming to achieve substantial improvements in key performance metrics such as cost efficiency, quality of output, customer service, and operational speed.

The concept of reengineering gained widespread recognition and prominence through the groundbreaking work of management scholars Michael Hammer and

James Champy. In their influential book "Reengineering the Corporation: A Manifesto for Business Revolution", they argued that traditional incremental improvements were often inadequate in the face of rapidly changing business environments. Instead, they proposed a bold and comprehensive reexamination of processes to achieve breakthrough results [24].

Reengineering has since become a well-debated and widely implemented practice across various industries. Its relevance is particularly pronounced in today's dynamic business landscape, where technological advancements, shifting market dynamics, and evolving consumer preferences necessitate adaptable and innovative operational models.

Reengineering holds significant promise for achieving transformative impact, it is not without its critics. Some argue that its radical nature can encounter resistance from employees, and that a more gradual approach may be more suitable in certain organizational contexts. Additionally, successful reengineering initiatives require adept leadership, a deep understanding of organizational culture, and effective change management strategies [42].

In summary, reengineering offers a potent approach to driving substantial improvements in organizational performance. It involves a radical reevaluation of core processes and has been championed by influential management thinkers. While reengineering has demonstrated its potential for revolutionary impact, organizations must carefully assess its suitability and approach within their unique circumstances.

Business processes are activities that organizations perform to achieve specific goals or outcomes. They are the series of steps and tasks that transform inputs into outputs.

Operational processes include core and supporting. Core processes are the primary processes that directly create value for customers. For example, in a manufacturing company, core processes include production and quality control. Supporting processes while not directly involved in creating value, provide essential support to core processes. Examples include maintenance, IT support, and procurement [16].

Production processes including manufacturing, assembly line production, batch production. Manufacturing process involves the conversion of raw materials or components into finished goods through various methods such as assembly, machining, or chemical processes. Assembly line production is a specific type of manufacturing process where products are produced in a linear sequence with each worker responsible for a specific task. Batch production process, products are manufactured in specific batches, allowing for customization within each batch.

Management processes include strategic planning, budgeting and financial planning and performance management. Strategic planning process involves setting the organization's overall direction and goals. It includes activities like defining mission and vision, formulating strategies, and setting objectives. Budgeting and financial planning process involves creating budgets, allocating resources, and financial forecasting to ensure the organization's financial stability and sustainability. Performance management involves monitoring and assessing organizational performance against predefined metrics and targets. [23]

Innovation processes includes research and development and product lifecycle management. Research and development (R&D) involve creating new products, services, or improving existing ones to meet evolving market demands and maintain competitiveness. Product lifecycle management encompasses the management of a product from its conception, through engineering and manufacturing, to its end of life.

Supply chain processes involve procurement and sourcing, logistics and distribution. Procurement and sourcing involve acquiring goods and services from external suppliers. Logistics and distribution manage the movement and storage of materials, finished goods, and information from suppliers to customers.

Customer-facing processes include sales and marketing and customer support and service. Human resources processes involve recruitment and onboarding, performance appraisal and talent management [8].

Information technology processes that are IT service management process manages the delivery of IT services to meet business needs and software development lifecycle governs the development, testing, and deployment of software applications.

Each of these processes contributes to the overall functioning of an organization, and effective management of all types is essential for sustained success. The short formulation is disclosed in the tab. 1.2.

Table 1.2

Business processes structure at the enterprise

Business process	Types of subprocesses	Key objectives
Operational	Core Supporting	Handle customer requests/orders. Provide efficient operational support.
Production	Manufacturing Assembly line production Batch production	Transform raw materials into goods. Streamline assembly for efficiency. Customize production batches.
Management	Strategic planning Budgeting and financial planning Performance management	Set clear business direction. Optimize resource allocation. Align employee performance.
Innovation	Research and development Product lifecycle management	Drive innovation and improvement. Manage products efficiently.
Supply chain	Procurement and sourcing Logistics and distribution	Secure cost-effective supplies. Ensure timely delivery.
Customer-facing	Sales and marketing Customer support and service	Acquire and retain customers. Resolve issues, boost satisfaction.
Human resources	Recruitment and onboarding Performance appraisal and talent management	Hire and develop talent. Evaluate and nurture employees.
Information technology	IT service management Software development lifecycle	Deliver effective IT services. Develop quality software.

Production processes are at the core of business operations. They transform raw materials into finished products or services, directly impacting customer satisfaction and operational efficiency. These processes are closely tied to supply chains and quality control measures. Regardless of industry or company size, they play a crucial role in determining competitiveness and success. Optimizing production processes is a key strategy for sustained growth and resilience in the market. In summary, production

processes are central to business success, influencing customer satisfaction and overall effectiveness.

1.2. The production business processes classification and implementation approaches

Business processes are a key element of any successful enterprise. They are the steps, rules and procedures that define how activities and tasks are performed, and they can have a major impact on the production line.

The introduction of business processes at the enterprise is a crucial step towards achieving efficiency, quality, and customer satisfaction. The adoption of a process improvement approach depends on the specific needs of the enterprise and the goals that it aims to achieve [34].

Regardless of the approach adopted, the successful introduction of business processes at the enterprise requires the participation of all employees and a commitment to continuous improvement. By adopting a structured approach to process improvement and focusing on customer satisfaction, an enterprise can achieve significant improvements in efficiency, quality, and cost savings.

Approaches when creating or changing business processes aim to provide the company's management team possible ways of applying useful structures to develop the work of enterprise and rise the efficiency of tasks' performance. It is important to define possible solutions and their consequences when creating and changing business processes to reach desired outcome [30].

Business Process Reengineering (BPR) is a structured approach to improving business processes through the analysis and design of workflow and organizational processes within an organization. The overarching goal of BPR is to enable organizations to become more efficient and productive. As such, BPR focuses on identifying areas in which substantial performance improvements could be achieved.

Pursuing BPR involves radical redesign, often with the help of technology both external and internal, in order to achieve improvements with respect to cost, quality, service and speed. To execute this approach, it's necessary to identify core processes,

map current processes and objectives, analyze process changes for current environment, define best practices based on industry standards and determine the effectiveness of new process flows [8].

In addition to improving the efficiency of current processes and reducing costs, there are other potential benefits from introducing BPR into a business. For example, by standardizing key processes across departments or multiple locations it can help facilitate communication between staff members as well as improve customer satisfaction by providing streamlined services [37].

BPR offers significant advantages. It reduces costs by eliminating non-value-added tasks and streamlining cycle times. This leads to improved product and service quality, enhancing the company's reputation and competitiveness. Additionally, BPR enhances customer satisfaction by minimizing lead times and refining the overall customer experience.

However, BPR can face challenges. Resistance from employees and the need for a deep understanding of existing processes can be hurdles. Effective change management and thorough analysis are crucial for successful BPR implementation [29].

When introducing business processes at the enterprise, many companies choose a Lean approach. Lean management is based on the Toyota Production System created in the late nineteen fifties and is rooted in techniques such as value stream mapping, process flow analysis, kaizen events and other tools. The main goal of this method is to maximize customer value while minimizing waste.

To apply Lean management, it is important to first identify customer needs and understand what adds value for them. Value should be the basis for any decision taken for business process optimization. Secondly, processes should be optimized through experimentation and improvement. This is achieved through the identification of improved quality and reduced cost.

Finally, it is vital to ensure that actions are implemented and results monitored effectively throughout each stage of business process improvement. This requires constant communication between different departments and all stakeholders involved

in order to agree on changes, prioritize tasks and ensure that improvements are reflected in practice.

Lean manufacturing involves identifying waste, such as overproduction, excess inventory, and unnecessary motion, and implementing improvements to eliminate or reduce it. This approach requires a cultural shift towards continuous improvement and involves the participation of all employees [38].

Lean manufacturing offers several key advantages. It streamlines operations by eliminating non-value-added tasks, thereby reducing cycle times and enhancing productivity. Additionally, it cuts costs by eliminating waste and improving process efficiency. The result is improved product and service quality through the elimination of defects and the reduction of variability.

Yet, there are potential challenges with Lean Manufacturing. Implementing it can be a substantial shift for an enterprise, potentially met with resistance from employees.

It's important to note that while Lean is highly effective at waste reduction and cycle time improvement, it may not address all inefficiencies within a process. Therefore, a comprehensive approach to process improvement may be needed [43].

Six sigma is a data-driven approach to process improvement that aims to eliminate defects and reduce variability in business processes. This approach uses statistical methods to identify and analyze the causes of defects and to implement improvements that result in more consistent and reliable processes.

The Six sigma methodology is divided into five phases, or "DMAIC" (Define, Measure, Analyze, Improve and Control). By following these steps, businesses can streamline their processes and improve their bottom line.

The Define phase outlines the exact parameters that need to be addressed. The Measure phase looks at the current performance of the process and how it matches up to the desired outcome. In the Analyze phase, statistical data is gathered to identify trends and patterns. The Improve phase focuses on implementing solutions that drive improvement in the process, while the Control phase establishes systems to monitor progress.

The phases are shown in fig. 1.1.

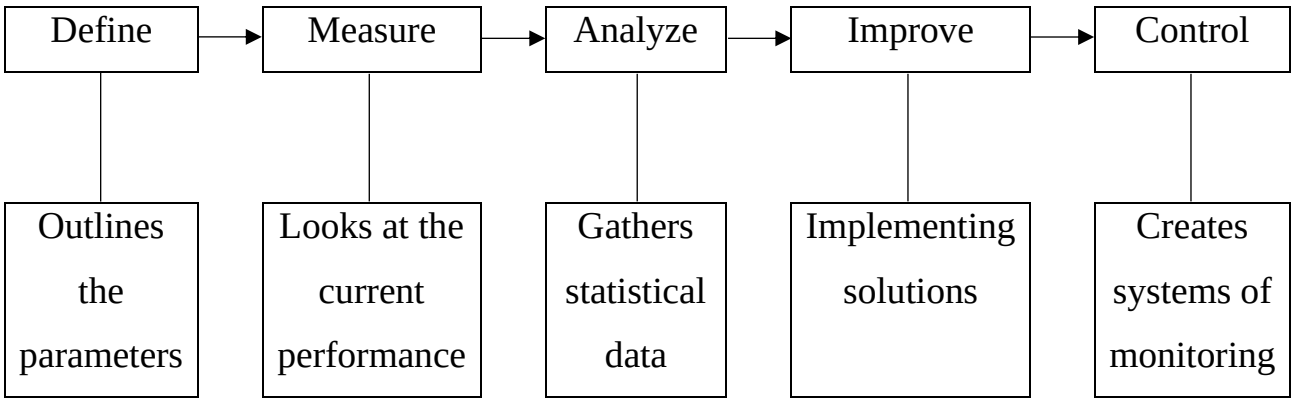

Fig. 1.1. The Six Sigma methodology phases

The six sigma methodology has been adopted by many businesses worldwide, as it helps create a culture of continuous improvement through data-driven decisions. It also helps businesses identify areas of waste and inefficiency that can be eliminated through careful analysis and process optimization. Ultimately, six sigma can help enterprises save time and money while increasing quality assurance throughout their organization [12].

Six Sigma offers several significant advantages. Firstly, it enhances the quality of products and services by reducing defects and minimizing variability. Additionally, it streamlines operations by eliminating non-value-added activities, leading to reduced cycle times and increased productivity. Moreover, it achieves cost savings through process optimization and waste elimination.

However, there are potential drawbacks to implementing Six Sigma. It can be a complex approach that demands specialized training for employees. Furthermore, it requires a substantial investment of time and resources, which may pose challenges for some enterprises. It's important to carefully weigh these factors when considering Six Sigma as a process improvement methodology.

The Kaizen methodology is a widely-accepted approach to business improvement. It centers on continuous improvement of already existing processes, with an emphasis on quality and customer satisfaction. The goal is to make the process

simpler, more efficient, and more cost-effective. The Kaizen approach can provide significant value in terms of process optimization and cost savings [31].

The key elements of Kaizen are:

– standardization: define who, what, where, when and how tasks should be done;

– visualization: establish visual controls that make it easy to understand the workflow at a glance;

– efficiency: reduce "waste" (time and effort) in the process by eliminating non-essential steps and reducing processing time for each step in the process;

– measurement: monitor performance regularly to identify areas for improvement or uncover any underlying problems that need to be addressed;

– improvement: establish an ongoing program of improvement initiatives, leveraging feedback from stakeholders and data from previous efforts to identify new opportunities for development or changes needed in existing processes.

The Kaizen processes steps are shown in the fig. 1.2.

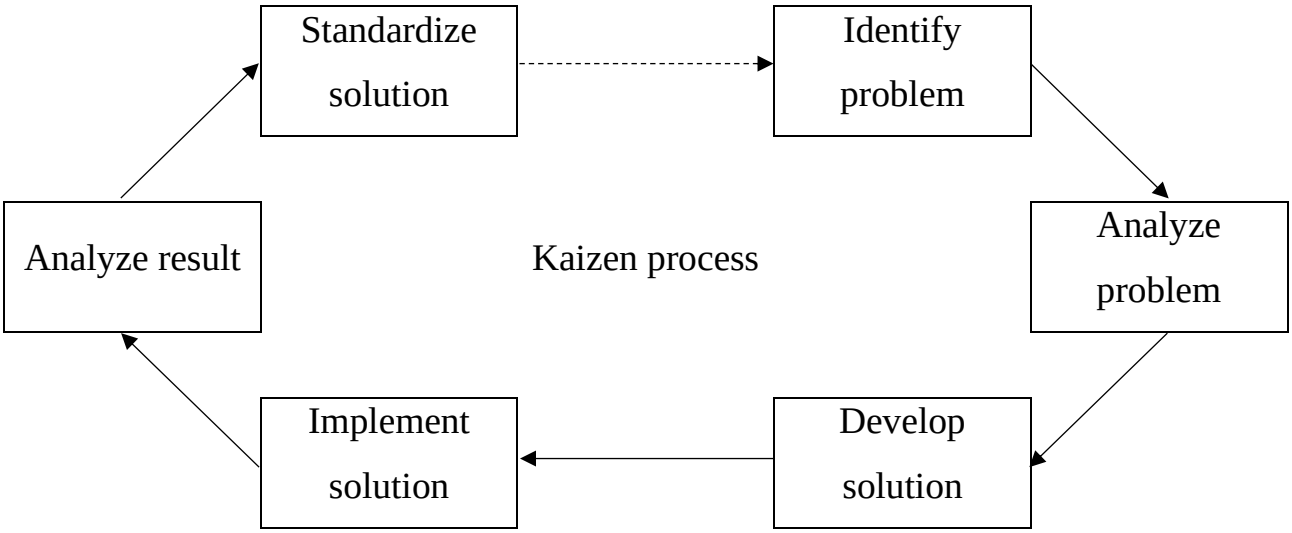

Fig. 1.2. The Kaizen process steps

By implementing the Kaizen approach effectively, businesses can achieve significant gains in efficiency, customer satisfaction, and cost savings – all while making better use of their resources than ever before [43].

Business process automation (BPA) is a must-have for enterprises that want to increase their efficiency, which can be achieved with the right approach. BPA provides a way of removing manual processes, streamlining operations and improving customer service. The use of technology enables organizations to identify and eliminate bottlenecks in their workflow, reducing labor costs and providing quicker turnaround times for projects.

In order for BPA to be effective, it's important to ensure that all stakeholders are on board and that processes are designed with the customer in mind. The crucial steps are: Identify tasks that could be automated - start by analyzing existing processes and identifying areas which could benefit from automation. Communication between departments should also be taken into consideration as this can affect the efficiency of the process. Secondly, define objectives - when introducing BPA it's important to have specific objectives in mind such as cost reduction, increased customer satisfaction or improved efficiency. This will ensure everyone is working towards a common goal. Design user interface - all user interfaces should be designed with usability in mind so users can easily interact with the system. This will ensure that employees can quickly learn how to use the system and become more productive [33].

By following these steps, businesses can successfully implement BPA and reap the benefits of increased efficiency and improved customer service.

Business process management (BPM) is a holistic approach to managing and improving business processes. This approach involves the systematic management of business processes from end to end, from design to implementation to monitoring and improvement [26].

BPM involves identifying the business processes, defining their objectives, and mapping the process flow. The process is then analyzed to identify inefficiencies and bottlenecks, and improvements are implemented. BPM also involves continuous monitoring and improvement to ensure that the process remains efficient and effective.

BPM offers several significant advantages. Firstly, it enhances process efficiency by pinpointing inefficiencies and implementing improvements. Additionally, it leads to improved quality of products and services by identifying and

rectifying defects. Moreover, it achieves cost savings through waste elimination and process optimization.

However, there are potential challenges to implementing BPM. It can be a complex approach that necessitates specialized training for employees. Additionally, there may be resistance to change, with employees potentially hesitant to adopt new processes. It's important to note that BPM primarily focuses on managing and enhancing business processes, and may not address other inefficiencies in the overall process. This should be taken into consideration when implementing BPM [28].

Total quality management (TQM) is a comprehensive approach to quality management that involves the participation of all employees in the process of continuous improvement. This approach involves the identification and elimination of defects and the implementation of systems and processes to ensure quality.

TQM involves a focus on customer satisfaction and the implementation of systems and processes to ensure that customer needs are met. This approach is highly effective in improving quality and customer satisfaction [32].

The key benefits of TQM include:

Improved quality of products and services by eliminating defects and implementing systems and processes to ensure quality.

TQM involves a focus on customer satisfaction, which can improve customer loyalty and retention.

Approach involves the participation of all employees in the process of continuous improvement, which can improve employee engagement and motivation.

However, there are also some potential cons of using TQM, including:

TQM is primarily focused on quality management and may not address other inefficiencies in the process.

This approach may require a significant cultural shift in an enterprise, and there may be resistance to the new approach from employees.

TQM may not address larger strategic goals and may focus only on quality management.

Lean six sigma is a combination of the Lean and Six sigma approaches to process improvement. This approach involves the use of Lean tools and techniques to eliminate waste and reduce cycle times, combined with Six Sigma tools and techniques to identify and eliminate defects and reduce variability [21].

Lean six sigma is highly effective in achieving significant improvements in process efficiency, quality, and cost savings.

Lean Six Sigma is a powerful methodology that offers a range of benefits to organizations. It combines the strengths of Lean, which focuses on eliminating waste and optimizing processes, with Six Sigma's emphasis on reducing defects and variability. By doing so, it brings about significant improvements in process efficiency, ultimately leading to cost savings. Additionally, it plays a crucial role in enhancing the overall quality of products and services.

On other hand, like any transformative approach, there are potential challenges. Implementing Lean Six Sigma can be intricate, requiring specialized training for employees to fully grasp and apply its principles effectively. Moreover, introducing such a methodology may encounter resistance from employees who are accustomed to existing processes. It's important to acknowledge that while Lean Six Sigma excels at certain aspects of process improvement, it may not address every inefficiency in a given process.

In conclusion, Lean Six Sigma presents a powerful framework for organizations looking to streamline operations, enhance quality, and reduce costs. However, it's essential to approach its implementation with a clear understanding of its complexities and potential areas of resistance within the organization. When applied thoughtfully, Lean Six Sigma can yield substantial benefits and contribute to sustainable process improvements.

When it comes to implementing business processes within an enterprise, there exists a range of approaches to consider. The ultimate aim is to identify and adopt the approach that aligns most effectively with the specific requirements and objectives of the business. This decision is pivotal, as it sets the foundation for how operations will be organized, streamlined, and optimized to achieve optimal outcomes. Therefore, a

careful evaluation of the available approaches, considering factors such as organizational structure, industry requirements, and desired outcomes, is essential. By doing so, the enterprise can embark on a path that not only enhances efficiency but also supports sustainable growth and competitive advantage in today's dynamic business landscape [30]. The comparison of approaches is shown in tab. 1.3.

Table 1.3

Comparison of implementation approaches of processes

Approach	Key principles	Benefits	Suitable industries
Business process reengineering	Rethinking and redesigning processes	Efficiency gains, cost reduction, improved quality	Diverse industries
Lean manufacturing	Identify and eliminate waste	Reduced waste, improved efficiency, faster production cycles	Manufacturing
Six sigma	Reduce variability and improve quality	Enhanced quality, reduced defects, increased customer satisfaction	Manufacturing, service, healthcare
Kaizen	Continuous Small Improvements	Efficiency Gains, Employee Empowerment	Manufacturing, Service
Business process automation	Automate repetitive tasks	Increased efficiency, reduced human error, faster processing	IT, finance, operations
Business process management	Process optimization	Improved visibility, enhanced collaboration, streamlined workflows	Diverse industries
Total quality management	Quality excellence	Improved quality, customer satisfaction, enhanced employee morale	Manufacturing, service
Lean six sigma	Combined approach	Comprehensive process improvement, reduced costs, higher quality	Diverse industries

Lean Six Sigma is widely used across various industries for process improvement. It combines the principles of Lean Manufacturing (focused on waste reduction) and Six Sigma (focused on reducing process variation) to create a comprehensive approach to process optimization. Many organizations find Lean Six Sigma effective in achieving higher quality, lower costs, and improved operational efficiency. [36]

The first step in finding the right approach is to look internally and analyze current business processes. Start looking for areas of improvement, redundancies, and areas where automation or other streamlining could help. This will give an understanding of what needs to be addressed before deciding on an introduction method [25].

Consultative approach. A consultant works with team to help identify improvements and suggest new ways of improving efficiency. This can be a great option if the team lacks experience in process implementation or optimization.

Top-Down methodology. This method focuses on improving existing processes from the top-level down instead of introducing new ones from scratch. It can be used to streamline existing processes and reduce redundancies.

Automation. Technology can help reduce manual labor and improve data accuracy in many organizations, making them more efficient overall. Automation can also help reduce downtime due to human error or unexpected delays in production or other activities [46].

When it comes to implementing business processes within an enterprise, there is no one-size-fits-all solution. The most suitable approach will depend on a multitude of factors, including the scale of the organization. This process demands a comprehensive understanding of the enterprise's unique needs, its existing operational framework, and its long-term objectives. Moreover, it necessitates a consideration of the industry in which the enterprise operates.

2. COMPREHENSIVE ANALYSIS OF LLC PC POLYPACK LTD ACTIVITY

2.1. General characteristics of the enterprise, technical, economic and financial analysis of its activity

Incorporated in 2000, LLC PC Polypack LTD is a limited liability corporation (after, LLC PC Polypack LTD). They manufacture flexible containers and polypropylene bags (Big-Bag). Items are adaptable, strong, and resistant to a variety of impacts. They also come in packaging that is eco-friendly and are utilized in a variety of industries, including trade and agriculture [15].

The business established a full-cycle enterprise, put in place an ISO 9001 quality management system, and gathered a team of experts who are aware of the significance of each client's requirements since it is committed to the idea of offering consumers high-quality packaging. A general and useful modern alternative to the material meant for packing, subsequent transportation, warehousing, and storage of numerous groupings of commodities is polypropylene packaging (both food and household categories). The following traits set it apart: strength, durability, wear resistance, flexibility, ease of weldability, small weight, environmental friendliness [35].

Now, the company manufactures 960 thousand flexible containers annually and 36 million bags. The primary product line includes 500 and 1000 kg capacity soft containers and 5, 10, 25, and 50 kg capacity polypropylene bags. Being a full-cycle producer, they are not constrained by the conventional assortment and are prepared to create unique packaging in accordance with the demands of each particular customer. available for 4-color printing and with the option to alter the color of the box entirely or partially [7].

In addition, LLC PC Polypack LTD, a producer of polypropylene fabric bags, has been accredited in line with ISO 9001 and other standards, and is outfitted with cutting-edge machinery from global manufacturers.

The company LLC PC Polypack LTD has articulated a clear mission statement that encapsulates its vision. It is committed to furnishing industrial enterprises in

Ukraine with innovative solutions that pave the way for their advancement. These solutions encompass the creation and enhancement of cutting-edge products and services, underpinned by the high quality and professional dedication of its workforce. This endeavor is particularly advantageous for the packaging needs of various industries, including food, chemicals, and others [44].

It was identified the organizational structure of LLC PC Polypack LTD and it is shown in fig. 2.1.

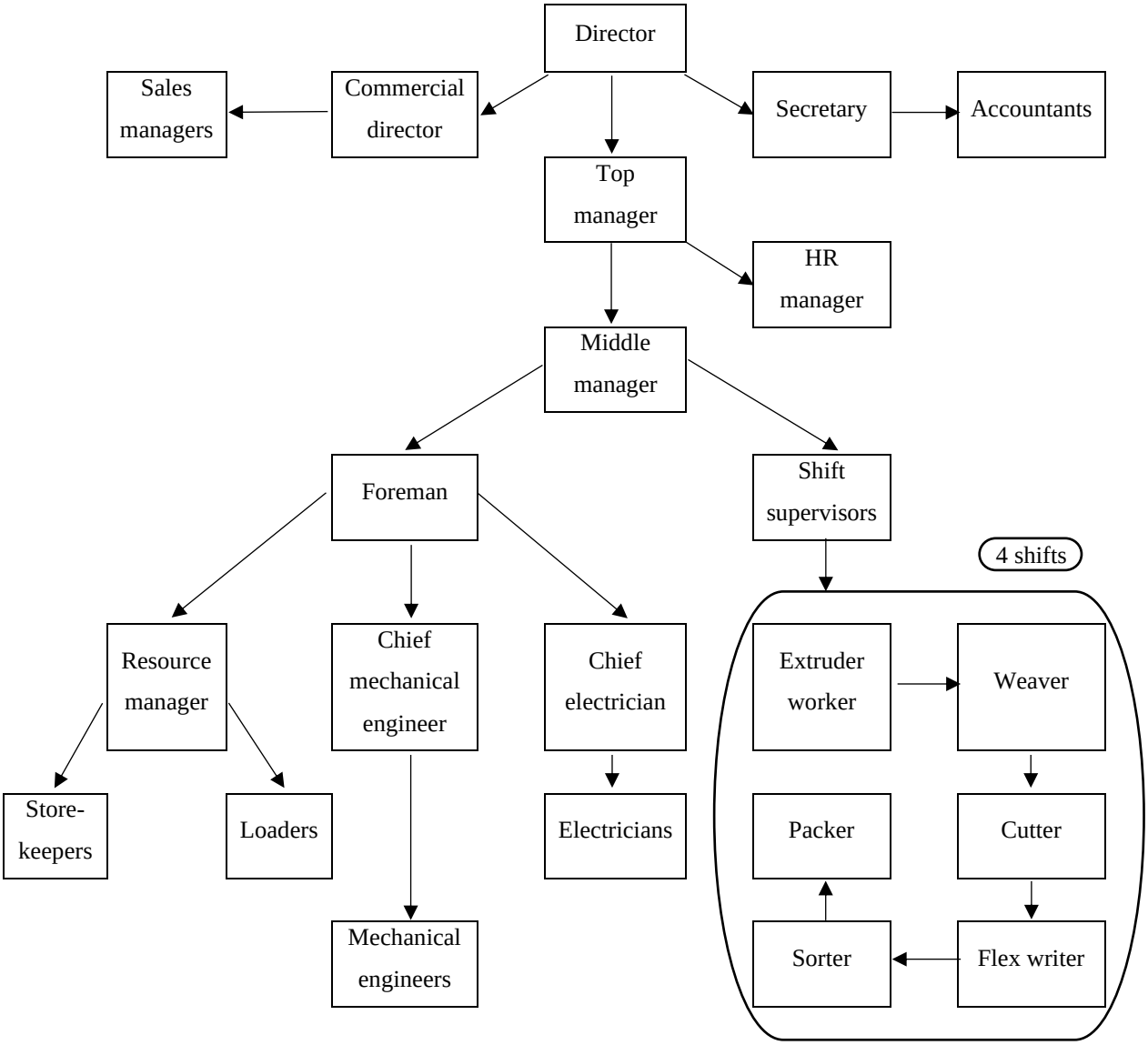

Fig. 2.1. Organizational structure of LLC PC Polypack LTD

LLC PC Polypack LTD employs a vertical organizational structure. Among the co-founders and investors, one holds a substantial 40% share and assumes the role of director within the company. While the remaining two co-founders do not directly engage in the production process, they are involved in decision-making.

The director serves as the highest point of the company's structural framework. This includes optimizing the company's assets, as well as overseeing the financial and economic ramifications of its operations. The director creates both annual and long-term plans, ensuring strict adherence to requisites outlined by federal, regional, and local budgets, state non-budgetary social funds, suppliers, consumers, and creditors, encompassing financial institutions. Directly reporting to the director are the Secretary, Commercial Director, and Top Manager. Additionally, the director takes on the responsibility of delivering information to subordinates regarding organizational objectives, action plans, and goals [15].

The secretary at LLC PC Polypack LTD takes on a multifaceted role as both the business manager and organizer of the director's schedule. They are instrumental in generating organizational reports, overseeing the accounting team, and assuming primary responsibility for developing, validating, and reconciling accounting reports.

The company employs four accountants who involves in the organization's financial operations. Their responsibilities encompass primary accounting maintenance, the handling of crucial documents such as waybills, cash transactions, personnel records, and contracts with contractors.

Sales managers at LLC PC Polypack LTD are instrumental in creating promotional materials, actively seeking out potential clients, and organizing promotional events like presentations and exhibits to drive product and service sales.

Top managers play a crucial role in supporting the director by contributing to the development of long-term plans and assigning tasks to staff. They hold direct authority over the HR manager and the hiring process. Additionally, they oversee the intermediate manager who is responsible for the enterprise's production division. This top-level management collaborates closely with the intermediate manager to formulate both strategic (short-term) and operational (day-to-day) plans. Middle managers take

charge of the entire production cycle, ensuring that production goals are met, high-quality products are consistently delivered, and resources are optimally utilized. They spearhead efforts to enhance production organization, technology, and automation, while also focusing on defect prevention and quality improvement.

The resource manager, chief mechanical engineer, and chief electrician report to the foreman. Typically, this official guarantees the operation of equipment and technological procedures. His area of accountability includes the entirety of the enterprise's technological activity.

The storekeeper oversees the receipt and release of goods, manages inventory, and maintains warehouse records. This includes checking shipment documentation and monitoring finances.

Within the team of loaders, there is a top loader who holds a higher position and possesses greater expertise. They handle the processing of items in the warehouse, involving tasks such as sorting, stacking, carrying, reweighing, packaging, and utilizing basic handling tools and transportation methods [15].

A team of mechanical engineers, led by the chief mechanical engineer, ensures the efficient operation of assigned machinery. They conduct both planned and unforeseen maintenance, manage consumables and replacement parts, oversee equipment upgrades, and handle the installation of new machinery.

In the electrical department, a leader oversees a team of electricians responsible for maintaining and repairing electronic equipment. They also manage the installation of new electrical networks and conduct planned preventative maintenance.

Shift managers collaborate with the middle manager to create operational plans, communicating daily and monthly plans to staff. They coordinate tasks for each employee, ensuring adherence to production standards and the timely delivery of high-quality products. LLC PC Polypack LTD operates on a four-shift system, each with a full team of workers, assistants, and supervisors. Fig. 2.1 depicts the production process in order, with extruder workers, weavers, cutters, flex writers, sorters, and packers being included. A worker at an extruder created threads using chalk and polypropylene. Weavers use different machinery to weave threads into polypropylene canvas. With

specialized machinery, a cutter separates canvas into the required size, then seals and sews one side of the bag. Flex writers create prints with customers' defined logos. To identify a fault, the sorter must inspect the finished product. Most 500 bags are compressed into one pack by the packer. They are all required to carry out previously created daily and monthly plans and record their progress in specific lists. The shift supervisor checked the work after that.

LLC PC Polypack LTD features a vertically integrated organizational structure with clear hierarchy, but it diverges from convention in departments like sales, finance, supply, technical assistance, and manufacturing.

In this structure, a single individual oversees the entire operation, including various divisions. This leader typically makes strategic decisions independently, and authority flows from top to bottom. While providing high control, it also increases the manager's workload due to the expansive scope of responsibilities [22].

LLC PC Polypack LTD is a versatile producer, offering a diverse array of products that cater to various industries. They specialize in creating packaging solutions and advanced materials, showcasing a dedication to quality and innovation. Their wide-ranging product line enables them to meet the unique needs of different businesses and industries. Whether it's specialized packaging or cutting-edge materials, LLC PC Polypack LTD is a trusted name in providing reliable and top-notch products.

They prioritize quality and customer satisfaction, offering innovative packaging solutions and materials. Their product line is continuously updated to keep up with market demands.

One of the standout features of LLC PC Polypack LTD is their ability to customize products to meet the specific needs of their customers. Whether it's tailoring packaging solutions or creating specialized materials, they have a flexible approach that allows for personalization. This ensures that businesses can get exactly what they need to meet their unique requirements. The ability to customize products not only showcases LLC PC Polypack LTD's commitment to customer satisfaction but also highlights their expertise in adapting to the diverse demands of different industries. This personalized approach sets them apart as a reliable and adaptable partner for

businesses seeking tailored solutions. The range of products produced by LLC PC Polypack LTD is shown in the tab. 2.1.

Table 2.1

Range of products produced by LLC PC Polypack LTD

Type of product	Capacity	Purposes	Characteristics
Heat-cut bags	50 kg, 25kg, 10kg, 5kg	Flour, grain and bulk food products	Durability and spillage protection
Bags with polyethylene liner	50 kg, 10kg, 5kg	Sugar packaging	Moisture protection
Bags with valve and polyethylene liner	50 kg	Bulk substances of chemical production	Fast loading, moisture protection
Soft containers (Big Bag)	500 kg, 1000 kg	Chemical products	Heat resistant, lifting
Polypropylene hose fabric	Standard sizes of hose fabric	Soft containers, polypropylene bags, technical products.	Adjustable

The heat-cut bags offered by LLC PC Polypack LTD are specially designed for storing bulk food products like flour and grains. These bags are made from environmentally-friendly raw materials that are certified for contact with food, ensuring the safety of the stored items. The unique weaving of these bags provides exceptional strength and protection against spillage, adding an extra layer of security during storage and transport [15].

One of the notable features of these heat-cut bags is their exclusive packaging options. Customers have the flexibility to customize the size, density, and color of the bag according to their specific preferences and requirements. Additionally, these bags offer the possibility of printing, allowing for up to four colors to be used. This

customization option provides businesses with the opportunity to showcase their brand and product information effectively.

The bags also feature an easy opening neck, which facilitates quick and convenient loading of products. This practical design element streamlines the process of filling the bags with bulk food items. Overall, LLC PC Polypack LTD's heat-cut bags stand out for their quality, eco-friendly materials, unique weaving for added strength, and the ability to be tailored to meet individual customer needs.

LLC PC Polypack LTD offers specialized bags with a polyethylene liner, specifically designed for packaging sugar. These bags are crafted from environmentally-friendly raw materials that are certified for safe contact with food, ensuring the integrity of the stored product. The incorporation of a polyethylene liner provides an added layer of protection, safeguarding the sugar from moisture and environmental factors during storage and transport.

The innovative sewing technology used in these bags facilitates convenient loading, streamlining the packaging process for businesses. Additionally, the bags are reinforced with a sturdy thread, ensuring the safe storage of products, even when stacked in tall columns of 40 rows or more. This robust construction adds an extra level of security, giving businesses confidence in the integrity of their packaged sugar.

Overall, LLC PC Polypack LTD's bags with a polyethylene liner are a reliable choice for sugar packaging, featuring eco-friendly materials, advanced sewing technology, and reinforced threads for safe storage, even in tall stacks.

LLC PC Polypack LTD introduces a specialized line of bags equipped with a valve and polyethylene liner, meticulously designed to handle a diverse range of bulk substances commonly found in chemical production. The inclusion of a valve proves instrumental in expediting the loading process, ensuring efficiency and convenience for businesses. Furthermore, these bags are fortified with a polyethylene liner, effectively shielding the contents from exposure to potentially damp environments, thereby preserving the integrity and quality of the stored substances.

A distinctive weaving pattern characterizes these bags, providing them with exceptional strength and conferring a heightened level of protection against potential

mechanical damage. This robust construction serves as a testament to their durability and resilience, even in demanding industrial settings. To further enhance their versatility, businesses have the option to incorporate printing with the capacity for up to four colors. This feature empowers companies to personalize the bags with branding elements and pertinent product information, enabling effective communication with customers.

The container is constructed using UV-stabilized polypropylene woven fabric, with a density ranging from 95 to 160 g/m2 and a flat width between 1200 to 1850mm.

The container's loading height is determined based on the bulk density of the material being loaded. Standard loading capacities for the container are set at 500 to 1000 kg. It adheres to a safety factor of 5:1, which is verified by a certificate affirming its compliance with both international and national regulations governing the transportation of hazardous materials.

The lifting loops of the container are seamlessly integrated with the body, extending its structural integrity. Depending on the preferred loading method, containers with 1, 2, or 4 loops can be produced. For added protection against environmental elements, the container can be outfitted with an inner polyethylene liner (which can be heat-resistant or antistatic, tailored to the customer's specifications) along with an external polyethylene cover.

Upon request, the container can be customized to include additional features such as a loading valve, unloading valve, apron, lapel, or a double bottom, ensuring it aligns precisely with the customer's requirements.

Polypropylene hose/sleeve fabric is a high-strength multifunctional material. Today, its advantages have found application in various industries, construction and agriculture. Polypropylene hose fabric is used for the manufacture of soft containers, polypropylene bags, as well as various technical products.

The sleeve fabric offered by LLC PC Polypack LTD boasts remarkable durability, ensuring it stands up to the rigors of various applications. Its robust construction not only provides strength but also makes it highly resistant to UV exposure, safeguarding it against the damaging effects of prolonged sunlight.

Additionally, the fabric exhibits excellent chemical resistance, making it suitable for environments where contact with potentially corrosive substances is a concern.

Furthermore, the sleeve fabric is engineered to be rot-resistant, offering longevity even in environments with high moisture content. This quality ensures that the fabric maintains its integrity over time, even when exposed to damp conditions. Moreover, it's worth noting that this fabric has the versatility to be used for food storage applications, providing a safe and reliable option for storing edible products. This multifaceted fabric is designed to meet a range of needs, making it a valuable choice for various industries and applications [15].

LLC PC Polypack LTD, as a Ukrainian-based company, holds a significant position in the local market for industrial polypropylene packaging solutions. With a market share ranging from 30% to 35% among native producers, the company has established itself as a prominent player in the industry. This strong presence indicates that LLC PC Polypack LTD has effectively captured a substantial portion of the market, showcasing the quality and reliability of its products to Ukrainian businesses.

However, it's important to note that the entry of new competitors from India, offering cheaper products, poses a challenge for LLC PC Polypack LTD. The influx of these cost-effective alternatives may potentially disrupt the established market dynamics. Ukrainian businesses, seeking to optimize costs, might be inclined to explore these more economical options, potentially impacting LLC PC Polypack LTD's market share.

In light of this, LLC PC Polypack LTD should focus on maintaining its competitive edge by emphasizing the unique value propositions of its products. This could include highlighting the quality, durability, and specialized features of its packaging solutions. Additionally, the company might consider strategies such as diversification of product offerings, targeted marketing campaigns, and exploring new markets or segments to mitigate the impact of new entrants and secure its position in the evolving landscape. Adapting to changing market conditions and continually innovating will be crucial for LLC PC Polypack LTD to navigate the challenges posed by emerging competitors.

LLC PC Polypack LTD balance sheet and income statement for years 2021 (appendix A) and 2022 (appendix B) are used to conduct technical and economic analysis of its activity [15].

Performance indicators analysis refer to a set of quantifiable measurements used to gauge a company's overall long-term performance. Used by an organization for evaluating achievements of a specific activity it is engaged in. Success is defined in terms of progressing towards strategic goals, but very often, success is simply referred as the repeated achievement of some level of operational goals [45].

We start from general performance indicators, Output and sales that results of analysis displayed in tab. 2.2.

Table 2.2

Output and sales performance indicators

Indicator	2021	2022	Increase	Growth Rate, %
Sales revenue, th UAH	1847017	992932	-854085	-46,24%
Commercial product, th UAH	2 003 033	696 884	-1306148	-65,21%
Gross product, th UAH	2009992	698558	-1311435	-65,25%
Net output, th UAH	612724	121566	-491158	-80,16%
Share of Net output, %	30,59%	17,44%	-13,15%	-42,97%
Value added, th UAH	687782	283604	-404178	-58,77%
Share of Value added, %	37,24%	28,56%	-8,68%	-23,30%

Sales revenue saw a drastic decline from 1,847,017 th UAH in 2021 to 992,932 th UAH in 2022. This represents a decrease of 854,085 th UAH or by 46.24%. This significant drop in revenue indicates a challenging market environment or internal issues that impacted the company's top-line performance.

Commercial product also experienced a substantial decrease from 2,003,033 th UAH in 2021 to 696,884 th UAH in 2022. This signifies a decrease of 1,306,148 th UAH or by 65.21%. This points towards a significant reduction in the value of the company's commercial products, which may have been influenced by shifts in market demand or other factors.

Gross product followed a similar trend, decreasing from 2,009,992 th UAH in 2021 to 698,558 th UAH in 2022. This represents a decrease of 1,311,435 th UAH or by 65.25%. This indicates a substantial drop in the overall production value, which may have been affected by various internal or external factors.

Net output experienced a dramatic decrease from 612,724 th UAH in 2021 to 121,566 th UAH in 2022. This reflects a decrease of 491,158 th UAH or by 80.16%. This signifies a significant reduction in the net output value, which may have been influenced by changes in production levels or cost factors.

Share of net output dropped from 30.59% in 2021 to 17.44% in 2022, indicating a decrease of 13.15% or by 42.97%. This suggests that the proportion of net output within the company's overall operations decreased, even though the overall net output value dropped.

Value added exhibited a notable decrease from 687,782 th UAH in 2021 to 283,604 th UAH in 2022. This represents a decrease of 404,178 th UAH or by 58.77%. This indicates a significant reduction in the value added to products and services, potentially influenced by changes in production processes or cost structures.

Share of value added decreased from 37.24% in 2021 to 28.56% in 2022, reflecting a decrease of 8.68% or by 23.30%. This implies that the proportion of value added within the company's overall operations decreased, even though the overall value added dropped.

This analysis demonstrates a challenging year for the company, with significant declines across key financial indicators. These trends may be indicative of broader market challenges and internal factors affecting the company's performance that is destruction of the part of production.

Next group are Turnover indicators. That calculates how quickly a business conducts its operations. Most often, turnover is used to understand how quickly company collects cash from accounts receivable or how fast the company sells its inventory. Turnover is the total amount of money LLC PC Polypack LTD receives as a result of the sales from goods over a certain period of time and they calculated in tab. 2.3.

Table 2.3

Turnover performance indicators

Indicator	2021	2022	Increase	Growth Rate, %
Assets turnover, turns	0,85	0,45	-0,40	-47,16%
Days total assets outstanding, days	427,42	808,96	381,53	89,26%
Current assets turnover, turns	1,78	0,88	-0,90	-50,66%
Days current assets outstanding, days	205,19	415,83	210,64	102,65%
Accounts receivable turnover, turns	3,38	1,64	-1,75	-51,58%
Days accounts receivable outstanding, days	107,87	222,76	114,89	106,51%
Accounts payable turnover, turns	6,34	4,26	-2,07	-32,73%
Days accounts payable outstanding, days	57,58	85,61	28,02	48,66%
Inventories turnover, turns	4,89	3,71	-1,17	-23,98%
Days inventories outstanding, days	74,71	98,28	23,57	31,55%

Assets turnover decreased significantly from 0.85 in 2021 to 0.45 turns in 2022. This marks a decrease of 0.40 turns or a by 47.16%. This indicates that the company generated less revenue relative to its total assets in 2022, signifying potential inefficiencies in asset utilization.

Days total assets outstanding increased notably from 427.42 days in 2021 to 808.96 days in 2022. This represents an increase of 381.53 days or by 89.26%. The substantial increase in days outstanding suggests that assets were tied up for a longer duration in 2022, possibly due to slower turnover or delayed realization of value.

Current assets turnover experienced a significant decrease from 1.78 in 2021 to 0.88 in 2022. This signifies a decrease of 0.90 or by 50.66%. This indicates that the company generated less revenue relative to its current assets in 2022, potentially indicating challenges in effectively utilizing short-term resources.

Days current assets outstanding increased dramatically from 205.19 days in 2021 to 415.83 days in 2022. This reflects an increase of 210.64 days or by 102.65%. The substantial rise in days outstanding suggests that current assets were tied up for a longer duration in 2022, possibly due to slower turnover or delayed realization of value.

Accounts receivable turnover witnessed a significant decrease from 3.38 in 2021 to 1.64 in 2022. This represents a decrease of 1.75 or by 51.58%. This indicates that

the company collected receivables at a slower rate in 2022, potentially signaling challenges in managing credit and collections.

Days accounts receivable outstanding saw a substantial increase from 107.87 days in 2021 to 222.76 days in 2022. This marks an increase of 114.89 days or by 106.51%. The significant rise in days outstanding suggests that accounts receivable took longer to convert to cash in 2022, potentially indicating challenges in timely collection.

Accounts payable turnover decreased from 6.34 in 2021 to 4.26 in 2022. This signifies a decrease of 2.07 or by .73%. This indicates that the company paid its suppliers at a slower rate in 2022, potentially indicating shifts in payment practices or supplier relationships.

Days accounts payable outstanding increased from 57.58 days in 2021 to 85.61 days in 2022. This reflects an increase of 28.02 days or by 48.66%. The increase in days outstanding suggests that accounts payable took longer to settle in 2022, potentially indicating shifts in payment practices or supplier relationships.

Inventories turnover decreased from 4.89 in 2021 to 3.71 in 2022. This represents a decrease of 1.17 or by 23.98%. This indicates that the company's inventory turnover slowed down in 2022, potentially signaling challenges in managing and utilizing inventory efficiently.

Days inventories outstanding increased from 74.71 days in 2021 to 98.28 days in 2022. This marks an increase of 23.57 days or by 31.55%. The increase in days outstanding for inventories suggests that inventory held for a longer period in 2022, potentially indicating challenges in inventory management.

Overall, the analysis indicates several areas where the company's operational efficiency may have been impacted, potentially reflecting shifts in market dynamics or internal processes. These changes should be carefully examined to understand their implications on the company's performance and future strategies.

Profit indicators directly quantify the amount of profit generated, while profitability indicators provide a relative measure of how efficiently a company is utilizing its resources to generate profit. Both sets of indicators are crucial for assessing

a company's financial health and performance. Indicators of Profit and profitability analysis performed in tab. 2.4.

Table 2.4

Profit and profitability performance indicators

Indicator	2021	2022	Increase	Growth Rate, %
Gross profit, th UAH	365883	121875	-244008	-66,69%
Profit on sales, th UAH	46660	11816	-34844	-74,68%
Total costs, th UAH	1800357	981116	-819241	-45,50%
Operational profit, th UAH	70078	17573	-52505	-74,92%
Earnings before taxes, th UAH	86875	7532	-79343	-91,33%
Net profit, th UAH	72034	6461	-65573	-91,03%
Earnings before interest and taxes, th UAH	97815	17676	-80139	-81,93%
Earnings before interest, taxes, depreciation, th UAH	230969	95156	-135813	-58,80%
Return on sales, %	2,53%	1,19%	-1,3%	-52,89%
Product profitability, %	2,59%	1,20%	-1,4%	-53,53%
Enterprise profitability, %	3,28%	0,81%	-2,5%	-75,27%
Return on assets, %	3,33%	0,29%	-3,0%	-91,18%
Return on equity, %	6,7%	0,6%	-6,1%	-91,19%
Return on investments, %	6,2%	0,6%	-5,7%	-91,15%

Gross profit changed from 365,883 th UAH to 121,875 th UAH. In 2022 compared to 2021, gross profit decreased by 244,008 th UAH or by 66.69%. It means that the company generated significantly less profit from its core operations in 2022.

Profit on sales changed from 46,660 th UAH to 11,816 th UAH. In 2022 compared to 2021, profit on sales decreased by 34,844 th UAH or by 74.68%. It means that the company earned significantly less profit per unit of sales revenue in 2022.

Total costs changed from 1,800,357 th UAH to 981,116 th UAH. In 2022 compared to 2021, total costs decreased by 819,241 th UAH or by 45.50%. It means that the company incurred substantially lower expenses in 2022.

Operational profit changed from 70,078 th UAH to 17,573 th UAH. In 2022 compared to 2021, operational profit decreased by 52,505 th UAH or by 74.92%. It means that a lower percentage of revenue was converted into operational profit in 2022.

Earnings before taxes changed from 86,875 th UAH to 7,532 th UAH. In 2022 compared to 2021, earnings before taxes decreased by 79,343 th UAH or by 91.33%. It means that the company earned significantly less before accounting for taxes in 2022.

Net profit changed from 72,034 th UAH to 6,461 th UAH. In 2022 compared to 2021, net profit decreased by 65,573 th UAH or by 91.03%. It means that a lower percentage of revenue translated into net profit in 2022.

Earnings before interest and taxes changed from 97,815 th UAH to 17,676 th UAH. In 2022 compared to 2021, earnings before interest and taxes decreased by 80,139 th UAH or by 81.93%. It means that the company earned significantly less before accounting for interest and taxes in 2022.

Earnings before interest, taxes, and depreciation changed from 230,969 th UAH to 95,156 th UAH. In 2022 compared to 2021, earnings before interest, taxes, and depreciation decreased by 135,813 th UAH or by 58.80%. It means that the financial performance before accounting for depreciation experienced a notable reduction in 2022.

Return on sales changed from 2.53% to 1.19%. In 2022 compared to 2021, return on sales decreased by 1.3%. It means that the company generated a lower percentage of profit from each unit of sales revenue in 2022.

Product profitability changed from 2.59% to 1.20%. In 2022 compared to 2021, product profitability decreased by 1.4%. It means that individual products were less profitable in 2022.

Enterprise profitability changed from 3.28% to 0.81%. In 2022 compared to 2021, enterprise profitability decreased by 2.5%. It means that the overall profitability of the enterprise experienced a significant decline in 2022.

Return on assets changed from 3.33% to 0.29%. In 2022 compared to 2021, return on assets decreased by 3.0%. It means that the efficiency of asset utilization saw a substantial drop in 2022.

Return on equity changed from 6.7% to 0.6%. In 2022 compared to 2021, return on equity decreased by 6.1%. It means that the efficiency of equity utilization witnessed a significant decline in 2022.

Return on investments changed from 6.2% to 0.6%. In 2022 compared to 2021, return on investments decreased by 5.7%. It means that the return on investments experienced a notable reduction in 2022.

Next we will analyze individual performance indicators that will show how productive, incentive, use of resources and timely consumptive performed resources of organization. There Material resources efficiency indicators calculated in tab. 2.5.

Table 2.5

Material resources efficiency indicators

Indicator	2021	2022	Increase	Growth Rate, %
Material costs, th UAH	1257155	497839	-759316,37	-60,40%
Material costs productivity, UAH/UAH	1,59	1,40	-0,19	-12,14%
Material costs intensity, UAH/UAH	0,63	0,71	0,09	13,82%
Relative economy, th UAH	-60456		–	-
Relative growth of material costs	1,14		–	-
Productivity material costs, %	4%	2%	-1%	-36,05%

In 2022 compared to 2021, LLC PC Polypack LTD experienced a significant decrease in material costs, declining from 1,257,155 th UAH to 497,839 th UAH. This marks a substantial reduction of 759,316 th UAH, which translates to a notable decrease of 60.40%. This reduction in costs indicates a positive outcome for the company, demonstrating efficient resource management and cost-saving measures.

In 2022, the company achieved a productivity ratio of 1,40 UAH of commercial product for each 1 UAH of material cost, compared to 1,59 UAH in 2021. This decrease of 0,19 UAH of commercial product per each UAH of material costs, or 12,14%, showcases a regress in resource utilization.

Furthermore, the material costs intensity, which represents the ratio of material costs to commercial product, increased from 0.63 UAH/UAH in 2021 to 0.71 UAH/UAH in 2022. This indicates a 13.82% rise in material costs intensity, suggesting a slight increase in the proportion of material costs in relation to commercial product.

LLC PC Polypack LTD spend 60456 th UAH more in 2022 than in case that company use the productivity of 2021. Material costs are growing faster than commercial product by 14%. It is bad for company finances.

Overall, the analysis reveals negative trends in material costs management for LLC PC Polypack LTD in 2022. We move on to the part of Labor resources efficiency indicators, calculation results of them showed in tab. 2.6.

Table 2.6

Labor resources efficiency indicators

Indicator	2021	2022	Increase	Growth Rate, %
Number of employees, people	336	355	19	5,65%
Labor productivity, th UAH/person	5961,41	1963,05	-3998,35	-67,07%
Labor productivity by net output, th UAH/person	1823,58	342,44	-1481,14	-81,22%
Labor intensity, p/Million UAH	0,17	0,51	0,34	203,68%
Relative economy of employees, people	-238,10		–	–
Relative growth of employees	3,04		–	–
Employees profitability, th UAH / person	138,87	33,28	-105,58	-76,03%
Variable labor costs, th UAH	149 212	42 604	-106608	-71,45%
Fixed labor costs, th UAH	149 730	42 706	-107024	-71,48%
Employees productivity, th UAH / person	298942	85310	-213631,86	-71,46%
Labor cost productivity, UAH/UAH	6,70	8,17	1,47	21,92%
Labor cost intensity, UAH/UAH	0,15	0,12	-0,03	-17,98%
Relative economy of labor costs, th UAH	18696,43		–	–
Relative growth rate of labor costs	0,82		–	–
Labor costs profitability, %	16%	14%	-2%	-11,26%

In 2022 compare to 2021 average number of employees increased from 336 people to 355 people that is by 19 persons or by53,65%. Every employee in 2021 create to the company 5961,41 th UAH of commercial product. In 2022 every employee creates for company 1963,05 th UAH of commercial product that is decrease by 3998,35 th UAH per employee or by 67,07%. Every employee in 2021 create to company 31824 th UAH of Net output, when in 2022 it is 342 th UAH of Net output, that decrease by 1481 th UAH per each employee or by 81,22% is bad result. In 2021 to create 1 mln UAH of commercial product company need 0,17 employees when in

2022 they need 0,51 employees for such operation. That is increase by 0,34 person per 1 mln UAH of commercial product. Company used 238,10 persons more in 2022 than in case they use productivity of 2021. Average number of employees grow faster than commercial product by 204%. In 2022 compare to 2021 per each employee company earn decrease from 138,87 th UAH/person to 33,28 th UAH/person of profit, that is high decrease by 105,58 th UAH of profit per employee or by 76,03%. In that part we see negative result for company.

Variable labor costs in 2022 compare to 2021 decrease from 149212 th UAH to 42604 th UAH that is by 106608 th UAH or by 71,45%. Fixed labor costs decreased from 2021 to 2022 by 107024 th UAH or it is by 71,48%, that is good for company that costs grow up. Company in 2021 produced 6,7 UAH of commercial product per each 1 UAH of labor costs, in 2022 indicator is 8,17 UAH of commercial product per 1 UAH of labor cost. That increased by 1,47 UAH of commercial product per 1 UAH of labor cost or by 21,92%. In 2021 company spend 15 kopeks of labor cost for each 1 UAH of commercial product, when the same indicator in 2022 was 12 kopeks of costs per 1 UAH of commercial product. That indicator decreased by 3 kopeks of labor cost for each 1 UAH of commercial product or by 17,98%. Company spend 18696 th UAH less than in case that we use of productivity of 2021. Labor costs grow 18% slower than commercial product. In 2021 per every 1 UAH of labor costs company earned 16 kopeks of profit when in 2022 per each 1 UAH of labor costs they earn 14 kopeks of profit, it means that the decrease by 2 kopeks of profit per each 1 UAH of LC or by 11,26%. Company has rather positive results, because more important relation of labor costs to commercial product that to profit and these indicators are negative.

The last part of indicators of LLC PC Polypack LTD we consider are property, plant and equipment (PPE) efficiency indicators.

In 2022 compare to 2021 PPE average decreased by 63059 th UAH or by 5,75%. Company produces 1,83 UAH of commercial product per each 1 UAH of PPE in 2021, that is in 2022 they produce 0,67 UAH of commercial product by each 1 UAH of PPE, that decrease by 1,15 UAH of commercial product per each 1 UAH of PPE or by 63%.

In 2021 company used 55 kopeks of PPE to produce 1 UAH of commercial product, in 2022 it was 1,48 UAH of PPE, that is increase by 94 kopek of PPE used per each 1 UAH of commercial product or by 171%. LLC PC Polypack LTD used 652361 th UAH more of PPE in 2022 than in case that they use productivity of 2021. PPE grow faster than commercial product. Per every 1 UAH of PPE company earn 4 kopeks of profit in 2021, in 2022 per each 1 UAH of PPE they earn 1 kopeks of profit, it means decrease by 4 kopeks of profit per each 1 UAH of PPE or by 73%. Company has negative results, because all the indicators in this group decrease. The analysis of indicators is shown in tab. 2.7.

Table 2.7

Property, plant and equipment efficiency indicators

Indicator	2021	2022	Increase	Growth Rate, %
Average property, plant and equipment, th UAH	1097126,5	1034068	-63059	-5,75%
Property, plant and equipment productivity, UAH/UAH	1,83	0,67	-1,15	-63,09%
Property, plant and equipment intensity, UAH/UAH	0,55	1,48	0,94	170,91%
Relative release of Property, plant and equipment, th UAH	-652361		–	–
Relative growth rate of Property, plant and equipment	2,71		–	–
Property, plant and equipment profitability, %	4%	1%	-3%	-73,13%

In the transition from 2021 to 2022, LLC PC Polypack LTD experienced significant shifts across various performance indicators. In terms of output and sales, there was a notable decrease in sales revenue by 46.24%, commercial product by 65.21%, gross product by 65.25%, and net output by 80.16%. This reduction in output and sales is reflected in the declining shares of net output and value added, demonstrating a decrease in the company's operational scale and financial performance. Turnover indicators also exhibited shifts, these reductions signify changes in the efficiency of resource utilization and operational turnover rates.

In terms of profit and profitability, there was a significant decline in various financial metrics. Gross profit saw a decrease of 66.69%, profit on sales decreased by 74.68%, and total costs reduced by 45.50%. This led to a decline in earnings before taxes by 91.33%, net profit by 91.03%, earnings before interest and taxes by 81.93%, and earnings before interest, taxes, and depreciation by 58.80%.

Moreover, return on sales, product profitability, enterprise profitability, return on assets, return on equity, and return on investments (ROI) all experienced significant decreases, indicating a substantial shift in the company's financial performance and profitability ratios. The material resources efficiency and property, plant and equipment efficiency indicators show significant negative changes, that is caused by destruction of part of the production that includes materials and equipment, when in labor terms we can see positive changes. The calculations of ratio analysis of financial statement is shown in tab. 2.8.

Table 2.8

Financial ratios

Indicator	2021	2022	Increase
Gross margin ratio, %	19,8%	12,3%	-7,5
Profit margin ratio, %	3,9%	0,7%	-3,2%
Current ratio	1,075	1,127	0,052
Quick ratio	0,528	0,755	0,228
Receivables turnover ratio, times	3,384	1,639	-1,745
Inventory turnover ratio, times	4,885	3,714	-1,172
Debt to assets	0,520	0,489	-0,031
Debt to equity	1,083	0,957	-0,126

The gross margin ratio dropped from 19.8% to 12.3%, indicating a decrease in profitability after accounting for the cost of goods sold. The profit margin ratio plummeted from 3.9% to 0.7%, signaling a significant reduction in overall profitability.

Current ratio slightly increased from 1.075 to 1.127, showing a slight improvement in the company's ability to cover short-term obligations. Quick ratio

surged from 0.528 to 0.755, indicating a higher capacity to cover immediate liabilities without relying on inventory liquidation.

Efficiency in collecting outstanding payments dropped, with the ratio falling from 3.384 to 1.639. The rate at which inventory was turning over slightly decreased from 4.885 to 3.714.

There was a slight decrease, from 0.520 to 0.489, indicating a relatively lower reliance on debt for asset financing. Debt to equity ratio decreased from 1.083 to 0.957, suggesting a slight reduction in financial leverage. These shifts in financial indicators reflect changes in the company's profitability, liquidity, efficiency, and capital structure.

Overall, the transition from 2021 to 2022 marked a period of significant adjustments in LLC PC Polypack LTD's operational and financial performance, with notable declines observed across key indicators. This period may necessitate strategic reassessment and adjustments to address the challenges faced by the company.

2.2. Analysis of production business processes of the enterprise

In an ever-evolving industry landscape, the efficiency and effectiveness of production processes play a vital role in the success of any manufacturing enterprise. This analysis delves into the specific operational dynamics at LLC PC Polypack LTD, aiming to analyze and evaluate the existing production workflows. By examining various steps of the production cycle, encompassing resource utilization, quality assurance, and logistical coordination, this part is to unearth opportunities for enhancement and optimization. Through a review of the company's current production business processes, we aim to provide valuable insights that can steer strategic decision-making. The ultimate goal is to identify areas for improvement, fostering greater operational prowess and improve LLC PC Polypack LTD's competitive edge in the market. The actual model IDF0 of production business processes is shown in the fig. 2.2.

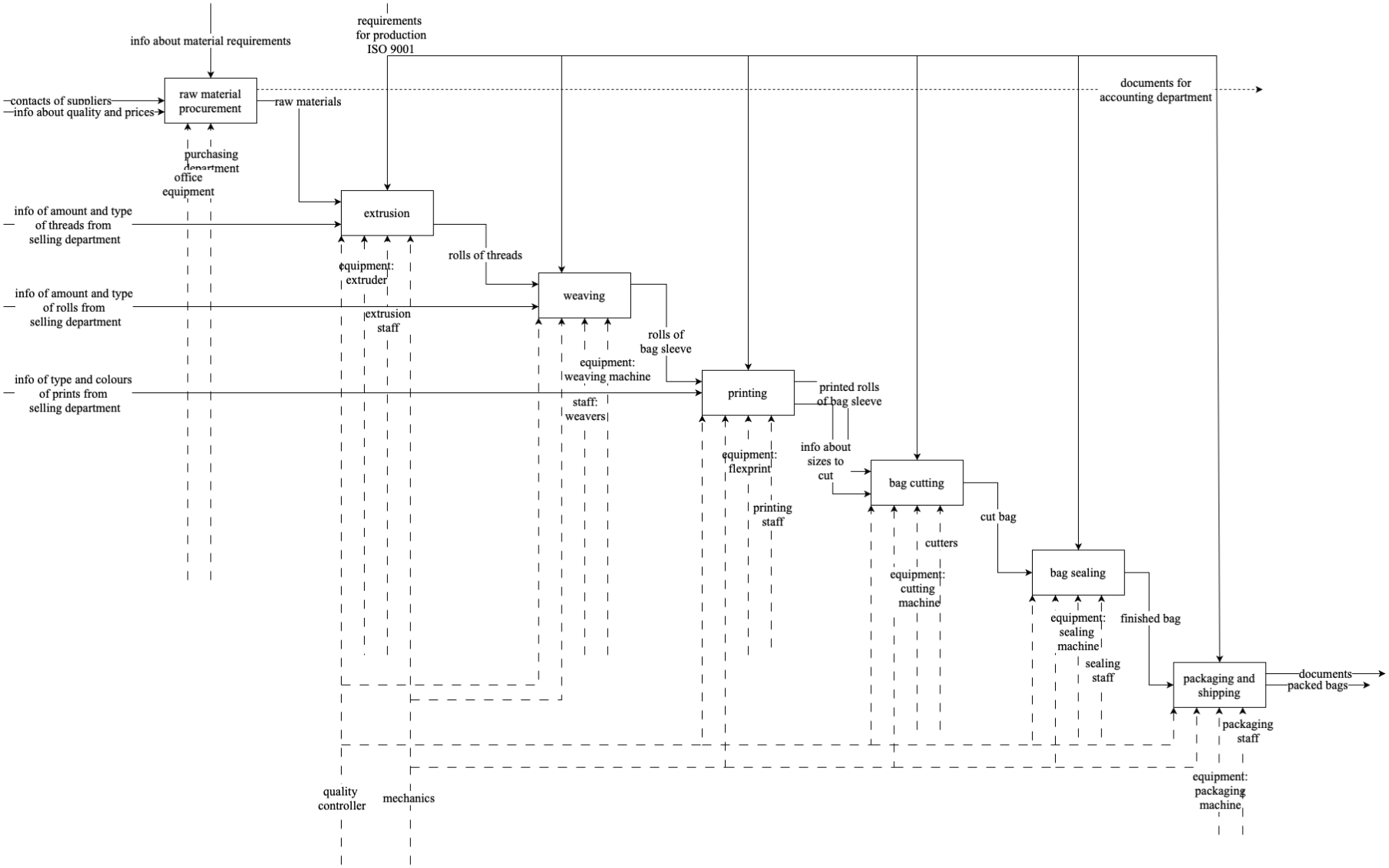

Fig. 2.2 Actual production business processes of LLC PC Polypack LTD in IDEF0 notation

The production journey begins with the procurement of essential raw materials, such as polypropylene resin, additives, and colorants. These materials are sourced from trusted suppliers, ensuring the foundation for subsequent manufacturing stages.

The polypropylene resin undergoes a transformation through a process of melting and extrusion. This sheet is then meticulously cut into smaller pieces, which are further transformed into thread-like structures. The resulting threads are expertly wound onto large rolls, setting the stage for the next phase of production.

Utilizing the thread-like structures specialized machine is employed for weaving. The completed sleeves are wound onto large rolls.

For bags requiring custom designs or logos, the polypropylene sheet is directed to the printing stage. Here, a flexographic printing process is applied to the polypropylene sheet, allowing for the incorporation of the desired patterns or logos, enhancing the visual appeal of the bags.

The printed polypropylene sheet, now enhanced with designs and patterns, undergoes precise cutting to shape individual bag blanks. Each blank is tailored to the desired size and shape, ensuring consistency in the final product. A specialized bag cutting machine is employed for this purpose.

The individual bag blanks are sealed together in the next phase. This sealing process plays a critical role in forming the sides and bottom of the bags. It employs heat sealing or ultrasonic sealing techniques to ensure the bags' structural integrity.

With the bags successfully produced and quality-inspected, the final step of the process involves packaging and preparation for shipping. During this phase, the bags are carefully packaged to protect them during transit, ensuring they reach their intended destinations in excellent condition.

Quality control is a paramount aspect of LLC PC Polypack LTD's production process. Throughout each stage of production, a dedicated control person oversees the processes, ensuring strict adherence to ISO 9001 standards. These standards serve as a benchmark for maintaining exceptional product quality and consistency. Additionally, the presence of a skilled mechanic provides vital support in maintaining and operating the production machinery, ensuring a seamless and efficient production workflow.

In conclusion, LLC PC Polypack LTD's production process for polypropylene bags is characterized by precision, quality, and adherence to industry standards. This analysis highlights the efficiency and attention to detail that contribute to LLC PC Polypack LTD's reputation as a trusted and innovative manufacturer in the industry.

The first stage of production processes is displayed in fig. 2.3 in the model EPC notation.

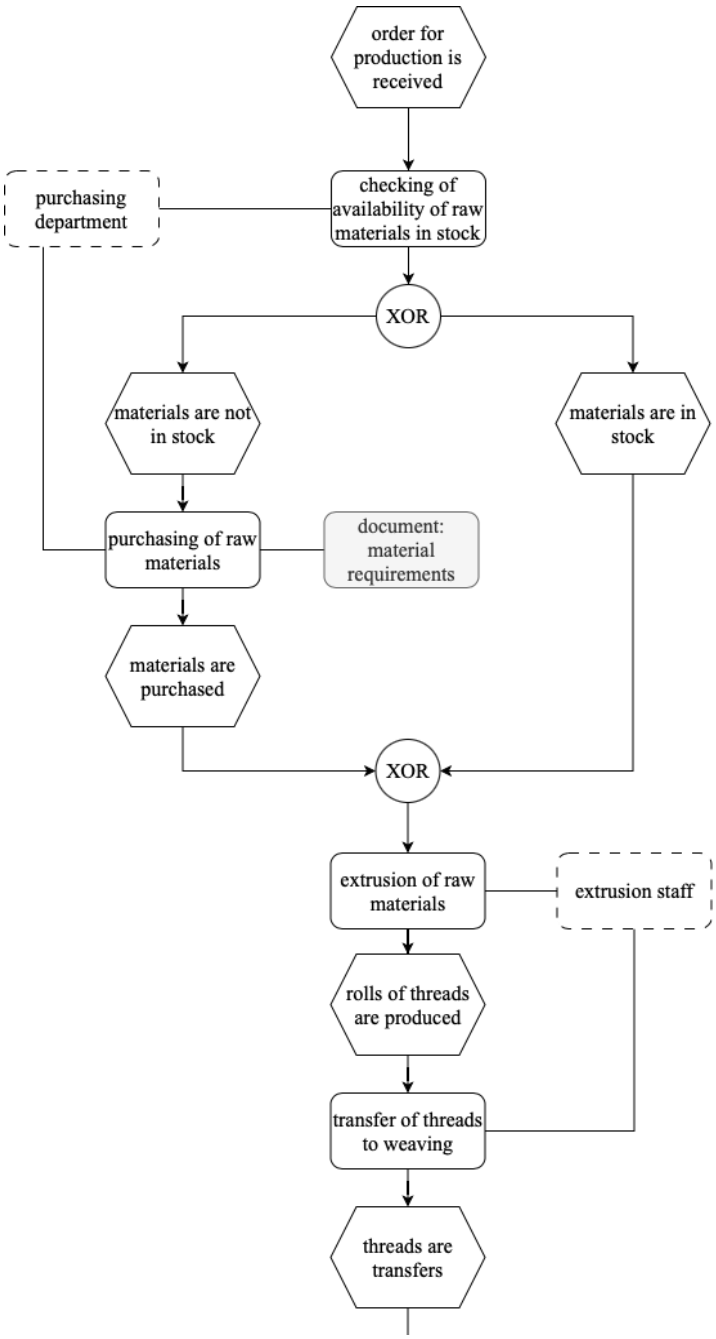

Fig. 2.3. Subprocesses of raw materials preparation and extrusion at the enterprise in EPC notation

The process is starting from the receiving of the order for production from the customer. After checking the availability of raw materials in stock by purchasing department the decision is taken based on weather materials are in stock or not.

If the required materials are not in stock purchasing department ordered them from company's suppliers, the quality of ordered products is supported by material requirements. After ordered or stock are transferred by extrusion staff for processing them through extrusion to produce rolls of threads. After the threads are transferred to weaving process. During all the further processes control of production is made according to ISO 9001 requirements. The next part of subprocesses considered bag sleeve creation are shown in fig. 2.4.

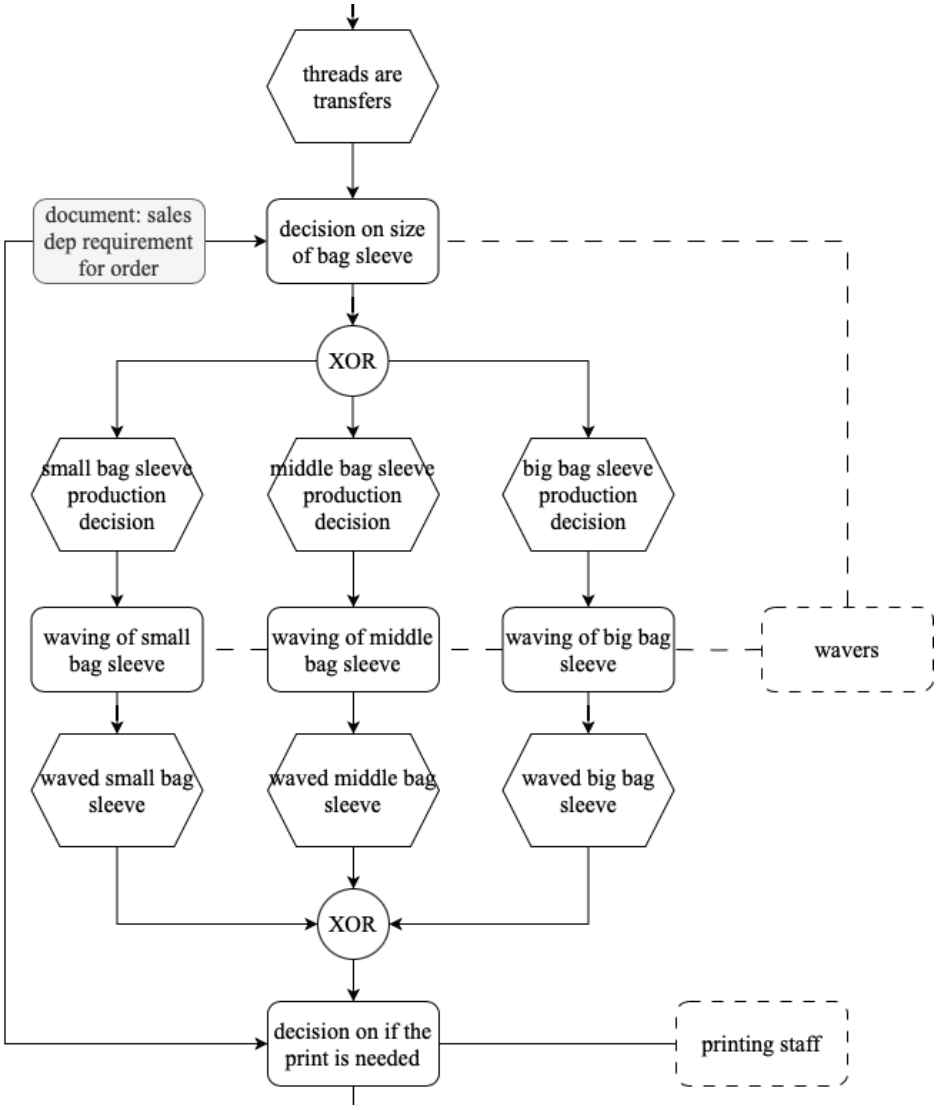

Fig. 2.4. Subprocesses of bag sleeve creation at the enterprise in EPC notation

Starting from the receiving rolls of threads from extrusion staff the decision on size of bag sleeve need to be taken. During this process thread is examined for quality level. The decision is supported by sales department requirements for order and plan of chief of the shift. The decision is based on the order requirements could wary depending on custom sizes or divided by general sizes solution. It could be small bag sleeve need to be produced on the certain machine, middle size bag sleeve or big bag sleeve. After the decision is taken based on supporting document, needed size of bag sleeve is waved on the special equipment by wavers. The next step of processes are considered in the fig. 2.5.

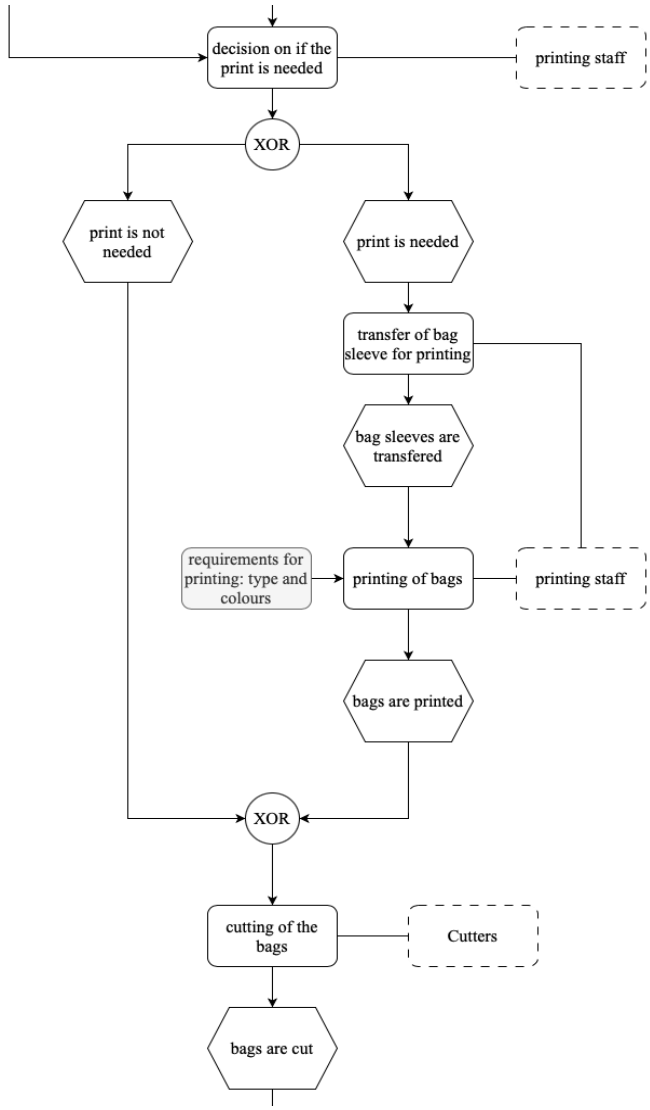

Fig. 2.5. Subprocesses of bag sleeve printing and cutting at the enterprise in EPC standard notation

After the right sized waved sleeve bag is produced it need to be considered the decision about printing based on the customers' requirements send by sales department, it is taken by printing staff. If the print is not needed it transferred right to the cutting process. If the print is required bag sleeve is transferred to the printing department. After the transfer bags are printed with the mockup up to the 4 colors. The printing process is supported by requirement for printing of its type and colors and processed by printing staff. When the bag sleeve is ready with or without print it is transferred to the cutters in department where the sleeve is cut in right sizes considering the order requirements. The last part of the subprocesses are displayed in fig. 2.6.

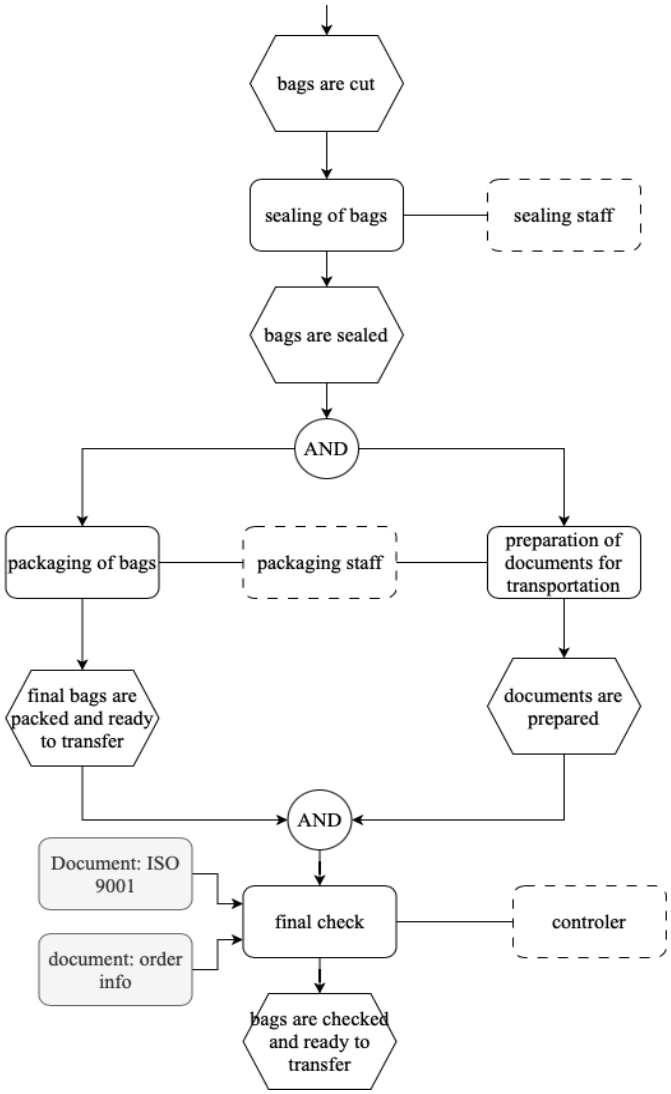

Fig. 2.6. Subprocesses of finishing the production processes at the enterprise in EPC standard notation

The process of cutting the bags is followed by sealing of bags by the special staff on the automated line. After all the production processes to accomplish the final bag product, they are packed by packaging staff using press machines. In the same time the preparation of documents for transportation are made.

Lastly, it is accomplished the final check of the product according to document of quality ISO 9001 and order information by controller. After the final check is complete the bags are ready to transfer, the production business processes are finished. The full model is presented in appendix C.

For the evaluation of production business processes express method of assessing business processes will be used. This approach outlines key components for assessing the efficacy of business process management, including metrics for individual process effectiveness, product quality benchmarks, measures of customer satisfaction with the company's outcomes, and microeconomic as well as financial performance indicators.

Based on the established process models, it is recommended to compute metrics like complexity, processability, controllability, resource intensity, and adjustability to assess the efficiency of business processes [14].

The paper proposes employing functional modeling methods like IDEF and DFD, or integrated information systems modeling methods such as ARIS, ORACLE, SAP/R3, BAAN, to develop process models. These constructed models serve as the foundation for computing efficiency indicators for business processes, including metrics like complexity, processability, controllability, resource intensity, and adjustability.

The author also determined the standard values for these metrics. To perform these calculations, it is essential to have quantitative data for fundamental parameters, such as the levels in the business process system, the instances of business processes, the breaks in process instances, the classes of business processes, the owners of business processes, the resources utilized in the process execution, the outputs in business process instances, and the regulatory documentation count. Results of analysis of current processes is shown in tab. 2.9.

Table 2.9

Current model by express method of assessing business processes

Factor	Calculation	Actual value	Normative value
Difficulty index	the levels in the business process system / the instances of business processes	0,61	≤0,66.
Processability indicator	the breaks in process instances / the classes of business processes	0,21	<1
Indicator of controllability	the owners of business processes / the classes of business processes	0,89	<1
Resource capacity	the resources utilized in the process execution / the outputs in business process instances	0,89	<1
Regulation	the regulatory documentation count / the classes of business processes	0,8	≥1

The difficulty index measures the complexity of the business process system relative to the number of instances. In this case, the actual value (0.61) is slightly below the normative value (≤0.66), indicating that the business process system is moderately complex compared to the number of instances.

The processability indicator assesses the interruptions or breaks in process instances in relation to the classes of business processes. With an actual value of 0.21, which is less than the normative value of <1, it suggests that the process instances experience minimal interruptions.

Indicator of controllability evaluates the extent to which business processes are under control by their respective owners. The actual value of 0.89 is very close to but less than the normative value of <1. This suggests that there is a high level of control over the business processes.

Resource capacity factor looks at the efficiency of resource utilization in relation to the outputs of business process instances. With an actual value of 0.89, which is less

than the normative value of <1, it indicates that the resources are effectively utilized in producing the desired outputs.

Regulation assesses the adequacy of regulatory documentation relative to the number of business process classes. With an actual value of 0,9, which is lover than the normative value of ≥1, it suggests that there is a way to change of regulatory documentation in place for the existing classes of business processes.

Overall, based on this express assessment, the business process system at LLC PC Polypack LTD seems to be well-structured and controlled, with efficient resource utilization. The complexity of the system in relation to the number of instances is moderate, and interruptions in process instances are minimal. Additionally, there is a sufficient level of regulatory documentation in place.

After calculating the five specified performance indicators, the integral indicator is calculated. If its normative value is between 1 and 2 inclusive, then the business process is effective, and if the value is greater than 2, then the business process is recognized as ineffective and in need of changes. The actual value of integral indicator is 3,5 so the system needs to be changed.

The calculations suggest that there are opportunities for significant enhancements in the system's performance and effectiveness. This implies that by implementing targeted improvements, LLC PC Polypack LTD can further optimize its production business processes, potentially leading to even higher levels of efficiency and quality.

Given the existing production structure, it is crucial to address the current challenges faced by the company, notably the significant damage to a substantial portion of the plant and the emergence of competitive players from China and India offering products at lower prices. In light of these circumstances, a strategic shift in the production processes is important. [41]

The destruction of a significant portion of the plant poses a multifaceted challenge for LLC PC Polypack LTD. It not only disrupts ongoing operations but also necessitates extensive repairs, reconstruction, and potentially even facility expansion.

This event leads to downtime, which in turn affects production schedules, delivery commitments, and revenue generation. Additionally, the financial burden of reconstruction and repairs can strain the company's resources and impact its cash flow, potentially leading to financial instability.

Simultaneously, the emergence of competitors from China and India introduces heightened market competition. These competitors often leverage lower production costs, including labor and material expenses, allowing them to offer similar products at substantially lower prices but lower quality. This can erode LLC PC Polypack LTD's market share and profitability. Furthermore, the pricing pressure exerted by these competitors can trigger a downward trend in industry prices overall.

In the upcoming section, we will delve into strategies for enhancing production business processes, along with outlining the methods of evaluation. This will provide a comprehensive approach to optimizing operations and ensuring sustained efficiency.

This revised production model not only addresses the immediate challenges but also positions the company for greater competitiveness and sustainability in the face of evolving market dynamics. It optimizes resource utilization, enhances operational efficiency, and fortifies the company's ability to offer high-quality products in a cost-effective manner.

The proposed restructuring involves a paradigm shift towards a more streamlined and efficient approach. This entails a reduced dependency on labor-intensive processes and a transition towards working with semi-finished materials that possess a certain level of accomplishment. These semi-finished materials would then be refined and finalized within the enterprise premises, accompanied by rigorous quality control measures.

3. IMPROVEMENT OF PRODUCTION BUSINESS PROCESSES OF LLC PC POLYPACK LTD

3.1. Recommendations on reengineering of production business processes

To address the challenges currently faced by LLC PC Polypack LTD, it is advised to streamline the production processes by shifting from raw materials procurement, extruding, and weaving to directly procuring bag sleeves. This strategic shift will significantly reduce labor and costs associated with resource-intensive operations. By adopting this approach, the company can bypass the costly steps of extruding and weaving, leading to substantial savings.

Furthermore, this transition aligns well with the existing challenges. Given the recent destruction of a significant portion of the production infrastructure, including equipment responsible for extruding and weaving, acquiring new machinery represents a substantial financial burden.

By focusing on procuring bag sleeves, which are already partially processed, the company can circumvent the need for expensive extruding and weaving equipment. This approach not only optimizes production costs but also allows the company to allocate resources more efficiently [39]

Additionally, this shift in production processes addresses the competition from cheaper products entering the market from India and China. By reducing resource-intensive operations and associated costs, LLC PC Polypack LTD can offer more competitive pricing for its products.

This not only helps the company maintain its market position but also allows for increased flexibility in pricing strategies, which is essential in a competitive market landscape. Overall, this recommendation not only streamlines operations but also offers a strategic advantage in overcoming the current challenges faced by the company.

The new suggested model IDEF0 is presented in fig. 3.1.

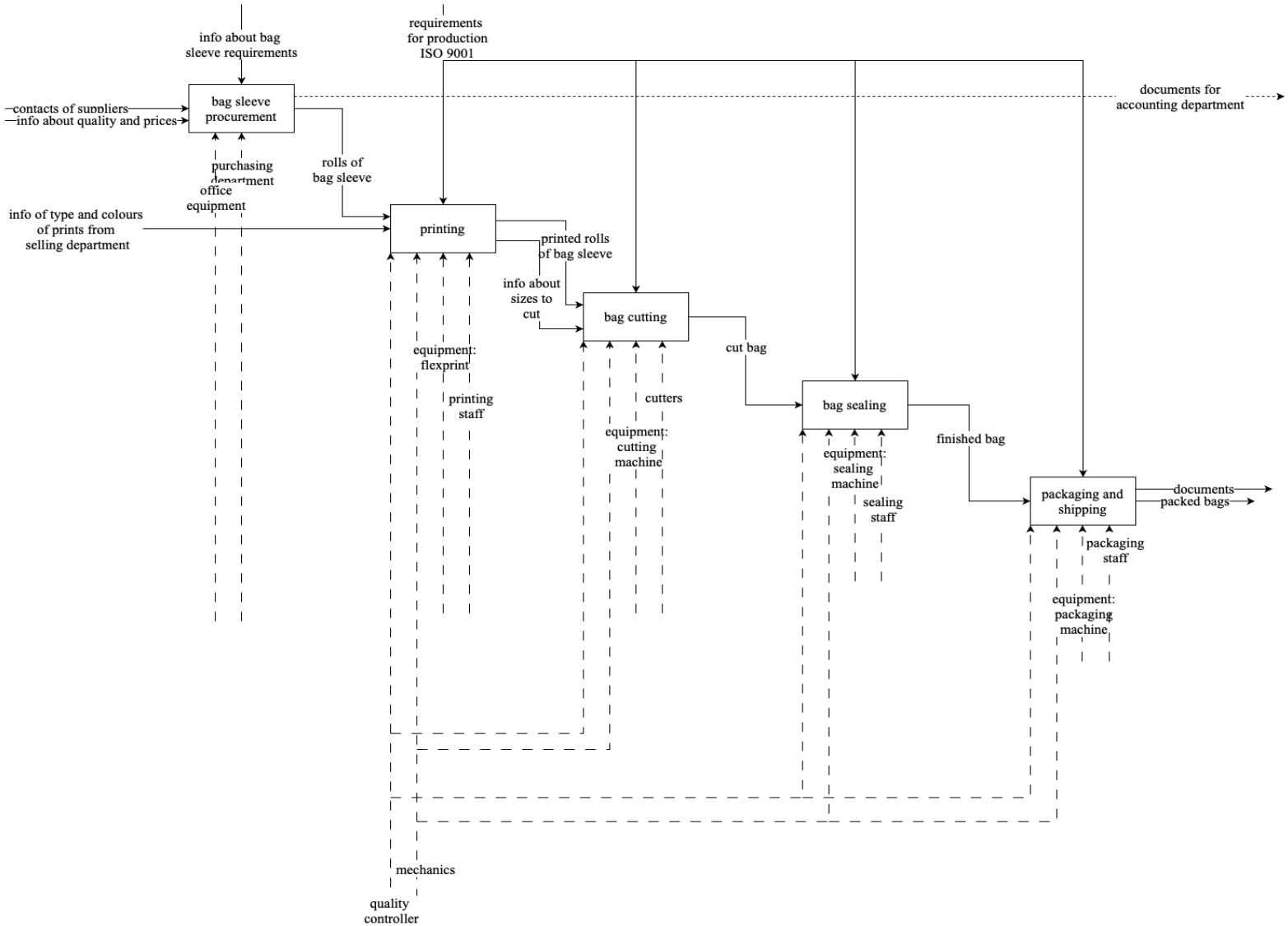

Fig. 3.1. Suggested production business processes of LLC PC Polypack LTD in IDEF0 notation

Use pre-extruded and weaved polypropylene bag sleeves from India: Instead of purchasing raw polypropylene resin and extruding and weaving it in-house, consider using pre-extruded and weaved. This eliminates the need for an extruder machine and the associated production step as well as weaving machine and associated staff. There are several suppliers that offer pre-extruded polypropylene bag sleeves in a variety of qualitative features. Given the current global situation and potential disruptions to supply chains, and the destruction of part of production recommendation is developed for the to eliminate two steps and make the process shorter.

At LLC PC Polypack LTD, the production of polypropylene bags follows a meticulously structured process to ensure quality and efficiency.

Bag sleeve procurement as the initial step involves sourcing bag sleeves from trusted suppliers in India. These sleeves undergo rigorous quality checks to ensure they meet company's exacting standards, a crucial step in maintaining the integrity of final products.

For bags requiring custom designs or logos, a flexographic printing process is employed. This precise technique ensures that the polypropylene sheet is adorned with the desired graphics.

Specialized machinery is used to precisely cut the printed polypropylene sheet into individual bag blanks. Each blank is tailored to specific size and shape specifications.

Advanced sealing techniques, such as heat sealing or ultrasonic sealing, are employed to securely assemble the bags. This guarantees sturdy sides and a stable bottom for each bag.

Following thorough production and inspection, the completed bags are meticulously packaged and readied for shipment to clients.

Throughout these processes, a dedicated supervisor oversees operations, ensuring strict adherence to prescribed standards. This vigilant oversight is crucial in maintaining consistency and quality in the final products. Additionally, a skilled mechanic provides essential support, ensuring that all machinery and equipment operate at peak efficiency.

At every stage, LLC PC Polypack LTD upholds the globally recognized ISO 9001 standards. This adherence to an internationally acclaimed quality management system is a testament to the company's commitment to producing bags of the highest quality. These measures collectively ensure that LLC PC Polypack LTD delivers products that meet and exceed customer expectations. LLC PC Polypack LTD suggested model of EPC (appendix D) is used to show more detailed steps of production processes. The changed part of the business processes is shown in fig. 3.2.

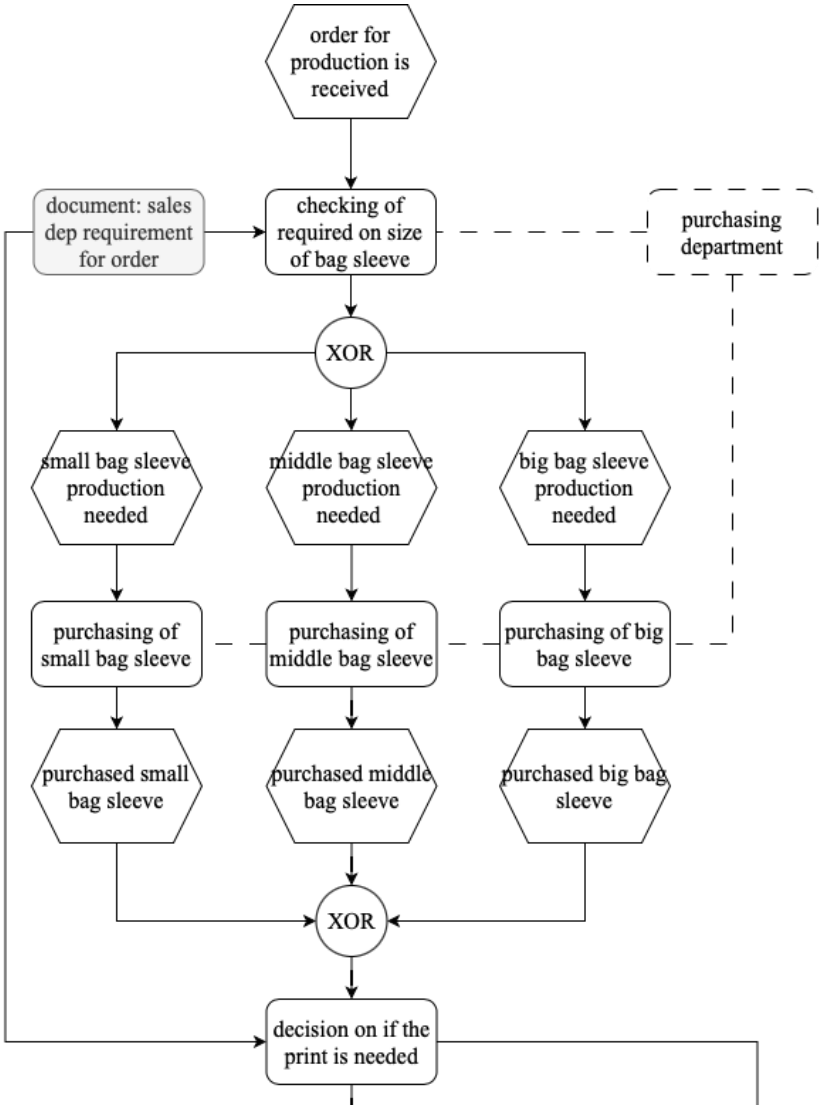

Fig. 3.2. Changed subprocesses at the enterprise in EPC standard notation

The two models of processes for producing polypropylene bags have a significant difference in the first step of the production process. In the first process, the

company procures the raw materials needed, which include polypropylene resin, additives, and colorants. They then melt and extrude the polypropylene resin into a flat sheet using an extruder machine, followed by weaving the sheet into seamless bag sleeves. The sleeves are then printed, cut into individual bag blanks, and sealed together to form the sides and bottom of the bag.

In the second process, the company procures the bag sleeve from India, which has already been made and quality-controlled. They then print the polypropylene sheet using a flexographic printing process, cut the printed sheet into individual bag blanks, and seal them together to form the sides and bottom of the bag.

The second process eliminates the first two steps of the production process, which can save time and resources. However, the company has less control over the quality of the bag sleeve, which may affect the overall quality of the final product.

Both processes use the same printing, cutting, sealing, and packaging steps. They also follow ISO 9001 requirements and have a controlling person and mechanic to oversee the production process.

The adoption of the new production processes at LLC PC Polypack LTD marks a significant advancement in operations. This transition from the conventional method of raw materials procurement, extrusion, and weaving to a more streamlined approach centered on bag sleeve procurement promises to revolutionize production. This transformation in production processes not only streamlines operations but also directly addresses the challenges posed by recent setbacks and evolving market dynamics. It empowers LLC PC Polypack LTD to navigate these challenges with resilience and innovation, ensuring a brighter and more sustainable future for the company.

With the help of certain key performance indicators company can evaluate the effectiveness of the model. Production volume measures the total number of bags produced within a specific period, such as daily, weekly, or monthly. Quality rate measures the percentage of bags that meet the required quality standards. It can be measured by inspecting a sample of bags or by tracking customer feedback and returns. Efficiency rate measures the overall efficiency of the production process, such as the

percentage of time that machines are operational, the percentage of orders completed on time, or the time required to produce a single bag. Cost per bag measures the total cost of production divided by the number of bags produced. It can help identify opportunities for cost savings or process improvements.

When assessing the production business processes at the enterprise, the criteria by which the system will be determined and evaluated, the components of the integral indicator of business processes development should be determined in tab. 3.1.

Table 3.1

Components of the factors of business processes development

Factor	Components of factor
F1. Difficulty index	Process complexity: the number of steps, dependencies, and interactions between different stages. Skill requirement: the level of expertise and skill set needed by the workforce to execute the process effectively. The level of technology and specialized equipment needed.
F2. Processability indicator	Standardization of process steps: the degree to which the process steps can be standardized and replicated. Feasibility of automation: the potential for automating the process using technology and machinery. Adaptability to changes in production volume.
F3. Indicator of controllability	Standardization: the extent to which processes are standardized and documented, facilitating easier control and replication. How consistent and predictable the process outcomes are. Feedback loops: the presence and effectiveness of feedback mechanisms to make necessary adjustments in real-time.
F4. Resource capacity	Resource intensity: the extent to which resources, including materials, labor, and equipment, are required for the process. Material and Labor availability. Facility capacity: the physical space and infrastructure available for production activities.
F5. Regulation	Compliance with industry standards and internal policies. Documentation and procedures. The process consistently produces products of the desired quality.

The subsequent step involves calculating the necessary number of experts (m) using the following formula:

$$m \geq 0{,}5\left(\frac{0{,}33}{b} + 5\right);\ N_{exp} \geq n \qquad (3.1)$$

where b – permissible error (b = 0,1);

n – is the number of evaluated factors.

Consequently, the evaluation necessitates the involvement of a team comprising 5 qualified experts. Their collective input will ensure a comprehensive and reliable assessment.

The subsequent step involves a selection process for experts and the assessment of their competence in the context of the analyzed scenario. The ideal candidates for this crucial role are individuals who possess an in-depth understanding of the organization's specific operations. It is also advisable to include an external specialist to provide an unbiased perspective.

When identifying potential experts, it's prudent to evaluate various specialists. The following categories are deemed suitable candidates for this important roll. First option will be internal employees, individuals from within the organization who possess a profound understanding of its inner workings, intricacies, and unique challenges. Their insider knowledge can be invaluable in the assessment process. The second option will be external specialist. Bringing in an external expert who is not directly affiliated with the organization can offer an impartial viewpoint. Their objectivity can be particularly beneficial in the evaluation.

By considering these categories for expert selection, the assessment process gains a well-rounded and comprehensive perspective, ensuring a robust and reliable outcome.

The production director holds a key leadership position overseeing the entire production department. They possess comprehensive knowledge of the company's production processes, workflow, and operational goals. With their strategic perspective, the production director can provide valuable insights into optimizing processes to meet organizational objectives.

The supply chain manager is responsible for overseeing the end-to-end supply chain process, including procurement, logistics, and inventory management. They have a holistic view of how materials flow through the production process and can identify opportunities for streamlining operations, reducing lead times, and optimizing resource allocation.

Quality control inspector is responsible for maintaining product quality standards, a quality control inspector is adept at identifying areas for improvement in the production process. They play a vital role in ensuring that products meet or exceed industry standards.

With a focus on optimizing production processes, a process engineer is skilled at analyzing workflows, identifying inefficiencies, and recommending enhancements. Their expertise lies in streamlining operations for increased efficiency and productivity.

Operations research analyst as external candidate is trained in analyzing complex systems, an operations research analyst can bring a data-driven approach to evaluating production processes. Their expertise in quantitative analysis can uncover opportunities for improvement.

Ultimately, a diverse team comprising both internal and external candidates brings a well-rounded perspective to the evaluation process. Internal candidates offer in-depth knowledge of the company's specific operations, while external experts provide fresh insights and best practices from a broader industry perspective.

To validate the selection of specific experts, it is imperative to assess their proficiency in the analyzed scenario. To evaluate the group's competence, potential experts are tasked with responding to two questionnaires.

The first centers around self-assessing their familiarity with the issue at hand in tab. 3.2, while the second focuses on gauging the level of substantiation in their expressed opinions in tab. 3.3.

Table 3.2

Questionnaire for self-assessment of the degree of familiarity with the analyzed problem

Grade	The degree of familiarity
0	not familiar with the problem
1, 2, 3	not familiar with the problem, but it is in my area of interest
4, 5,6	familiar with the problem, but do not take part in its practical solution
7, 8, 9	well acquainted with the problem and participate in its practical solution
10	the problem falls within the circle of my narrow specialization

This questionnaire emphasizes a singular pertinent aspect. With the responses gathered from this questionnaire, it becomes feasible to compute the familiarity coefficient (C_f) for each specialist, reflecting their level of understanding of the issue:

$$C_f = 0{,}1 \times G, \tag{3.2}$$

where G – the grades that the specialist emphasized in the questionnaire.

Table 3.3

Questionnaire for assessment of the level of argumentation of expressed opinions

Source of argumentation	Level of argumentation		
	high	average	low
Expertise in the field	0,5	0,4	0,3
Comparative analysis of similar situations, scenarios, or industry standards	0,1	0,08	0,05
Concrete internal data of research findings, case studies, or documented trends in industry	0,25	0,15	0,05
Reference to established principles or theories	0,05	0,04	0,03
Research on industry best practices in the world	0,05	0,04	0,02
Logical reasoning	0,05	0,04	0,02

Emphasize specific pertinent aspects in the questionnaire. The responses provided in this questionnaire align with the coefficient assessing the argumentations of opinions (C_A):

$$C_A = \sum G_i, \tag{3.3}$$

where G_i – the grades emphasized in the questionnaire.

Following the computation of familiarity and argumentation coefficients for each specialist, we ascertain the Competence coefficient (C_c):

$$C_C = \frac{C_f + C_A}{2} \tag{3.4}$$

The coefficients measuring familiarity, argumentation, and overall competence of experts must fall within the acceptable range of [0;1]. A higher ratio indicates greater competence. As such, the panel is composed of specialists exhibiting higher competence coefficients. The results of the analysis of the level of qualification of each expert are given in the table. 3.4.

Table 3.4

Evaluation of the level of qualification of the proposed experts

Expert	Familiarity coefficient	Argumentation coefficients	Competence coefficient
Production director (E1)	0,9	0,95	0,925
Supply chain manager (E2)	0,7	0,9	0,8
Quality control inspector (E3)	0,8	0,7	0,75
Process engineer (E4)	0,8	0,78	0,79
Operations research analyst (E5)	1	0,97	0,985

The table provides information of the expertise level of each expert. The Production director displays a high familiarity and strong argumentation coefficient, resulting in the highest overall competence coefficient of internal experts. The operations research analyst exhibits the highest scores across all three coefficients, indicating exceptional competence in the assessment process. The supply chain manager and process engineer also demonstrate solid competence, while the quality control inspector exhibits slightly lower overall competence, primarily due to a lower argumentation coefficient. In order to determine the final number of necessary experts (m_e), considering the level of their qualifications, we will use the formula:

$$m_e \leq \frac{3}{2 \times C_{c\,max}} \times \sum C_{c\,i}, \tag{3.5}$$

where $C_{C\,max}$ – the highest level of competence among experts,

$C_{c\,i}$ – index of level of competence.

Calculation of the maximum number of required experts:

$$m_e = \frac{3}{2 \times 0{,}985} \times 4{,}25 = 6{,}4.$$

Thus, the number of experts should be no less than 4,15 people and no more than 6,47 people. The 5 selected experts were approved to carry out assessment of the implementation of the new production business processes system at the enterprise.

The experts were asked to asses the at LLC PC Polypack LTD for each factor (from Table 3.1) on a the scale suggested in express evaluation. The score (Gi) given by the expert is multiplied by the coefficient of his competence and multiplied by 0.2 (we get the weighted score (Gw)). The overall assesment is determined by the formula:

$$Q = \frac{\sum G_i \times C_{c\,i}}{n} \tag{3.6}$$

The higher the value, the better system it become. The agreement of the opinions of the group's experts can be estimated using the concordance coefficient. The agreement of the opinions of the group's experts can be estimated using the concordance coefficient (W):

$$W = \frac{12 \times S}{m^2(n^3 - n)} \quad (3.7)$$

where m – number of experts,

n – number of factors,

S – the total deviation of the sum of the ranks of the j factor from the average sum of the ranks of all factors.

The results of the expert assessment of the new production business processes system for LLC PC Polypack LTD are shown in the tab. 3.5.

Table 3.5

Results of the expert assessment of the new production business processes system

		Expert grades															General assessment
		E1			E2			E3			E4			E5			
		G_i	C_c	G_w	G_i	C_c	G_w	G_i	C_c	G_w	G_i	C_c	G_w	G_i	C_c	G_w	
Factors	F1	0,55	0,925	0,10	0,6	0,8	0,10	0,57	0,75	0,09	0,6	0,79	0,09	0,51	0,985	0,10	0,48
	F2	0,15	0,925	0,03	0,21	0,8	0,03	0,2	0,75	0,03	0,22	0,79	0,03	0,19	0,985	0,04	0,16
	F3	0,65	0,925	0,12	0,8	0,8	0,13	0,75	0,75	0,11	0,8	0,79	0,13	0,7	0,985	0,14	0,63
	F4	0,65	0,925	0,12	0,75	0,8	0,12	0,7	0,75	0,11	0,8	0,79	0,13	0,72	0,985	0,14	0,61
	F5	1	0,925	0,19	1,1	0,8	0,18	1,2	0,75	0,18	0,9	0,79	0,14	1	0,985	0,20	0,88

Difficulty index as the actual value is 0.48, suggests that the processes are relatively straightforward and not overly complex. Processability indicator with an

actual value of 0.16, it indicates that the processes experience very few disruptions, indicating a well-structured workflow. Indicator of controllability actual value is 0.63, this indicates that there is a good level of control in place, with designated owners overseeing various process classes. Resource capacity with an actual value of 0.61, it implies that resources are used efficiently in the production process. Regulation with the actual value of 0.88, indicating that the system is well-regulated with ample documentation in place.

In summary, the assessment reveals a positive foundation for the production business processes. The processes are generally straightforward, operate smoothly, and are well-regulated. In this case, the concordance coefficient is equal to 0.7, which indicates a consistency of experts' opinions regarding the project's quality level.

The comparison of the factors assessment of the production business processes systems before and after suggested improvements is shown in tab. 3.6.

Table 3.6

The comparison of the systems before and after suggested improvements

Factors	Before improvements	After improvements	Change, %	Effect
Difficulty index	0,61	0,48	-21%	positive
Processability indicator	0,21	0,16	-24%	positive
Indicator of controllability	0,89	0,63	-29%	positive
Resource capacity	0,89	0,61	-31%	positive
Regulation	0,8	0,88	10%	positive

Difficulty index before improvements stood at 0.61, indicating a moderate level of complexity. After the enhancements, it decreased to 0.48, reflecting a 21% improvement. This suggests that the business processes have become less complex, signifying a positive effect on operational efficiency.

Initially, the processability indicator was at 0.21, indicating some room for improvement. Post-enhancements, it decreased to 0.16, showing a 24% improvement.

This signifies that the processes have become more manageable, which is a positive outcome.

The initial indicator of controllability was 0.89, indicating a good level of control. After improvements, it decreased to 0.63, marking a 29% improvement. This implies that there is now even better control over the processes, which is a positive development.

In previous system, the resource capacity was at 0.89, indicating room for improvement in resource utilization. Post-improvements, it decreased to 0.61, reflecting a 31% improvement. This suggests that resources are now being used more efficiently, which is a positive impact.

Initially, the regulation factor was at 0.8, indicating good regulatory adherence. After improvements, it increased to 0.88, showing an 10% improvement. This indicates an even higher level of regulatory compliance, which is a positive outcome.

In conclusion, the implemented improvements have collectively led to a commendable average improvement of the system of 16% across the various factors assessed. This signifies a substantial leap forward in the efficiency, manageability, and control of the production business processes. The positive impact on resource utilization and regulatory compliance further solidifies the success of the enhancement initiative. These improvements are significantly improving operational effectiveness and ultimately contribute to the overall success of LLC PC Polypack LTD.

3.2. Effect of implementation of given recommendations at the enterprise

Effect of implementation of recommendations at the enterprise is an important section that marks the transition from theoretical recommendations to practical application within the organizational context. [9]

In this section, we delve into the practical implications of the recommendations put forth in previous chapters. It serves as the actual execution, providing a comprehensive understanding of how these proposed changes will manifest within the day-to-day operations of LLC PC Polypack LTD.

Furthermore, we recognize the broader organizational context in which these changes are occurring. This includes acknowledging external factors such as market competition and internal challenges like infrastructure damage. These elements significantly influence the decision to implement these recommendations and shape the expectations for their outcomes.

A key focal point of this chapter is the strategic shift in production processes, particularly the transition to procuring bag sleeves instead of engaging in extruding and weaving processes. This shift is examined in detail, emphasizing its potential advantages, cost-effectiveness, and its alignment with the company's overarching goals. The first part of changes of implementation of the plan are shown in tab. 3.7 that describe the changes in the wages fund on the yearly basis.

Table 3.7

Projected decrease in labor costs after plan implementation

Indicator	Units of measurement	Value
Adjusted wages fund	ths UAH per year	83158
Economy of wages fund	ths UAH per year	7020
Single social tax rate	%	22
Economy of social tax	ths UAH per year	1544,4
Total decrease in labor costs yearly	ths UAH per year	8564,4

The table provides a detailed breakdown of the projected decrease in labor costs after the implementation of the proposed plan. Adjusted wages fund indicator measures the total amount of wages allocated for employees in thousands UAH per year. In this case, it is projected to be 83 158 ths UAH per year instead of 90 178 158 ths UAH per year estimated in 2022.

Economy of wages fund represents the anticipated reduction in the wages fund after implementing the plan. It is expected to result in savings of 7 020 ths UAH per year. This reduction is realized due to increased efficiency in production processes and shortage and streamlining of labor-intensive tasks so the company can partly reduce the number of workers and partly allocate labor resources for other processes to increase the productivity and number of produced items.

Single social tax rate represents the percentage of the single social tax rate. In this case, it is 22%, which is the standard rate applied to the wages fund. Economy of social tax reflects the projected reduction in social taxes paid by the company as a result of implementing the plan. It is estimated to be 1 544.4 ths UAH per year. This decrease in social tax is directly correlated with the reduction in the wages fund.

Total decrease in labor costs yearly is the sum of the economies in both the wages fund and social tax. It provides an overall estimate of the anticipated reduction in labor costs, amounting to 8 564.4 ths UAH per year.

In the tab. 3.8 it is disclosed the one-time spending structure and investments that are included in the plan.

Table 3.8

One-time spending and investments structure in plan implementation

Indicator	Units of measurement	Value
One-time spending		
Resources for creation of new instructions	ths UAH	1200
Resources for creation of new contracts	ths UAH	1500
Total costs of one time spending	ths UAH	2700
Investment		
Costs of new equipment	ths UAH	12645
Lifetime	years	5
Depreciation rate	%	20
Depreciation	ths UAH per year	2529

One-time spending in the plan of development of production business processes includes one-time spending and investment. First of all it is planned to invest in additional equipment for the processes of cutting and printing to increase the amount of produced final product. As the part of the enterprise is destroyed and it influenced more the first stages of production which are eliminated in the new system. As the part of employees are shorten on the most labor-intensive processes and could be distributed to the cutting and printing to increase the efficiency.

Secondly, to adapt the new system at the enterprises it was decided to develop new instructions of work as well as production planning that will take one-time investment of time and resources.

Lastly, it is necessary to find a new materials supplier, because the resources for the production are changed according to the model from raw materials to the produced sleeve in India. Because of the lower prices of these products and the agreement about the delivery the costs are very slightly changed

Resources for creation of new instructions indicates the amount of resources allocated for the development of new instructions. The value is 1200 thousand UAH. This spending is directed towards activities such as documentation, training, and possibly consulting services.

Resources for creation of new suppliers' contracts have the value 1500 thousand UAH. This spending involves legal fees, negotiations, and administrative costs associated with setting up new contractual arrangements with suppliers.

Total costs of one-time spending is the sum of the expenditures for creating new instructions and contracts. It amounts to 2700 ths UAH. This represents the overall one-time costs associated with the implementation of the plan.

Costs of new equipment denotes the expenses incurred for acquiring new equipment, which is crucial for the plan's execution. The value is 12645 thousand UAH. Lifetime indicates the estimated operational lifespan of the newly acquired equipment, which is 5 years in this case. Depreciation rate represents the annual depreciation rate of the equipment, which is 20%. Depreciation is the projected annual depreciation expense associated with the new equipment, amounting to 2529 thousand ths UAH per year.

Finally, after calculating of the labor cost changes and one-time spending and investment needed it was calculated the projected increase in profit for the first and the second year of implementation of new system. It is shown in the tab. 3.9.

The table outlines the projected increase in profit for the first and second years following the implementation of the plan.

Table 3.9

Projected increase in profit for the first and second year after plan implementation

Indicator	Units of measurement	Value
Increase in sales revenue	ths UAH per year	15886,9
Income tax rate	%	18
Increase in profit, 1st year	ths UAH	19222,3
Income tax	ths UAH	3460,0
Increase in net profit, 1st year	ths UAH	15762,3
Increase in profit, 2nd year	ths UAH	21922,3
Income tax	ths UAH	3946,0
Increase in net profit, 2nd year	ths UAH	17976,3

Increase in sales Revenue represents the anticipated additional revenue generated from increased sales. The projected value is 15886.9 thousand UAH annually. This increase in revenue is a direct result of the plan's execution, which is expected to drive higher sales. Because of allocation of resources for the new processes and shortage of production cycle. It gives the possibility to increase the amount of produced goods. Income tax applied to the additional profit generated. In this case, the income tax rate is 18%.

Increase in profit, 1st year figure signifies the projected rise in profit for the first year after implementing the plan. The value is 19222.3 thousand UAH . This increase is calculated before accounting for income tax.

Income tax represents the amount of income tax payable on the additional profit generated in the first year. It is calculated to be 3460.0 thousand UAH.

The net increase in profit for the first year, after deducting the income tax value is 15762.3 thousand UAH. This is the actual additional profit that the company will retain after paying taxes.

The projected rise in profit for the second year after implementing the plan value is 21922.3 thousand UAH per year. After we exclude the one-time spending that were applied for the first year.

The amount of income tax payable on the additional profit generated in the second year is calculated to be 3946.0 thousand UAH per year. The net increase in

profit for the second year, after deducting the income tax value is 17976.3 thousand UAH. This is the actual additional profit that the company will retain after paying taxes.

Overall, the comprehensive analysis of the potential cost savings in labor expenses that LLC PC Polypack LTD could achieve through the implementation of the proposed plan. It highlights the significant impact on the company's financials, with substantial reductions in both the wages fund and associated social tax. This indicates a positive outcome in terms of operational efficiency and cost-effectiveness.

Financial commitments required for the implementation of the plan. The one-time spending focuses on the creation of new instructions and contracts, whereas the investment component primarily revolves around the acquisition of new equipment. These financial allocations are vital for ensuring the successful execution and sustainability of the proposed plan. The depreciation calculations further illustrate the expected annual cost associated with the new equipment over its estimated operational lifespan of 5 years.

Lastly it provides projected financial gains resulting from the implementation of the plan. It considers both the increase in revenue and the associated tax implications, resulting in the net additional profit that the company can expect to realize in the first- and second-years following plan execution.

The implemented solution has had a positive influence on the company's market position, resulting in several notable competitive advantages.

With the optimized production processes, the company has achieved faster production cycles and improved delivery schedules. This ensures that clients receive their orders promptly, which is a crucial factor in client satisfaction and retention.

The solution has led to cost reductions in key areas of production. This allows the company to offer competitive pricing without compromising on quality. The ability to provide cost-effective solutions gives LLC PC Polypack LTD a strong advantage in price-sensitive markets and enhances its appeal to cost-conscious clients.

The enhanced processes have made the company more agile in responding to market demands and shifts in customer preferences. This adaptability ensures that LLC

PC Polypack LTD can quickly align its offerings with changing market trends, giving it an edge over less nimble competitors.

To further enhance the economic impact in the future, LLC PC Polypack LTD could consider the following strategies and initiatives.

Exploring new markets or expanding the company's presence in existing ones can lead to increased revenue streams. Conducting market research to identify untapped opportunities and tailoring products to suit specific regional or industry demands can be a good opportunity for growth. Company can diversify the market by the prices and quality of their products as it become easier with the substitution of raw materials with bag sleeve. It is easy to make different price bags and take wider market.

Implementing robust supply chain management practices, including just-in-time inventory systems and efficient logistics, can lead to cost savings and improved operational efficiency.

Staying ahead of industry trends and anticipating market shifts allows for proactive adjustments to strategies and offerings. This can help the company maintain a competitive edge and capitalize on emerging opportunities.

By considering and potentially implementing these strategies, LLC PC Polypack LTD can further enhance its economic impact, and increase its market position.

CONCLUSIONS

In this thesis delved into the critical area of reengineering production business processes. Through a comprehensive analysis of various models and methodologies, it provided valuable insights for optimizing operational efficiency. The practical significance of this research is underscored by the potential for organizations to enhance their competitiveness and profitability.

The primary aim of this thesis was to conduct a comprehensive analysis of the existing production business processes at LLC PC Polypack LTD, proposing strategic reengineering initiatives. This encompassed the identification of inefficiencies, recommendations for process optimizations, and the evaluation of their potential impact.

Focusing on the production business processes at LLC PC Polypack LTD, the research centered on reengineering initiatives designed to optimize these processes for heightened efficiency and productivity. The company specializes in the production of polypropylene bags and containers. It employs equipment sourced from industry leaders, utilizes premium-grade raw materials, and holds certifications in compliance with standards, including ISO 9001. Employing a combination of qualitative and quantitative methods, including process modeling, morphological analysis, data analysis, expert interviews, and literature review, the study drew from a diverse set of information sources.

By applying reengineering strategies within LLC PC Polypack LTD, this study provides practical insights for businesses striving to enhance their operational effectiveness. To achieve this goal, a series of specific tasks were outlined, including a thorough consideration of the essence of production business processes, an analysis of their place within the broader business framework, a study of classification specifics, and an evaluation of their implementation principles within the enterprise. Additionally, the study provided comprehensive information about LLC PC Polypack LTD, conducted technical and economic analyses, assessed current production business processes, and developed a new system supported by expert analysis.

After analysis of activity of the enterprise it was disclosed that the transition from 2021 to 2022, LLC PC Polypack LTD experienced shifts in operational and financial performance, characterized by noticeable declines in crucial indicators. These developments signal the need for a strategic reevaluation and targeted adjustments to effectively address the challenges confronting the company.

The analysis and calculations reveal substantial opportunities for enhancing the performance and efficiency of the existing system. This indicates that strategic improvements within LLC PC Polypack LTD's production business processes hold the potential for elevated levels of productivity and quality.

Addressing the extensive damage sustained by a significant portion of the plant is of paramount importance. This challenge not only disrupts ongoing operations but also necessitates a substantial investment in repairs, reconstruction, and potentially facility expansion.

It was suggested to implement transitioning to the direct procurement of bag sleeves presents a strategic solution to the challenges faced by LLC PC Polypack LTD. This shift reductions both labor and operational costs, particularly in resource-intensive stages. By sidestepping the costly steps of extruding and weaving, the company stands to make significant savings. Avoiding the hefty expense of procuring new machinery, the company can concentrate resources more efficiently.

Moreover, this transition not only optimizes production costs but also positions the company to tackle the competition posed by more affordable products from India and China.

Lastly it was calculated economical effect of the implementation of the new production business processes system. It was evaluated by the internal and external experts as more efficient way of potential development of the enterprise.

This research offers strategies to enhance the execution of production processes. Through the application of reengineering methods, companies can streamline operations, reduce costs, and enhance overall efficiency, ultimately bolstering their competitiveness in the market.

Based on the work, an article is prepared (Appendix E).

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APPENDICES

APPENDIX A

Financial statement of LLC PC Polypack LTD for 2020-2021

Table A.1

Assets of the Balance sheet of LLC PC Polypack LTD for 2020 - 2021

Стаття	Код рядка	2020	2021
I. Необоротні активи			
Нематеріальні активи:	1000	206	516
первісна вартість	1001	3074	3772
накопичена амортизація	1002	2868	3256
Незавершені капітальні інвестиції	1005	22045	21839
Основні засоби:	1010	1123342	1070911
первісна вартість	1011	1725572	1785443
знос	1012	602230	714532
інші фінансові інвестиції	1035	111	111
Відстрочені податкові активи	1045	4899	5171
Усього за розділом I	1095	1150603	1098548
II. Оборотні активи			
Запаси	1100	250863	355493
Виробничі запаси	1101	85971	59163
Незавершене виробництво	1102	9002	14583
Готова продукція	1103	155617	280727
Товари	1104	273	1020
Дебіторська заборгованість за продукцію, товари, роботи, послуги	1125	556389	535334
Дебіторська заборгованість за розрахунками:			
за виданими авансами	1130	69158	218932
з бюджетом	1135	5672	18591
Інша поточна дебіторська заборгованість	1155	10481	14409
Гроші та їх еквіваленти	1165	19754	21575
Готівка	1166	7	2
Рахунки в банках	1167	19747	21573
Усього за розділом II	1195	912317	1164334
III. Необоротні активи, утримувані для продажу, та групи вибуття	1200	–	–
Баланс	1300	2062920	2262882

Table A.2

Liabilities of the Balance sheet of LLC PC Polypack LTD for 2020 - 2021

Стаття	Код рядка	2020	2021
I. Власний капітал			
Зареєстрований (пайовий) капітал	1400	20000	20000
Нерозподілений прибуток (непокритий збиток)	1420	1034243	1066276
Неоплачений капітал	1425	–	–
Вилучений капітал	1430	–	–
Усього за розділом I	1495	1054243	1086276
II. Довгострокові зобов'язання і забезпечення			
Пенсійні зобов'язання	1505	3780	3782
Довгострокові кредити банків	1510	56203	73560
Довгострокові забезпечення	1520	17307	16375
Довгострокові забезпечення витрат персоналу	1521	17307	16375
Усього за розділом II	1595	77290	93717
III. Поточні зобов'язання і забезпечення			
Поточна кредиторська заборгованість:			
за довгостроковими зобов'язаннями	1610	259350	229866
за товари, роботи, послуги	1615	239899	227446
за розрахунками з бюджетом	1620	13172	5968
за розрахунками зі страхування	1625	5064	4716
за розрахунками з оплати праці	1630	18461	18292
за одержаними авансами	1635	23423	199765
за розрахунками з учасниками	1640	77062	80013
Інші поточні зобов'язання	1690	294956	316823
Усього за розділом III	1695	931387	1082889
IV. Зобов'язання, пов'язані з необоротними активами, утримуваними для продажу, та групами вибуття	1700	–	–
V. Чиста вартість активів недержавного пенсійного фонду	1800	–	–
Баланс	1900	2062920	2262882

APPENDIX B

Financial statement of LLC PC Polypack LTD for 2021-2022

Table B.1

Assets of the Balance sheet of LLC PC Polypack LTD for 2021 - 2022

Стаття	Код рядка	2021	2022
I. Необоротні активи			
Нематеріальні активи:	1000	516	173
первісна вартість	1001	3772	3772
накопичена амортизація	1002	3256	3599
Незавершені капітальні інвестиції	1005	21839	36756
Основні засоби:	1010	1070911	997224
первісна вартість	1011	1785443	1788796
знос	1012	714532	791572
інші фінансові інвестиції	1035	111	111
Відстрочені податкові активи	1045	5171	6100
Усього за розділом I	1095	1098548	1040364
II. Оборотні активи			
Запаси	1100	355493	113595
Виробничі запаси	1101	59163	75734
Незавершене виробництво	1102	14583	16051
Готова продукція	1103	280727	21017
Товари	1104	1020	793
Дебіторська заборгованість за продукцію, товари, роботи, послуги	1125	535334	676645
Дебіторська заборгованість за розрахунками:			
за виданими авансами	1130	35706	69158
з бюджетом	1135	18591	11476
Інша поточна дебіторська заборгованість	1155	14409	13232
Гроші та їх еквіваленти	1165	21575	46051
Готівка	1166	2	1
Рахунки в банках	1167	21573	46050
Усього за розділом II	1195	1164334	1098064
III. Необоротні активи, утримувані для продажу, та групи вибуття	1200		
Баланс	1300	2262882	2138428

Table B.2

Liabilities of the Balance sheet of LLC PC Polypack LTD for 2021 - 2022

Стаття	Код рядка	2021	2022
I. Власний капітал			
Зареєстрований (пайовий) капітал	1400	20000	20000
Нерозподілений прибуток (непокритий збиток)	1420	1066276	1072737
Усього за розділом I	1495	1086276	1092737
II. Довгострокові зобов'язання і забезпечення			
Пенсійні зобов'язання	1505	3782	3846
Довгострокові кредити банків	1510	73560	44263
Довгострокові забезпечення	1520	16375	23142
Довгострокові забезпечення витрат персоналу	1521	16375	23142
Усього за розділом II	1595	93717	71251
III. Поточні зобов'язання і забезпечення			
Поточна кредиторська заборгованість:			
за довгостроковими зобов'язаннями	1610	229866	223822
за товари, роботи, послуги	1615	227446	181142
за розрахунками з бюджетом	1620	5968	20460
за розрахунками зі страхування	1625	4716	2194
за розрахунками з оплати праці	1630	18292	8002
за одержаними авансами	1635	199765	156159
за розрахунками з учасниками	1640	80013	68261
Інші поточні зобов'язання	1690	316823	314400
Усього за розділом III	1695	1082889	974440
IV. Зобов'язання, пов'язані з необоротними активами, утримуваними для продажу, та групами вибуття	1700	–	–
V. Чиста вартість активів недержавного пенсійного фонду	1800	–	–
Баланс	1900	2262882	2138428

Table B.3

Financial statement of LLC PC Polypack LTD for 2021 - 2022

Стаття	Код рядка	2021	2022
I. ФІНАНСОВІ РЕЗУЛЬТАТИ			
Чистий дохід від реалізації продукції (товарів, робіт, послуг), net sales revenue	2000	1847017	992932
Собівартість реалізованої продукції (товарів, робіт, послуг), COGS	2050	-1481134	-871057
Валовий: прибуток	2090	365883	121875
Валовий: збиток	2095	-	-
Інші операційні доходи	2120	57833	39477
Адміністративні витрати	2130	-123468	-41610
Витрати на збут	2150	-195755	-68449
Інші операційні витрати	2180	-34415	-33720
Фінансовий результат від операційної діяльності: прибуток	2190	70078	17573
Інші фінансові доходи	2220	0	0
Інші доходи	2240	30059	215
Фінансові витрати	2250	-10940	-10144
Втрати від участі в капіталі	2255	-	-
Інші витрати	2270	-2322	-112
Фінансовий результат до оподаткування: прибуток	2290	86875	7532
Фінансовий результат до оподаткування: збиток	2295	-	-
Витрати (дохід) з податку на прибуток	2300	-14841	-1071
Чистий фінансовий результат: прибуток	2350	72034	6461
Чистий фінансовий результат: збиток	2355	-	-
II. СУКУПНИЙ ДОХІД			
Сукупний дохід (сума рядків 2350, 2355 та 2460)	2465	72034	6461
III. ЕЛЕМЕНТИ ОПЕРАЦІЙНИХ ВИТРАТ			
Матеріальні затрати	2500	1261523	499034
Витрати на оплату праці	2505	299460	85412
Відрахування на соціальні заходи	2510	66301	18905
Амортизація	2515	133154	77480
Інші операційні витрати	2520	204897	75761
Разом	2550	1965335	756592

APPENDIX C

Current production business processes model EPC standard

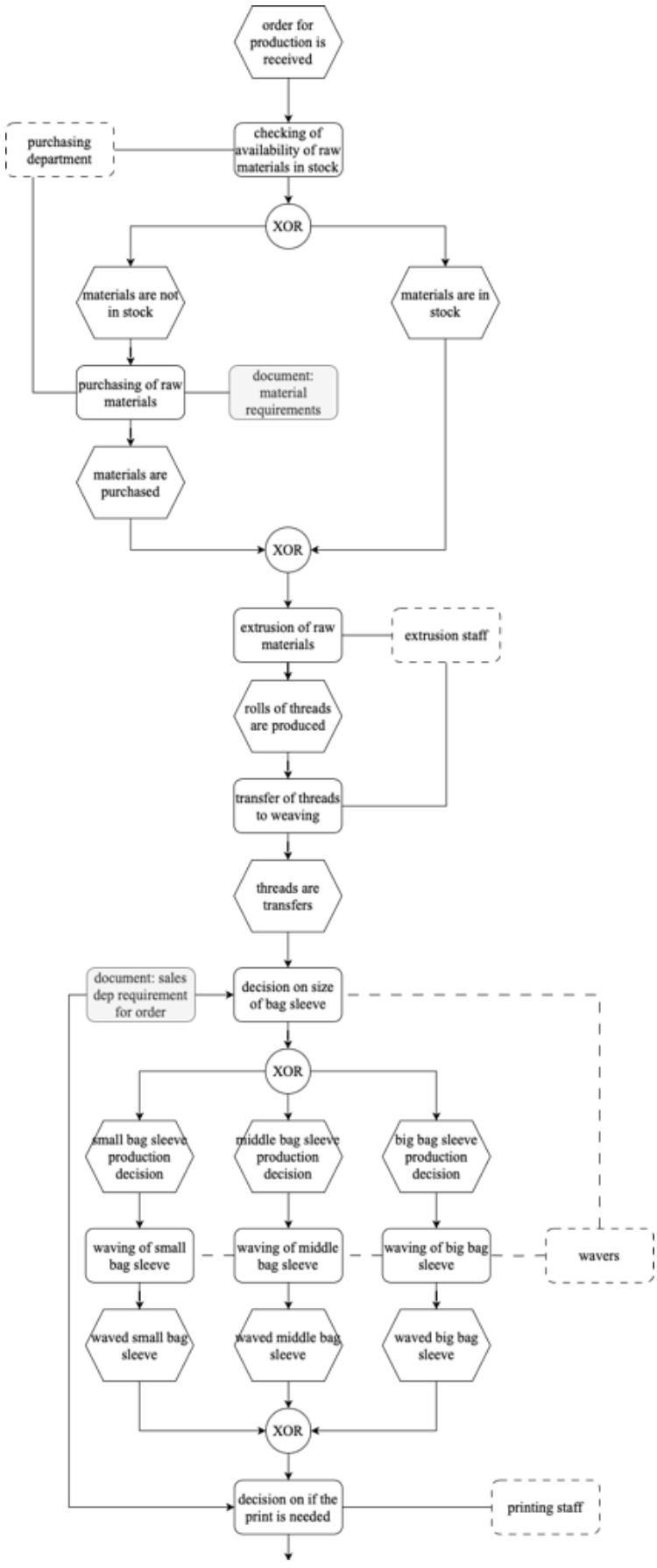
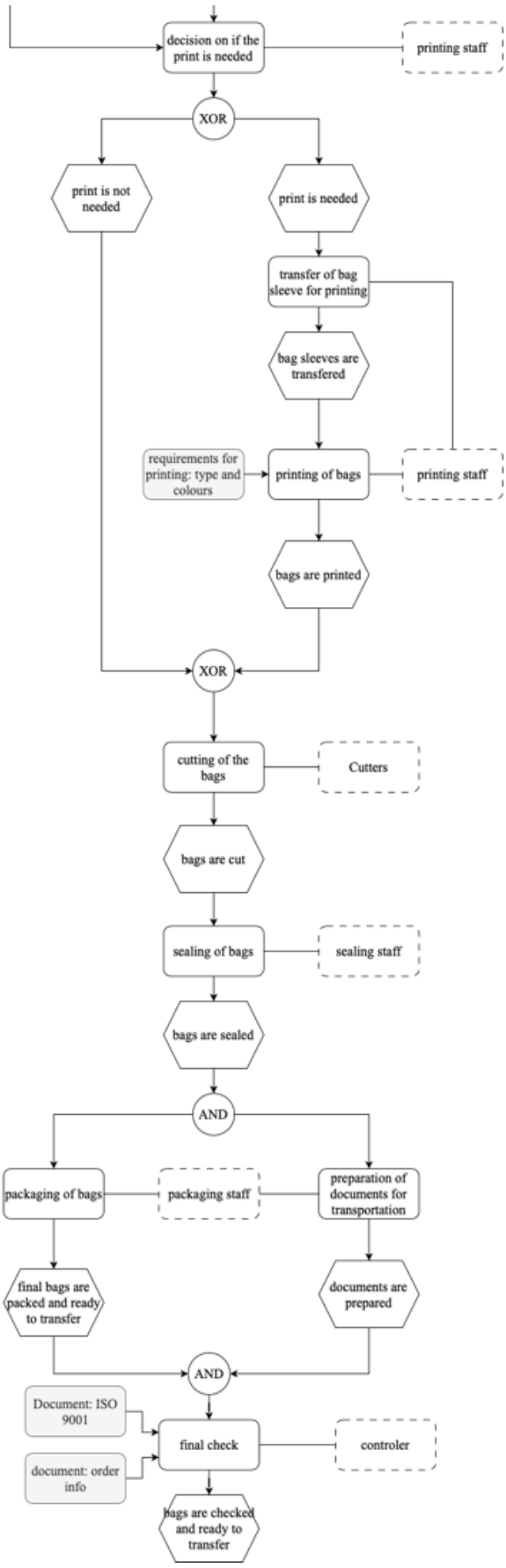


Fig. C.1. Current production business processes model EPC standard



Ending of fig. C.1

APPENDIX D

Suggested production business processes model EPC standard

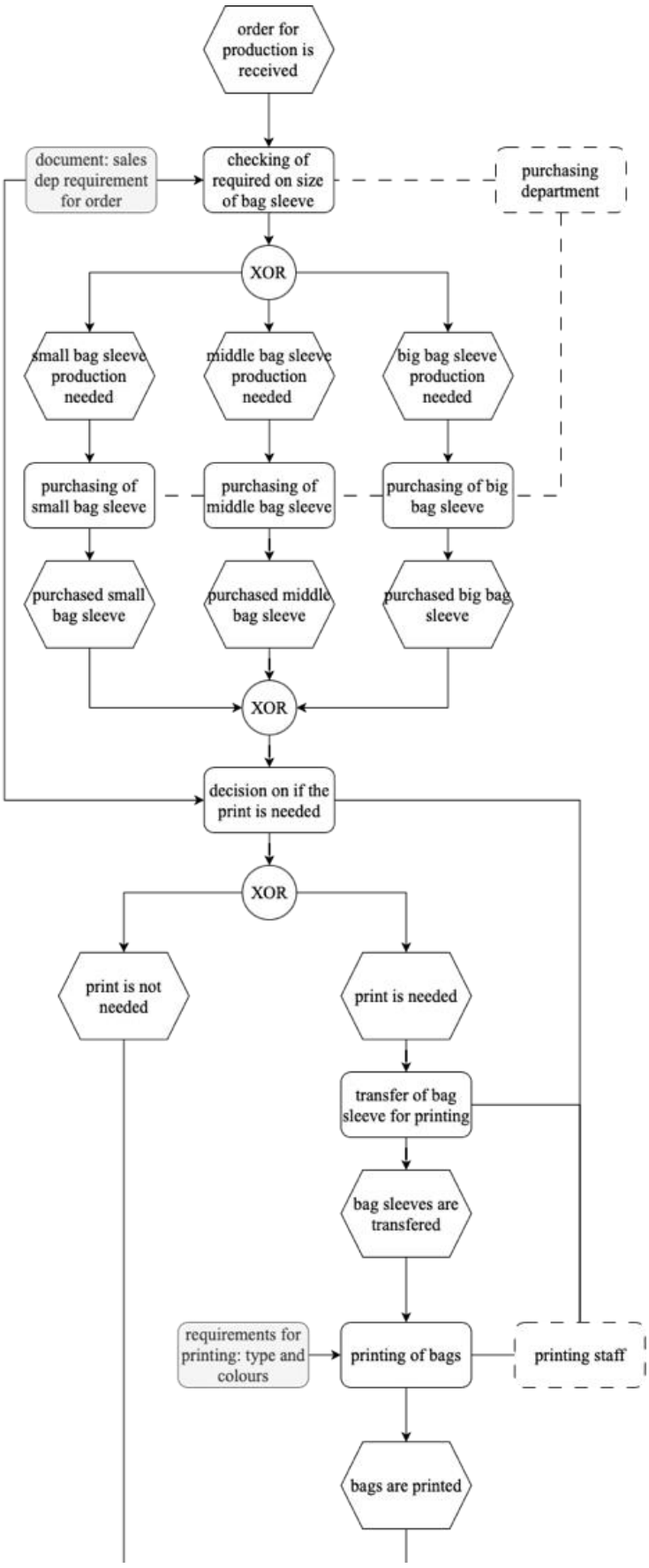
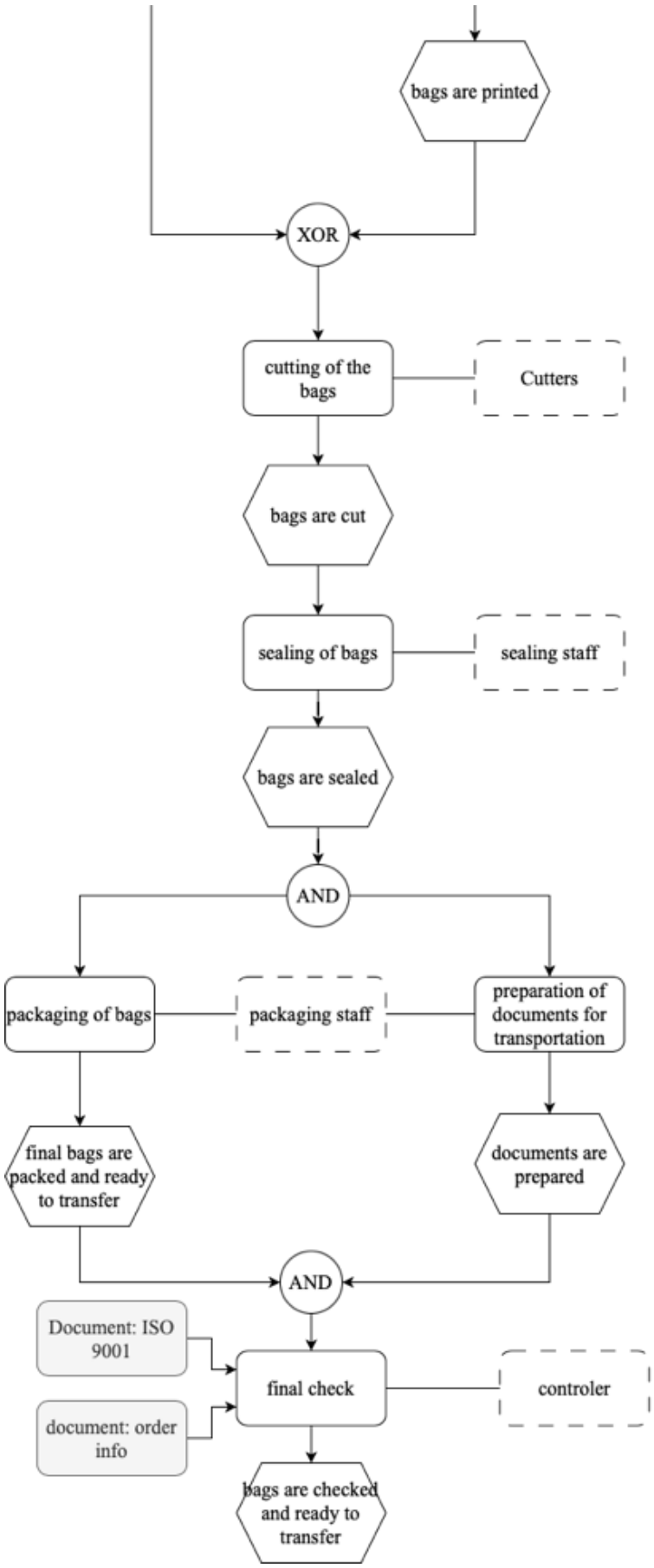


Fig. D.1. Suggested production business processes model EPC standard



Ending of fig. D.1

APPENDIX E

Scientific article

Approaches to introducing business process management at the enterprise

UDC 658.5

Mariia Skuridina

Abstract. The introduction of business process management at the enterprise is a crucial step towards achieving efficiency, quality, and customer satisfaction. The adoption of a process improvement approach depends on the specific needs of the enterprise and the goals that it aims to achieve.

In this article, different approaches to the introduction of business process management at the enterprise are discussed; the selection of the appropriate approach requires careful consideration of the enterprise's needs and goals. The successful introduction of business process management at the enterprise requires the participation of all employees and a commitment to continuous improvement.

Keywords: Business process, reengineering, optimization, business process management, process improvement.

Анотація. Впровадження управління бізнес-процесами на підприємстві є вирішальним кроком до досягнення ефективності, якості та задоволеності клієнтів. Прийняття підходу до вдосконалення процесу залежить від конкретних потреб підприємства та цілей, які воно прагне досягти.

У цій статті розглянуто декілька різних підходів до впровадження управління бізнес-процесами на підприємстві і вибір відповідного підходу вимагає ретельного розгляду потреб і цілей підприємства. Успішне впровадження управління бізнес-процесами на підприємстві вимагає участі всіх співробітників і прагнення до постійного вдосконалення.

Ключові слова: бізнес-процес, реінжиніринг, оптимізація, управління бізнес-процесами, вдосконалення процесів.

In today's fast-paced business world, it is essential to have well-defined and efficient business processes to achieve success. Business processes are a set of interrelated activities that work together to achieve a specific goal. An

enterprise's success largely depends on the efficiency and effectiveness of its business processes [5].

Approaches when creating or changing business processes aim to provide the company’s management team possible ways of applying useful structures to develop the work of enterprise and rise the efficiency of tasks’ performance. It is important to define possible solutions and their consequences when creating and changing business processes to reach desired outcome.

The object of study is management of business processes when the subject is individual approach when creating and changing business processes within the enterprise and production links.

The theoretical and methodological basis of the study is the provisions of regulations on innovation and development of small and medium enterprises. Use of different approaches when managing business processes at enterprise will lead to desired outcomes, because they are the basis of overall business’s work. Application of them creates the structure of production, logistics and defines the way of customer service. Adaptation and changes of business processes help to be flexible to influential factors.

Business Process Reengineering (BPR) is a structured approach to improving business processes through the analysis and design of workflow and organizational processes within an organization. The overarching goal of BPR is to enable organizations to become more efficient and productive. As such, BPR focuses on identifying areas in which substantial performance improvements could be achieved [3].

Pursuing BPR involves radical redesign, often with the help of technology both external and internal, in order to achieve improvements with respect to cost, quality, service and speed. Other potential benefits are standardizing key processes across departments or multiple locations it can help facilitate communication between staff members as well as improve customer satisfaction by providing streamlined services.

When introducing business processes at the enterprise, many companies choose a Lean approach. Lean management is based on the Toyota Production System created in the late nineteen fifties and is rooted in techniques such as value stream mapping, process flow analysis, kaizen

events and other tools. The main goal of this method is to maximize customer value while minimizing waste [6].

Among key benefits of BPR include are costs reduction, improved quality and increased customer satisfaction. However, there are also some potential drawbacks to BPR, including resistance to change, lack of understanding.

To apply Lean management, it is important to first identify customer needs and understand what adds value for them. Value should be the basis for any decision taken for business process optimization. Secondly, processes should be optimized iteratively through experimentation and improvement. This is achieved through the identification of improved quality and reduced cost. Finally, it is vital to ensure that actions are implemented and results monitored effectively throughout each stage of business process improvement. This requires constant communication between different departments and all stakeholders involved in order to agree on changes, prioritize tasks and ensure that improvements are reflected in practice.

Six Sigma is a business approach that seeks to improve the quality of output by reducing and eliminating errors in processes. The Six Sigma methodology is divided into five phases, or "DMAIC" (Define, Measure, Analyze, Improve and Control). By following these steps, businesses can streamline their processes and improve their bottom line.

The Six Sigma methodology has been adopted by many businesses worldwide, as it helps create a culture of continuous improvement through data-driven decisions. It also helps businesses identify areas of waste and inefficiency that can be eliminated through careful analysis and process optimization. The key benefits of Six Sigma include: improved quality, increased efficiency, cost savings. However, there are also some potential drawbacks to Six Sigma, including complexity and time-consuming.

The Kaizen methodology is a widely-accepted approach to business improvement. It centers on continuous improvement of already existing processes, with an emphasis on quality and customer satisfaction. The goal is to make the process simpler, more efficient, and more cost-effective. The Kaizen approach can provide significant value in terms of process optimization and cost savings. The key elements of Kaizen are: standardization, visualization, efficiency, measurement, improvement [8].

By implementing the Kaizen approach effectively, businesses can achieve significant gains in efficiency, customer satisfaction, and cost savings – all while making better use of their resources than ever before.

Business process automation (BPA) provides a way of removing manual processes, streamlining operations and improving customer service. The use of technology enables organizations to identify and eliminate bottlenecks in their workflow, reducing labor costs and providing quicker turnaround times [1].

Key steps to start identification tasks that could be automated are communication between departments, definition of objectives, design user interface. This way businesses can successfully implement BPA and reap the benefits of increased efficiency and improved customer service.

Business Process Management (BPM) is a holistic approach to managing and improving business processes. This approach involves the systematic management of business processes from end to end, from design to implementation to monitoring and improvement [2].

BPM involves identifying the business processes, defining their objectives, and mapping the process flow. The process is then analyzed to identify inefficiencies and bottlenecks, and improvements are implemented. BPM also involves continuous monitoring and improvement to ensure that the process remains efficient and effective. The key benefits of BPM include increased efficiency, improved quality, cost savings. There are also some potential cons to BPM, including complexity, resistance to change, limited scope.

Total Quality Management (TQM) is a comprehensive approach to quality management that involves the participation of all employees in the process of continuous improvement. This approach involves the identification and elimination of defects and the implementation of systems and processes to ensure quality [7].

TQM involves a focus on customer satisfaction and the implementation of systems and processes to ensure that customer needs are met.

The key benefits of TQM include improved quality, increased customer satisfaction, increased employee engagement. There are also some potential difficulties to TQM, including limited scope, resistance to change, lack of strategic focus.

When looking for an approach to introduce business processes at the enterprise, there are several to choose from. The goal is to choose the approach that best meets the needs of your business.

The first step in finding the right approach is to look internally and analyze current business processes. This will give an understanding of what needs to be addressed before deciding on an introduction method. Some approaches may work better than others, depending on the scale and complexity of enterprise's operations. For example:

Consultative approach. A consultant works with team to help identify improvements and suggest new ways of improving efficiency. This can be a great option if team lacks experience in process implementation or optimization.

Top-Down methodology. This method focuses on improving existing processes from the top-level down instead of introducing new ones from scratch. It can be used to streamline existing processes and reduce redundancies [4].

Automation. Technology can help reduce manual labor and improve data accuracy in many organizations, making them more efficient overall. Automation can also help reduce downtime due to human error or unexpected delays in production or other activities.

The right approach for introducing business processes at the enterprise depends on a variety of factors, such as its size and complexity, so it's important to take the time to evaluate each possibility carefully before deciding.

In summary, the integration of effective business processes is a crucial element towards attaining organizational efficiency, customer satisfaction, and financial growth. Irrespective of the chosen approach, a successful introduction of business processes requires the involvement of all employees and a determination to continuous improvement. By implementing a structured approach to process improvement, prioritizing customer satisfaction, and promoting an innovative and learning culture, an enterprise can realize significant improvements in efficiency, quality, and profitability.

In conclusion, the way an enterprise implements business processes should match its culture, resources and goals. To achieve success, it is important to properly assess the current state of the enterprise, define its strategic objectives, integrate tactics, and use agile approaches. A well-

structured plan for introducing business processes should consider the daily practices of the organization, its customer service and the customer experience it provides. The right use of technology can make the process of introducing business processes easier and less costly. It is important to constantly evaluate the effectiveness of the implemented business processes, make necessary changes, and look for innovative solutions.

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