EXAMPLE OF THE FRONT PAGE OF MASTER'S LEVEL DEGREE QUALIFICATION PAPER

MINISTRY OF EDUCATION AND SCIENCE OF UKRAINE

SUMY STATE UNIVERSITY

Educational and Research Institute of Business, Economics and Management

Department of International Economic Relations

«Admitted to the defense»
Head of the Department

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QUALIFICATION PAPER

It is submitted for the Master's degree

Specialty 292 "International Economic Relations"
on the topic "Management of business processes of international companies based on the principles of efficient use of energy resources"

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It is submitted for the Master's level degree requirements fulfillment.

Master's level degree qualification paper contains the results of own research. The use of the ideas, results and texts of other authors has a link to the corresponding source

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Sumy, 2023

MINISTRY OF EDUCATION AND SCIENCE OF UKRAINE

SUMY STATE UNIVERSITY

Educational and Research Institute of Business, Economics and Management

Department of International Economic Relations

TASKS FOR MASTER'S LEVEL DEGREE QUALIFICATION PAPER

(specialty 292 " International Economic Relations ")

student 2 course, group _ МБ.м-21ан

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Zmiievskyi Serhii Volodymyrovych

(student's full name)

1. The theme of the paper is «Management of business processes of international companies based on the principles of efficient use of energy resources »
approved by the order of the university from university №1371-VI from 29.11.2023

2. The term of completed paper submission by the student is«14» December 2023.

3. The purpose of the qualification paper is research of management of business processes of international companies based on the principles of efficient use of energy resources

4. The object of the research is management of business processes of international companies

5. The subject of research is business processes of international companies

6. The qualification paper is carried out on materials statistical reporting, periodical literature, educational literature, reports.

7. Approximate master's level degree qualification paper plan, terms for submitting chapters to the research advisor and the content of tasks for the accomplished purpose is as follows:

Chapter 1 Theoretical basis of the management of business processes of international companies based on the principles of efficient use of energy resources

(title, the deadline for submission)

Chapter 1 deals with explore management of business processes of international companies, RBP concept based on the principles of efficient use of energy resources

(the content of concrete tasks to the section to be performed by the student)

Chapter 2 Methodical approach of the management of business processes of international companies based on the principles of efficient use of energy resources

(title, the deadline for submission)

Chapter 2 deals with to evaluate the management of business processes of international companies, methodical approach to assessment of business processes of international companies based on the principles of efficient use of energy resources
(the content of concrete tasks to the chapter to be performed by the student)

Chapter 3 Development of the management of business processes of international companies based on the principles of efficient use of energy resources
(title, the deadline for submission)

Chapter 3 deals with to determine analytical aspects of evaluating of the management of business processes of international companies, improvement of the management of business processes of international companies based on the principles of efficient use of energy resources to draw research conclusions
(the content of concrete tasks to the chapter to be performed by the student)

8. Supervision on work:

Chapter	Full name and position of the advisor	Date	
		task issued by	task accepted by
1	Taraniuk L., professor	20.10.2023	19.11.2023
2	Taraniuk L., professor	20.11.2023	07.12.202
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ABSTRACT

of Master's level degree qualification paper on the theme
"Management of business processes of international companies based on the principles of efficient use of energy resources"
student Zmiievskyi Serhii Volodymyrovych

The main content of the master's level degree qualification paper is set out on 43 pages, including a list of used sources of 51 titles, which is placed on 6 pages. The work contains 2 tables, 2 pictures.

The purpose of the master's level degree qualification paper is research management of business processes of international companies based on the principles of efficient use of energy resources.

To achieve this goal and objectives there were used following scientific methods of research: systematization and generalization (by theoretical justification - the concept of competitive ability), comparison (in the process of management of business processes of international companies based on the principles of efficient use of energy resources), systematic analysis (during the study of the concept competitive ability at different levels).

All these factors necessitate the transformation (reengineering) of business processes of industrial companies in the conditions of Eurointegration in order to increase the level of energy efficiency of production. In our opinion, there is an urgent need to reengineering the business processes of industrial enterprises, which consists in radical redevelopment of processes in the manufacturing sector, which is: implementation of reinvention of fixed assets; updating of production technologies of finished products; application of energy bench marking, which is aimed at reducing the level of energy costs of production, energy intensity of finished products on the basis of successful practices of enterprises of Ukraine and EU; the introduction of start-ups in the activities of the industrial enterprises of the two countries and the experience of the EU countries that contain measures of energy-efficient nature (for example, the introduction of renewable energy technologies based on the energy of the sun, wind, geothermal sources, land, on the production, resulting in lower production costs the final product); Implementation of best practices in the transformation (reengineering) of business processes of EU enterprises aimed at increasing the level of energy efficiency of production, in the work of Ukrainian industrial enterprises, as well as the mechanism of feedback, when the experience of Ukrainian enterprises that implemented reengineering of business processes is implemented in work EU companies.

All this causes the actualization of the subject of this project. Also, to justify the project, it is worthwhile pointing out the types of effects that will be gained during the implementation of the joint project.

Degree of the studied problem. The determination of the effects of managing the business processes of international companies based on the principles of efficient use of energy resources remains unresolved. Economic effect. The formation of the methodological basis for the transformation of business processes of industrial companies, which is aimed at reducing the cost of production of final products, as a

result of the introduction of energy saving technologies, as well as reduction of production costs can be achieved as a result of the introduction of a horizontal (process-oriented) management structure, as a result of reduced administrative and overhead costs of production.

The social effect is the creation of new jobs during the implementation of the Ukrainian-EU project on the one hand, and the optimization of labor resources, which consists of internal and external rotation of personnel at enterprises in implementing reengineering of business processes. The budgetary effect is to pay taxes from the wage bill of project participants. The ecological effect is to reduce environmental damage in the transformation of business processes of industrial companies as a result of an increase in the level of compliance with the emission standards of enterprises emission standards, which are regulated in the European Union.

The information base of the master's level degree qualification paper is statistical reporting, periodical literature, educational literature, reports.

The main scientific results of the work are as follows: the theoretical provisions of management of business processes of companies based on efficient energy resources have been researched, methodological support for evaluating business process management based on energy management has been formed, practically tested in the work of international companies.

Businesses operating on a global scale often prioritize the efficient utilization of energy resources as a fundamental principle within their operations. This approach involves strategic planning and implementation of practices aimed at minimizing energy consumption, reducing waste, and maximizing the use of renewable or sustainable energy sources. Such companies focus on optimizing energy efficiency across various operational areas, including manufacturing processes, supply chain management, transportation, and office facilities.

Research methods Research the theoretical and methodological foundations of management of business processes of industrial companies in the context of using a coopetitive approach: economic analysis of the economic activity of energy efficient enterprises in the EU countries; formation of prerequisites for management of business processes of manufacturing companies in Ukraine and EU countries - a comparative analysis - when studying the problems and prospects of industrial enterprises in a transitional economy on a coopetitive approach. The CMMI methodology will be used to determine the level of process maturity in organizations of various sizes and activities.

Approval of work materials – carried out in the work of companies of the production sector in the construction of strategic and tactical planning of international economic activity

KEYWORDS: management, business processes, energy resources, assessment, criteria.

Year of Master’s level qualification paper fulfillment is 2023.

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CONTEST

Introduction 7

1 Theoretical basis of the management of business processes of international companies based on the principles of efficient use of energy resources 11

1.1. Management of business processes of international companies 11

1.2. RBP concept based on the principles of efficient use of energy resources 14

2 Methodical approach of the management of business processes of international companies based on the principles of efficient use of energy resources 18

2.1. Evaluation of the management of business processes of international companies 18

2.2. Methodical approach to assessment of business processes of international companies based on the principles of efficient use of energy resources 24

3. Development of the management of business processes of international companies based on the principles of efficient use of energy resources 27

3.1. Analytical aspects of evaluating of the management of business processes of international companies 27

3.2. Improvement of the management of business processes of international companies based on the principles of efficient use of energy resources 30

Conclusions 36

References 38

Introduction

Justification of the choice of topic and its relevance. In the conditions of the European integration vector for the development of post-Soviet countries, which Ukraine and EU need to include, the importance of implementing the concept of change management in the work of industrial enterprises, which is aimed at increasing the energy efficiency of production, is becoming more and more acute. A prerequisite for this phenomenon is a lot of factors, which for a long time had a negative impact on the work of industrial companies of different sectors of Ukraine and EU. These factors include:

- high level of physical wear of production equipment;

- long time orientation of industrial products to the eastern markets, primarily the market of the Russian Federation;

- outdated technological processes and design and technological documentation of production products, which has not changed since the Soviet Union and was in line with the outdated requirements of customers of industrial products;

- the absence of a scientific component in the production of industrial products, resulting in a decrease in the level of competitiveness of products both on the domestic and on external (international) markets;

- significant loss of market segments as a result of political actions, economic wars from Russia in relation to the Ukrainian and EU economic systems;

- low level of good citizens of the countries, as a result of the increase of the level of internationalization of labor resources, as a result of an increase in the level of labor migration into the countries of the European Union;

- raising the level of external borrowing (eurocredit) countries to fill their own budgets and not always effectively use them, as a consequence of the growth of external debt and the reduction of liquidity of economic systems of countries;

- high energy intensity of production of industrial products, due to outdated technological processes for production equipment, resulting in an increase in the cost

price and the final price of finished products and low level of competitiveness of products.

All these factors necessitate the transformation (reengineering) of business processes of industrial companies in the conditions of Eurointegration in order to increase the level of energy efficiency of production. In our opinion, there is an urgent need to reengineering the business processes of industrial enterprises, which consists in radical redevelopment of processes in the manufacturing sector, which is: implementation of reinvention of fixed assets; updating of production technologies of finished products; application of energy bench marking, which is aimed at reducing the level of energy costs of production, energy intensity of finished products on the basis of successful practices of enterprises of Ukraine and EU; the introduction of start-ups in the activities of the industrial enterprises of the two countries and the experience of the EU countries that contain measures of energy-efficient nature (for example, the introduction of renewable energy technologies based on the energy of the sun, wind, geothermal sources, land, on the production, resulting in lower production costs the final product); Implementation of best practices in the transformation (reengineering) of business processes of EU enterprises aimed at increasing the level of energy efficiency of production, in the work of Ukrainian industrial enterprises, as well as the mechanism of feedback, when the experience of Ukrainian enterprises that implemented reengineering of business processes is implemented in work EU companies.

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production costs can be achieved as a result of the introduction of a horizontal (process-oriented) management structure, as a result of reduced administrative and overhead costs of production.

The social effect is the creation of new jobs during the implementation of the Ukrainian-EU project on the one hand, and the optimization of labor resources, which consists of internal and external rotation of personnel at enterprises in implementing reengineering of business processes. The budgetary effect is to pay taxes from the wage bill of project participants. The ecological effect is to reduce environmental damage in the transformation of business processes of industrial companies as a result of an increase in the level of compliance with the emission standards of enterprises emission standards, which are regulated in the European Union.

Object of research is management of business processes of international companies.

Subject of research is business processes of international companies

The purpose of the work is research of management of business processes of international companies based on the principles of efficient use of energy resources

Tasks of the work are explore: the theoretical provisions of management of business processes of companies based on efficient energy resources have been researched, methodological support for evaluating business process management based on energy management has been formed, practically tested in the work of international companies.

Research methods Research the theoretical and methodological foundations of management of business processes of industrial companies in the context of using a coopetitive approach: economic analysis of the economic activity of energy efficient enterprises in the EU countries; formation of prerequisites for management of business processes of manufacturing companies in Ukraine and EU countries - a comparative analysis - when studying the problems and prospects of industrial enterprises in a transitional economy on a coopetitive approach. The CMMI methodology will be used to determine the level of process maturity in organizations of various sizes and activities.

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1. Theoretical basis of the management of business processes of international companies based on the principles of efficient use of energy resources

1.1 Management of business processes of international companies

The European integration vector of development, as well as the events of recent years (Covid-19, the war in Ukraine) had a strong impact on the economic, social, geopolitical components of the world economy.

According to Shwab [1], a significant decrease in the potential of these components is predicted. To restore the system of economic peace, it is necessary to take into account the possible destruction of production chains; an increase in the cost of production, a sharp drop in the level of well-being of citizens, as a result of an increase in the volume of labor migration of the population to the EU countries, an urgent need for energy-efficient industries.

These factors necessitate the implementation of the concept of change management in the work of industrial enterprises Taraniuk [2], which is aimed at increasing the level of energy efficiency of production, subject to the use of coopetititive strategies.

These factors necessitate the internationalization and reengineering of business processes of industrial companies in order to increase the level of energy efficiency of production, subject to the implementation of the coopetition approach using the RBV concept with the EU countries Dagnino [3]. The urgent need for reengineering of business processes of Ukrainian enterprises, which consists in a radical redesign of the processes of the production sector, consists in: the introduction of re-innovation of fixed assets; application of energy benchmarking, the purpose of which is to determine the energy intensity of finished products based on the successful experience of enterprises in Ukraine and EU countries. The implementation of a coopetitive approach will allow, through the development of a gradual process of mutual learning, to get more profit. To achieve efficiency, it will

be possible to choose the optimal trajectories for the development of opportunities for representatives included in the business process coopetition schemes, as well as to carry out certain reengineering activities. Studies of the impact of demand-driven structural transformations on economic growth and technological change are of great importance Lorentz [4].All this determines the actualization of the subject of this project.

Much attention is paid to the study of the transformation of business processes in the work of enterprises. Thus, the work D'Espallier [5] examines the role of institutional transformations in the activities of financial organizations.

The formation of an information system is a necessary lever in the creation of a controlled subsystem for the organizational and economic support of radical transformations. An analysis of the introduction of IT support into the activities of firms when redesigning the information support of business processes according to the standards of the countries of Central and Eastern Europe is reflected in the works of scientists Bhushan [6].

Since the essence of the RBM concept of an enterprise is business processes, the use of a coopertiative approach will create a consistent system of interaction between various business processes of enterprises in order to minimize the costs of all interested participants/parties. The concept of RBV is mentioned for the first time Penrose [7], among researchers it also deserves mention CUCCULELLI, [8]. The leading researchers in this direction are Bengtsson [9], Roy [10] and colleagues Ciambaretto, Fernandez [11]. In Ukraine, studies of coopetition are carried out mainly for the development of financial and banking institutions Leonov, Vasilyeva, Tsyganyuk [12].The practical aspects of state regulation of reengineering of manufacturing companies were considered in his work by the scientist Abu-Shanab [13].

Methodological aspects of assessing the risk management system of an enterprise in business process reengineering were proposed by scientists from the Sumy Scientific School Melnik [14]. When implementing the organizational and

economic system of fundamental transformations of business processes, it is necessary to take into account the features of the stages of its implementation.

Mechanisms for transforming business processes of manufacturing companies in the energy sector and methods for their evaluation are proposed. Sotnik [15], as well as the problematic aspects of the work of energy enterprises and ways to solve them.

It is also necessary to study technological transformations and their impact on the work of companies in countries; these aspects were studied by: Deva, Nitu [16], as well as Lorenz, Kyarli, Savona, Valente [4]. Scientists Reuben, Suenens [17]studied strategic changes in the work of economic entities of the countries of the world.

Another important aspect of the formation of the concept of technological change is the formation of effective innovation management. Scientists have studied the processes of innovation management at the production level at the enterprise Oleynik, Kozmenko, Wiebe, Kozmenko [18]. Scientists Kharlamova, Stavytskyy, Zarotiadis [19] dealt with issues of the impact of technological changes on the income imbalance of EC companies. The management of financial transformations during the implementation of e-business innovations in the work of companies in the countries has been studied in the work Ünal, Gassot [20].

It should be noted that one of the main shortcomings of business process redesign of Ukrainian enterprises is its insufficient internationalization, taking into account the successful practices of European countries. This was sufficiently fully covered in the work of scientists Shakhova S., Taraniuk L, Taraniuk K. [2]

The study of this aspect is expedient during the implementation of the research. Because this parameter can significantly affect the overall efficiency of industrial companies and the formation of competitive pricing of industrial products in the domestic and foreign markets.

The formation of a methodological basis for the internationalization and reengineering of the business processes of industrial companies, provided that a coopetitive approach is used, which is aimed at reducing the costs of production of final products. By introducing energy-saving technologies and reducing production

costs, it is possible to set up a horizontal (process-oriented) management structure. As a result, administration and general production costs have been reduced.

1.2 RBP concept based on the principles of efficient use of energy resources

The reengineering of business processes involves redesigning workflows and systems within an organization to improve efficiency, effectiveness, and often to incorporate innovative practices. When focusing on the efficient use of energy resources, here's how the principles of energy efficiency can be integrated into this concept:

Process Mapping and Energy Audit: Begin by mapping out existing business processes while conducting an energy audit. Identify areas where energy is being consumed and potential areas for improvement.

Energy-Efficient Technology Integration: Reengineer processes by integrating energy-efficient technologies where possible. This might involve upgrading machinery, adopting smart sensors, or utilizing energy-efficient appliances in office spaces.

Workflow Optimization for Energy Conservation: Redesign workflows to minimize energy consumption. Implement measures such as scheduling tasks during off-peak energy hours, optimizing transportation routes to reduce fuel usage, or consolidating activities to reduce overall energy demand.

Employee Engagement and Training: Educate and engage employees on energy-efficient practices within their workflows. Encourage a culture of energy conservation by training staff to use equipment efficiently, turn off unnecessary devices, and contribute ideas for energy-saving improvements.

Supply Chain Optimization: Reengineer supply chain processes to prioritize energy-efficient suppliers and transportation methods. This might involve sourcing materials locally to reduce transportation energy, using eco-friendly packaging, or collaborating with suppliers committed to sustainable practices.

Data-Driven Decision Making: Implement systems to track energy consumption throughout the business processes. Analyze this data to make informed decisions about

areas needing improvement and to measure the impact of reengineered processes on energy efficiency.

Regulatory Compliance and Green Standards: Align reengineered processes with regulatory energy efficiency standards and certifications. Strive to meet or exceed these standards to showcase the commitment to sustainable business practices.

Continuous Improvement and Innovation: Foster a culture of continuous improvement by encouraging innovation in energy-saving strategies. Regularly review and refine reengineered processes to adapt to new technologies and best practices in energy conservation.

Investment in Renewable Energy: Explore opportunities to invest in renewable energy sources within the organization's operations. This might include installing solar panels, utilizing wind power, or investing in other renewable energy projects to offset energy consumption.

Stakeholder Collaboration: Collaborate with stakeholders, including energy consultants, industry peers, and local communities, to share best practices, collaborate on energy-efficient initiatives, and advocate for broader adoption of sustainable practices.

By incorporating energy-efficient principles into the reengineering of business processes, organizations can reduce their carbon footprint, lower operational costs, and contribute positively to environmental sustainability while also improving overall efficiency and competitiveness.

Efficient use of energy resources is crucial for sustainability, cost savings, and reducing environmental impact. Several principles guide the efficient utilization of energy resources:

1. Energy Conservation: Reduce unnecessary energy use wherever possible. This involves turning off lights, electronics, and machinery when not in use, optimizing heating and cooling systems, and employing energy-efficient appliances and equipment.

2. Energy Efficiency: Enhance the efficiency of energy-consuming devices and systems. Upgrade to energy-efficient technologies, improve insulation, seal air leaks, and adopt smart thermostats or lighting systems to minimize energy waste.

3. Renewable Energy Adoption: Prioritize the use of renewable energy sources such as solar, wind, hydro, geothermal, and biomass. Invest in renewable energy systems to decrease reliance on finite fossil fuels and reduce greenhouse gas emissions.

4. Demand-Side Management: Manage and control energy consumption on the consumer side. Encourage energy conservation practices, implement demand-response programs, and use smart grid technologies to optimize energy usage during peak and off-peak periods.

5. Energy Storage Solutions: Implement energy storage technologies to store excess energy generated during low-demand periods and release it during high-demand times. Battery storage, pumped hydro storage, and thermal storage are examples of such solutions.

6. Decentralized Energy Systems: Establish decentralized energy solutions such as microgrids or community-based renewable energy projects. These systems provide localized and often more resilient energy sources, especially in remote areas.

7. Policy Support and Incentives: Develop supportive policies, regulations, and incentives that promote energy efficiency and renewable energy adoption. This includes tax incentives, subsidies, and mandates encouraging businesses and individuals to invest in sustainable energy practices.

8. Technological Innovation: Invest in research and development to innovate new energy-efficient technologies and solutions. Explore advancements in energy storage, renewable energy, smart grid technologies, and energy-efficient manufacturing processes.

9. Data Analytics and Monitoring: Use data analytics and monitoring systems to understand energy consumption patterns, identify inefficiencies, and make informed decisions for better energy management and optimization.

10. Education and Awareness: Educate individuals, businesses, and communities about the importance of energy efficiency and conservation. Promote awareness campaigns, training programs, and educational initiatives to encourage behavioral changes toward more sustainable energy practices.

Efficient use of energy resources involves a holistic approach that combines technological advancements, policy interventions, behavioral changes, and a collective effort from various stakeholders to achieve sustainable and responsible energy consumption.

2. Methodical approach of the management of business processes of international companies based on the principles of efficient use of energy resources

2.1 Evaluation of the management of business processes of international companies

The principles of the process approach are based on several principles, the implementation of which can significantly increase productivity. Business process managers use processes to achieve organizational goals through their management, optimization, and control [21]. According to the authors, a business process means any sequence of interconnected actions that generate results valuable to their clients [22], or simply - the way all actions are performed [23].

The process approach comprises several essential elements that are indispensable for its implementation within an organization: inputs, outputs, resources, process owner, process customers and suppliers, process indicators. Elements that change during actions are considered as process inputs. These inputs may include materials, equipment, documentation, diverse information, staff, finances, and more. The anticipated outcomes represent the process results. Outputs could manifest as physical products, various services, or information.

Resources are the necessary components of a process. Resources remain unchanged throughout the process. The process approach defines resources as equipment, documentation, finances, staff, infrastructure, the environment, and more.

The concept of the process owner is introduced as one of the most crucial elements. Each process should have its owner. The owner is an individual who possesses the necessary resources and is accountable for the final outcome (output) of the process.

Every process should involve suppliers and customers. Suppliers contribute to the process, while customers are interested in the results. A process can have both external and internal suppliers and customers. A process fails if it lacks suppliers, and it becomes redundant if there are no customers involved [24].

Indicators are necessary for gathering information about the process and making appropriate managerial decisions. These indicators constitute a set of quantitative or qualitative parameters that characterize the process and its output [51].

The process approach offers several advantages over the functional approach, primarily due to the horizontal linkages between organizational units. The main benefits of the process approach include coordinating actions among organizational units within a process, focusing on the process result, enhancing organizational efficiency and effectiveness, defining clear actions to achieve results, increasing predictability in outcomes, identifying opportunities for process improvement, eliminating barriers between organizational units, reducing unnecessary vertical relationships, preventing the accumulation of unused resources, and reducing time and material costs [51].

The process approach underlies several popular and effective organizational improvement concepts. There are four directions that utilize the process approach as the primary method to enhance productivity [51]:

- *Total Quality Management (TQM):* This concept involves continually improving the quality of products, processes, and organizational management systems. Customer satisfaction is the cornerstone of the organization's activities.

- *Continuous Improvement Process*: This concept ensures incremental enhancements to all components of the process, consistently implemented. The Japanese "kaizen" is the most renowned method employing continuous process improvement.

- *Business Process Improvement* or Management: This method aids organizations in improving efficiency by optimizing business processes. Process changes are implemented incrementally and systematically.

- *Business Process Reengineering* (BPR): Originating in the early 1990s, this approach is based on rethinking existing processes and radically altering them (redesign). BPR facilitates rapid process changes compared to the aforementioned methods. It also uses information technology as a foundational element for changes.

The necessity and advantages of the business process are evident in large organizations. Processes provide a lifeline for any business, helping to organize individual actions and ensure optimal resource utilization [24].

Management of Business Processes (BPM) is a systematic approach to improving organizational business processes. Continuous improvement is one of the key philosophies of BPM, aiming to place it at the core of all BPM initiatives. BPM is a continuous approach to consistently improving the execution of business processes. Regarding management and the development of business process management, authors like V. King, P. Fingar, H. Smith, among others, have proposed different concepts to understand their connections and differences [25, 26]. For instance, V. King distinguished four waves of BPM development:

The first wave of BPM focuses on continual process improvement and in many ways aligns with the philosophy of Total Quality Management (TQM). TQM leads to increased productivity by simultaneously improving quality and customer satisfaction while reducing losses caused by poor production. Thus, TQM involves the systematic and consistent application of several methods within a company, clearly focused on product quality and customer satisfaction [51].

The second wave of BPM consisted of focusing on business process reengineering, also known as short-term reengineering, leading to significant, radical, and fundamental changes in the organization's applied working procedures or technologies. Achieving not just gradual but radical increases in organizational productivity was the expected outcome.

The third wave of BPM—referenced by authors P. Fingar and H. Smith [26]—refers to activities leading to the creation of a process-centric organization. This involves applying core procedural components or process management, comprising the following: defining key processes, including appointing process owners and customers; describing processes, mapping, and forming a process map (company's process model) for managing the process system; utilizing technological maps (models) to assess costs and enhance their efficiency; continual process improvement and performance measurement. Quality within the company is primarily understood as the demand for quality standards that must be adhered to in the process model's output. Information technology is viewed as

supporting the enterprise's process, while the process model forms the basis for process management. The management strategy is perceived as the top tier of the "pyramid" of process management. Competency management is considered a system for executing roles in specific processes (both management and key processes) by individuals possessing the relevant knowledge and abilities [27].

Improving business processes is a strategic planning initiative aimed at restructuring operational-based business processes by complexity level, employee skills, etc., to make the entire process more significant, efficient, and contribute to overall business growth. It's a fairly radical way to reinvent more effective ways of conducting business processes rather than taking small steps. Typically, it begins with process mapping, aiming to align IT resources with the organization's business objectives. There are numerous process improvement tools available in the market to assist in this endeavor [51].

Business process optimization utilizes existing processes and employs analytics and process analysis tools to eliminate bottlenecks and other significant process inefficiencies.

Business process mapping involves documenting, clarifying, and breaking down the sequence of processes into logical steps. This mapping is done in written form or visualized through flowcharts.

The process of defining business requirements and making decisions that best address business issues is carried out through business process analysis, which may involve process improvement, policy development, organizational changes, or strategic planning.

Integration of business processes is the ability to identify a process model that defines the sequence, hierarchy, events, and logic of executing and transferring information between systems within a single enterprise.

Business process modeling is a tool for analyzing business processes to measure efficiency, testing process design, identifying bottlenecks, testing changes, and determining how the process functions in different environmental conditions with varying data sets.

Business process transformation refers to radically changing a series of actions necessary to achieve a specific business goal. It aims to align company employees, goals, processes, and technologies.

Business process flow is the representation of the process you create, typically appearing as a form or flowchart. Each business process flow comprises stages, and within each stage, there are fields (or steps) to be filled.

Business process monitoring involves actively monitoring processes and activities to help management gain insight into critical transactions and processes within the enterprise. It helps management understand how their processes function and whether they align with the company's business goals.

Work process management (workflow management) enables coordinating repetitive tasks and procedures to make them easier and faster. Work process focuses on people and work regulations, describing the role of each employee, participant in task execution [24].

Understanding the philosophy of Business Process Management (BPM) in an international company is important across five dimensions [51]:

1. BPM and Organizational Culture: Culture can be defined as a set of shared values within a group, manifested through ideas, attitudes, rituals, technologies, products, and institutions. These values may vary from group to group or institution to institution and are defined as ideas that influence group behavior and organize its model [28]. According to E. Schein [29], group culture can be defined as a model of assumptions established by the group that resolves adaptation and internal integration issues within a multicultural group.

2. BPM as Process Organization Support: Studies on Business Process Management emphasize the influence of process management on organizational strategies. According to J. Chang [30], BPM was initially oriented toward a process-oriented management approach used for designing, analyzing, and improving business processes for managing and enhancing organizational behavior. The connection between BPM and organizational behavior outcomes is so profound that R. Dyckman [31] highlights that BPM maturity tends to improve the stability of organizational behavior in the long term.

BPM and Organizational Effectiveness: Evaluating methodology based on organizational processes can support the spread of BPM within an organization by

creating visibility into commercial processes through measuring intermediate and final results. The measurement system is crucial in management processes for providing assessment and spreading success stories for motivational purposes, evaluating progress, allocating and reallocating resources, and implementing continuous improvement systems. (Reference [32])

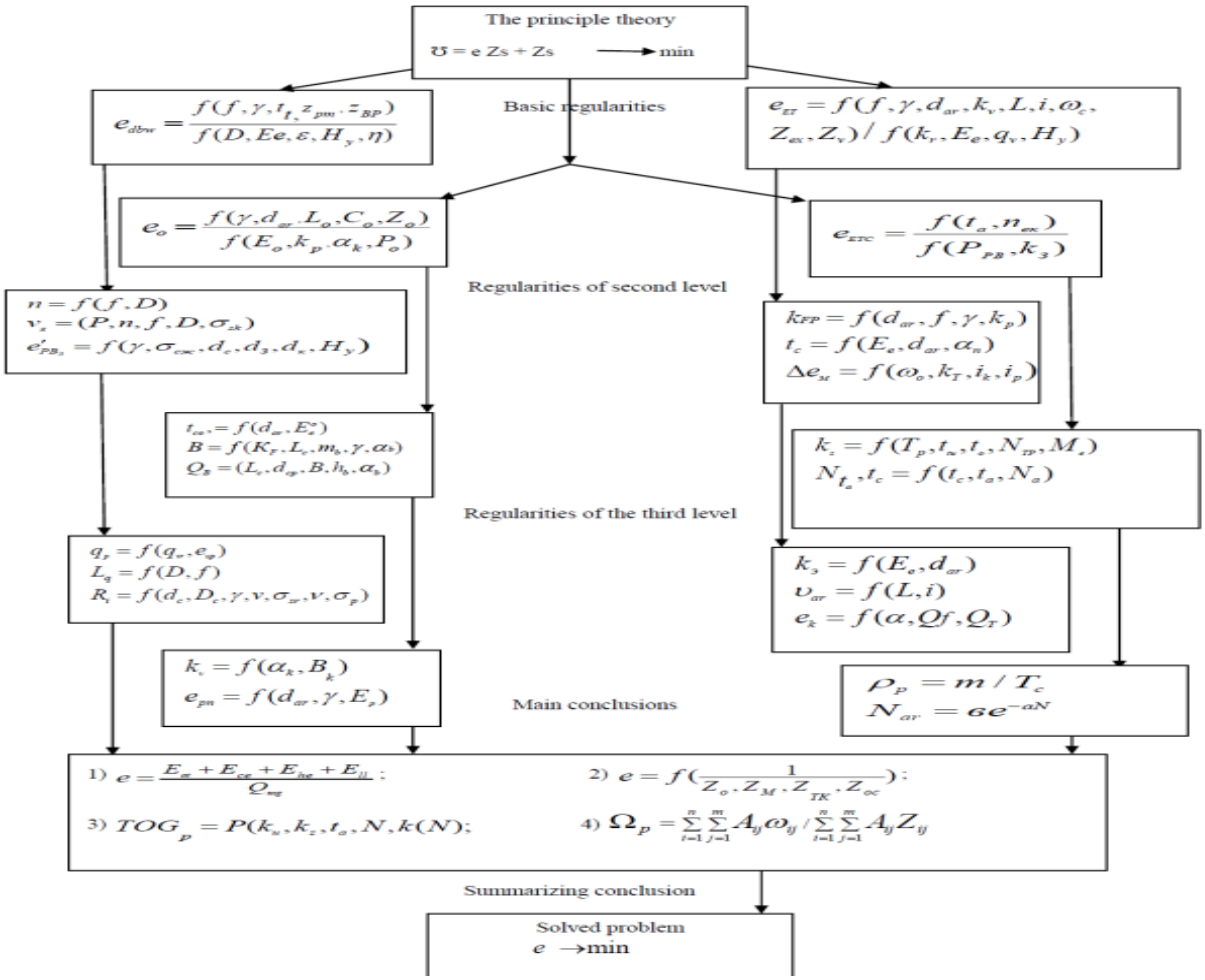
BPM as a Corporate Governance Support Tool: Modern international companies tend to adopt strategies that implement positive differentiation in their working segments to sustain themselves and thrive in the market. Factors such as increased competitiveness among companies and rapid, continual changes in client types make the business environment even more complex. This scenario compels enterprises to introduce new management methods, with one of the most relevant being Business Process Management (BPM). According to L. Jesusa [33], BPM's key advantages include process autonomy, improved effectiveness monitoring, organizational structure redefinition, and the implementation of benchmark models.

BPM as a Competitive Advantage Tool: From this perspective, BPM's primary goal is to create a company's competitive advantage, thereby ensuring products and services that better satisfy customers than those of competitors. In this sense, BPM acts as a tool for competitive advantage, involving continuous efforts to enhance the process. Managing business processes can create competitive advantages for an international company as it directly impacts the management and enhancement of the product's or service's value in the international market. In this light, BPM can invigorate and ensure the effective use of organizational resources, thus being a critical tool for seeking sustainable competitive advantages [51].

In any organization, there is a set of business processes that can and should be automated in order to reduce potential errors, speed up interaction among performers, and enhance the overall efficiency of enterprise management. Workflow systems should be simple and flexible because business processes within an organization are the most dynamic component and constantly subject to change to ensure the company's competitiveness and relevance to contemporary realities.

2.2 Methodical approach to assessment of business processes of international companies based on the principles of efficient use of energy resources

Theoretical knowledge is commonly acknowledged as an organized system of information. Summarizing the conducted research led to the establishment of the structure of the energy-saving theory (minimizing energy usage) in the context of open deposit development (Fig. 1).



Pic. 2.1 – Energy-saving theory (minimizing energy usage) in the context of open deposit development **[34]**

At the heart of this theory lies a fundamental principle that harmoniously binds together all its components into a comprehensive entity. The fundamental tenet of the energy-saving theory asserts that reducing energy consumption in open development is attained through technological and organizational means, aiming to achieve a

minimal comprehensive measure of energy efficiency. This measure is represented by the specific energy consumption in monetary terms (eZs) and the specific reduced economic costs (Zs = (EnK + C) / Q) associated with this specific technology. This principle unveils prospects for further advancing the theory of energy conservation. The nucleus of this theory comprises a set of relatively independent fundamental principles. These principles delineate the essential, consistent, recurring, and indispensable relationships among the phenomena encompassed by the theory of energy conservation [34].

1. **The specific energy inputs required for drilling and boring activities** show a direct correlation with the coefficient of rock strength (f), rock density (y), the specific time dedicated to auxiliary operations during drilling, machine price, and BP price. Conversely, these inputs are inversely related to the diameter of the charge (D), the excavator bucket capacity (Ee) utilized for handling exploded rocks, the specific energy of the explosion (e), the height of the working ledge, and the effectiveness of dust suppression methods. This pattern suggests that it would be advantageous to decrease the time spent on auxiliary operations during drilling, increase the charge diameter and ledge height, and employ VR technology with high specific energy explosions while lowering its cost [34].

2. **The energy inputs specific to excavation and transportation activities** are directly related to the rock's strength and density coefficients, the average diameter of the fragment, the vehicle container coefficient, length (L), slope (i), primary resistance during movement, excavator and vehicle prices, as well as communication costs (Z v). Conversely, these inputs are inversely related to the roughness coefficient in collapse, excavator bucket capacity, vehicle load capacity, and bench height. This leads to the conclusion that it is advantageous to utilize robust cargo-transport equipment, reduce the average fragment diameter, employ optimal slope gradients, implement measures to diminish traffic resistance, and increase bench height [34].

3. **The energy inputs specific to dump formation** are directly correlated with rock density, average fragment diameter, quarry-to-dump distance, overburden placement standards (Cp), bulk equipment costs (Zo), and inversely related to the

drowning machine's capacity (Eo), loosening coefficient, compensating slope on the working platform (k), and the likelihood of locomotive servicing in the dump (Ro). The primary conclusions highlight the necessity for a well-justified dump location and scheduled placement of empty rocks, advocating for maximal utilization of compensating slope in the dump's work area when deploying mobile equipment for rock deposition, and aiming to enhance the Ro value [34].

4. **The energy intensity specific to the excavator-transport complex** correlates directly with the dump trucks' age and the number of excavators operating on a single ledge (nек). Conversely, it is inversely related to the most likely value of the coefficient indicating equipment usage time (Prv), loading coefficient of slaughter and boom excavators, considering the relative intensity among loading, transportation, and unloading processes, the probability of deviations in loading and unloading times, the intervals between transport vehicle approaches, the number of vehicles, and their movement organization. The theory of energy conservation encompasses laws indicating varying degrees of association, exposing the principles and nature of these occurrences. While not delving into the specifics of second and third-level laws, we'll mention the initial values: 'n' represents the drill rod's rotational frequency, '-' stands for the duration of the excavator's working cycle, and 'the capacity of the bucket excavator' is denoted by another parameter. The information provided outlines various parameters associated with quarry operations, such as the dimensions of mooring steps, rolling stock length, bulldozer mass, and numerous other factors relevant to the mining process, including time durations, angles, coefficients, and specific energy consumptions across different equipment and processes. These diverse parameters cover aspects like equipment efficiency, environmental impact, energy expenditure, and output production in the quarrying process. In essence, these consolidated theoretical conclusions encapsulate the primary scientific methodologies addressing the challenge of energy conservation management in deep quarries [34].

3. Development of the management of business processes of international companies based on the principles of efficient use of energy resources

3.1 Analytical aspects of evaluating of the management of business processes of international companies

For the survival and development of a business in the market, effective commercialization of innovative products involves the development and implementation of a new competitive strategy. This strategy should encompass a detailed analysis of global factors that directly and indirectly influence its efficient functioning. Revamping outdated management models and transforming into a "global" enterprise can be achieved through the establishment of supply chains and their effective management.

It is known that a supply chain generally comprises the processes of procurement, manufacturing, and product distribution. Its primary objective is to harmonize these processes and fulfill consumer needs.

Each business forms its unique supply chain, which varies in breadth, length, and relationships among its participants. The requirements of these relationships are shaped in accordance with market demands and operational objectives. Although each business makes individual decisions about its supply chain functioning, the functional areas of the supply chain remain consistent for all. Classically, there are five drivers of supply chain efficiency [35]:

- Production;
- Storage;
- Location;
- Transportation;
- Information

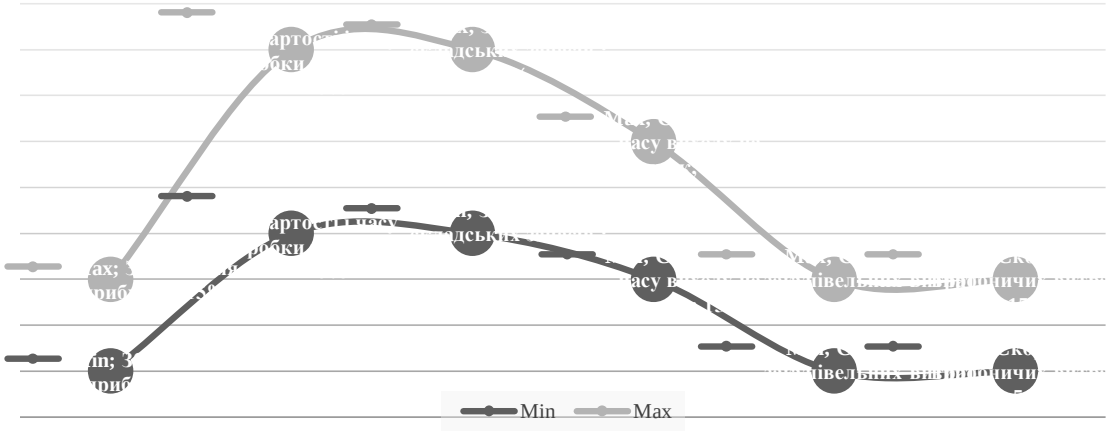
Sunil Chopra and Meindl [35] discuss 6 drivers of supply chain efficiency. This classification consists of three logistical drivers (facilities, inventory, transportation) and three cross-functional drivers (information, sourcing, pricing).

Despite the unique nature of supply chains, there exists a set of processes common to every chain, ensuring clear coordination among each segment. This, in turn, enhances the operational effectiveness of the supply chain. Based on an analysis of academic literature, the authors have developed and schematically depicted the collaboration within the supply chain and its drivers.

It is also important to consider that not only current influencing factors (previously discussed) affect supply chains and the specifics of developing a management model for them within a company, but it is also necessary to take into account a range of factors and trends that, in the long term, will require modifications to the chains according to future conditions.

According to assessments by major analytical companies like AMR Research and Forrester Research, it has been determined that utilizing the SCM concept enables companies to gain various competitive advantages (Pic. 2.2).

Every year, the aforementioned opportunities and benefits of efficient supply chain management expand and improve, allowing for competitiveness in a changing environment. Therefore, monitoring the key trends in SCM development is crucial, as well as shaping a comprehensive perspective of the SCM concept for the future. Analyzing the past and observing the present enables the projection of SCM trends in the future [36].



Pic. 3.1 - Competitive advantages from implementing the SCM concept (developed by authors based on AMR Research and Forrester Research) [36]

At the global level, it is becoming increasingly clear that it is impossible to operate efficiently without well-established links that ensure all processes associated with product creation and promotion are at the highest level. For example, Gartner, Inc. evaluates the supply chains of the world's largest and strongest companies annually to identify leaders and highlight their best practices. Gartner's assessment includes both quantitative and qualitative evaluations. When determining the "Top 25 Supply Chains," the quantitative evaluation takes into account four main indicators: 1) asset profitability; 2) inventory turnover; 3) revenue growth; 4) corporate social responsibility [36, 51].

The qualitative assessment of the supply chain is based on the opinions of two independent groups of experts: the global expert group (composed of clients and suppliers) and the analytical expert group from Gartner. The qualitative assessment allows for identifying the leadership aspect, which is the ability of a business to "share" its best supply chain management practices. The Top 10 supply chains by Gartner in 2016 and 2021 are listed in Table 3.1. [37, 51]

Table 3.1. - **Gartner's top 10 supply chains in 2016 and 2021 [38]**

Company	Total score		The opinion of global experts (25%)		Return on assets (20%)		Reversibility stocks (10%)		Income growth (15%)		Social responsibility (15%)	
	2016	2021	2016	2021	2016	2021	2016	2021	2016	2021	2016	2021
Unilever	5.84	6.39	1841	2074	10.8	10.2	6.9	6,8	3.6	1.9	10.00	10.00
McDonald's	5.54	5.27	1754	1264	13.2	13.9	156.0	174.5	-4.0	-4.2	3.00	3.00
Amazon.com	5.34	*	3356	*	0.56	*	8.4	*	20.4	*	0.00	*
Inditex	4.42	4.98	1212	1192	16.7	16.3	3.9	3.7	11.2	12.0	9.00	10.00
Cisco Systems	4.21	4.82	1158	1018	8.2	8.3	11.2	13.5	2.3	0.8	5.00	10.00
H&M	4.50	4.63	833	901	25.3	22.0	3.5	3.0	16.3	12.5	9.00	10.00
Intel	4.62	4.42	1112	952	11.4	10.5	4.3	4.0	1.1	4.6	9.00	7.00
Nestlé	3.68	4.10	1251	1159	8.9	7.9	5.2	5.1	-1.1	-0.6	10.00	10.00
Nike	3.58	4.07	1393	1290	14.7	16.2	3.9	3.8	9.7	7.9	4.00	6.00
Colgate-Palmolive	3.43	4.03	880	843	15.1	18.0	5.2	5.0	-3.5	-4.9	3.00	6.00
Starbucks	3.55	3.80	1069	926	16.9	20.3	6.8	11.1	13.8	12.7	4.00	4.00

As seen in Table 3.1, Amazon, whose supply chain ranked 3rd in 2016, in 2021 joined Apple and P&G, both of whose supply chains belong to the category of "Masters" ("Hall of Fame"), which Gartner introduced in 2015 to recognize sustained leadership over the last 10 years (a company's supply chain must be in the top five for at least seven years out of the examined ten) [36, 37].

3.2 Improvement of the management of business processes of international companies based on the principles of efficient use of energy resources

Improving the management of business processes within international companies involves a focus on maximizing the efficient utilization of energy resources. This encompasses strategies aimed at enhancing energy efficiency, reducing wastage, and optimizing energy consumption across various operational facets. By integrating principles of sustainable energy use into their business processes, international companies aim to minimize environmental impact while simultaneously fostering cost-effectiveness and operational excellence.

Let's take a closer look at the main supply chain elements of companies such as Amazon, Inditex (Zara brand), and Unilever.

1. **Amazon** - an online marketplace offering an extensive range of products including books, magazines, music, DVDs, electronics, computers, software, clothing, accessories, footwear, jewelry, home items, furniture, sports goods, beauty products, and personal care items (Amazon). Today, Amazon stands as one of the most influential retailers globally, significantly attributed to its innovative approaches within the supply chain.

The key elements of Amazon's supply chain include:

- Warehousing: Amazon pays special attention to optimizing warehouse processes. The efficiency of delivering products to consumers highly relies on the strategic placement of items within their warehouses. Amazon operates 493 warehouses covering approximately 180,000 square meters. Additionally, automation of storage and

distribution processes is implemented across all company warehouses. Amazon boasts over 4,500 robots in 20 distribution centers [38].

- Distribution of goods: Currently, Amazon offers various delivery options to its customers, including one-day delivery, first-class delivery, and free shipping. Presently, Amazon's delivery service covers over twenty American cities and London. This includes delivery from local restaurants and stores to the company's warehouses and directly to consumers [39]. Furthermore, Amazon plans to establish its transportation hub at Cincinnati airport, capable of handling over 200 flights a day, and intends to utilize drones for product deliveries. Additionally, Amazon opened its first "Go" store in Seattle [37].

- In-house logistics: Nearly 82% of Amazon's sales come from third-party sellers, but despite this, Amazon endeavors to adapt cooperation with them to its own logistics. Amazon employs both a push and pull strategy. The company uses a push strategy for distributing products stored in its own warehouses, and a pull strategy for selling goods from third-party sellers [40]. Moreover, Amazon's acquisition of the Whole Foods network was a pivotal transaction, merging offline and online retailers [37].

- Manufacturing: Amazon acknowledges the potential for manufacturing certain products at lower costs compared to its primary competitors. Therefore, Amazon actively works on organizing its manufacturing, enabling the sale of goods at lower prices.

Thus, in the development and management of Amazon's supply chain, focus is directed towards distribution processes [51].

2. **Inditex** is one of the largest retailers in the fashion industry, aiming to create beautiful and high-quality products. Presently, Inditex encompasses eight brands: Zara, Pull&Bear, Massimo Dutti, Bershka, Stradivarius, Oysho, Zara Home, and Uterqüe. Each brand is distinguished by its individuality and exclusive designer solutions (Inditex). Let's take a closer look at the supply chain of the Zara brand.

The key elements of Zara's supply chain include:

- Integration of manufacturer and retailer functions: The majority of Zara's production facilities are situated in Europe, with 50% of the entire production occurring in Spain, 26% in other European regions, and 24% in Asia and Africa. This flexibility in

production processes enables quick responses to sudden increases in demand, providing several advantages for the company [40]:

- Production of higher-quality garments.
- Elimination of transportation costs for shipping products from Asia.
- Ability to swiftly supply products to European and American markets.
- Prompt response to fashion trends and tendencies. Zara maintains a planning and analytics team that collects real-time information on current fashion trends, creating up to 1000 designs based on sales data and identified trends.

Each product development team, in addition to its own designers, includes individuals responsible for sales planning, procurement, and manufacturing processes, aiding in improving internal communication and working faster and more efficiently.

- Low inventory levels: Zara adheres to the principle that lower inventory levels in the supply chain result in reduced costs associated with maintaining those stocks. Producing small batches of goods helps in reducing inventory levels.

- Environmental responsibility: Zara is known for its energy-saving efforts and commitment to waste minimization and efficient waste management. Additionally, Inditex's goal is to establish 100% environmentally efficient stores by 2020.

- Distribution of goods: Zara operates a central distribution center with robust IT systems for storing and distributing its products [41]. Furthermore, advantageous distribution of goods is facilitated by the strategic placement of manufacturing facilities—76% of all products are manufactured in Europe. Also, all garments produced in Asia and Africa (accounting for 24% of all goods) are sent back to Spain, to the central distribution center, from where they are supplied to specific retail points.

In summary, Zara's supply chain focuses on rapid development and dissemination of new products. Zara follows the principle of producing the minimum necessary quantity of goods precisely when required and ensuring frequent but small shipments of products to retail points.

3. **Unilever manufactures** products under more than 400 brands, encompassing food, beverages, cleansing agents, and personal care items (**Unilever**). The fundamental elements of Unilever's supply chain comprise:

- **Sustainable energy use**: Unilever adopts the "Four Rs" approach - reducing, reusing, recovering, and recycling - to minimize waste generation. Additionally, the company focuses on repurposing waste into alternative resources, such as transforming factory waste into construction materials or composting coffee waste. By 2020, Unilever aims to transition to using 100% recyclable raw materials [40].

- **Environmental responsibility**: Sustainability is a key growth strategy for Unilever's rapidly advancing consumer goods brands. The company plans to double its growth by 2020 while reducing carbon emissions and environmental impact compared to present levels. Unilever aims to become carbon positive by 2030. Efforts are also dedicated to improving driver lives and reducing the environmental impact of freight transport. Collaborating with Convoy, Unilever chose the company for its high service levels, driver safety concerns, and consistent development of innovative technological solutions, enhancing delivery processes, expanding driver opportunities, and ensuring operational efficiency [43].

- **Strategic partnerships worldwide**: Unilever's success heavily relies on the principle that all partners must be ready and capable of adhering to similar commitments [44].

- **In-house logistics:** Unilever terminated outsourcing its logistics functions and now handles them internally, bolstering its resilience. For instance, to ensure truck capacity, Unilever actively collaborates with companies like Nestlé and Procter & Gamble. Furthermore, to enhance control over its logistics and supply chain, Unilever operates the European "Control Tower," responsible for ensuring transparency in European logistics. Located in Poland, this comprehensive logistics system coordinates thousands of Unilever product transportation movements via rail, road, sea, and air transport, efficiently reducing CO2 emissions, improving customer service, and reducing costs [45; 46; 47, 48].

Unilever is laying the foundation of its supply chain on several key pillars:

- **Blockchain development:** Collaborating with Nestlé, Dole, and Walmart, Unilever aims to integrate product data for all transactions into blockchain technology. The primary objective behind this initiative is to mitigate the bullwhip effect, where minor fluctuations

in consumer demand can have a significant impact at the start of the supply chain. The blockchain system seeks to unify flows of goods, information, and finances, facilitating quicker and more straightforward identification of a product's origin and its journey. Besides enhancing food safety, blockchain integration aims to automate payment procedures, invoicing, and audits [49].

Unilever's initial practical application of blockchain involved managing transactions within its tea supply chain. This blockchain tracks and verifies contracts involving 10,000 Malawian farmers supplying tea to Unilever and Sainsbury, a British retail network [47].

- **Transparency in the supply chain**: Unilever exhibited transparency by becoming the first company to disclose information on over 300 direct suppliers of palm oil, used in food products, cosmetics, and biofuels [47]. For Unilever, this transparency and the ability to trace palm oil sources are critical in addressing human rights issues.

- **Distribution of goods:** Unilever operates five distribution centers in Europe, facilitating global expansion and aiding in shipment consolidation to reduce carbon emissions [48]. These centers streamline deliveries among customers, factories, and suppliers [50]. Additionally, Unilever focuses on reducing CO2 emissions in its transportation and distribution systems.

For instance, in China, the Smart Transportation program emphasizes greater railway usage over road transportation to cut CO2 emissions and maintain rapid product transportation. Similarly, the "Big Bang" project implemented in Europe in 2016 enhanced logistics efficiency by shifting to multimodal transportation, optimizing cargo loading, and ensuring proper temperatures in freight vehicles.

In summary, Unilever's supply chain is grounded in resilience, incorporating blockchain technology, transparency initiatives, and efficient distribution methods to enhance sustainability and minimize environmental impact.

The results of the supply chain research for global companies such as Amazon, Zara, and Unilever are presented in Table 3.2 [37,51].

Table 3.2. - Key elements of supply chain success Amazon, Zara та Unilever [37]

A key element of success	Company		
	Amazon	Zara	Unilever
warehousing	■		
distribution of goods	■	■	■
own logistics	■		■
own production	■		
combination of manufacturer and retailer functions		■	
quick reaction to trends		■	
low inventory		■	
environmental responsibility		■	■
sustainable use of energy			■
strategic partnerships around the world			■
blockchain development			■
supply chain transparency			■

According to Table 3.2, each company constructs its own supply chain, based on specific key success characteristics. Accordingly, it can be argued that there is no unique formula for supply chain success, and its development is a lengthy and labor-intensive process that requires a detailed understanding of the company's activities, its micro and macro environment.

Conclusions

Managing business processes in international companies based on the principles of efficient energy resource utilization involves optimizing operations to minimize energy consumption, enhance sustainability, and reduce environmental impact. This includes implementing strategies and technologies aimed at conserving energy, reducing waste, utilizing renewable resources, and improving overall energy efficiency across various business operations. Efficient use of energy resources involves incorporating sustainable practices into production, supply chains, logistics, and overall organizational management to achieve cost-effectiveness while minimizing environmental footprint.

Business processes within international companies that emphasize the efficient utilization of energy resources entail a strategic approach focused on minimizing energy consumption while maintaining optimal operational performance. This involves adopting sustainable practices and implementing innovative technologies to maximize energy efficiency across various facets of the organization's operations. It encompasses initiatives aimed at reducing energy waste, optimizing resource utilization, integrating renewable energy sources, and adopting eco-friendly practices throughout the supply chain, production, distribution, and other operational aspects. The objective is to enhance cost-effectiveness, minimize environmental impact, and promote long-term sustainability within the company's operations.

Businesses operating on a global scale often prioritize the efficient utilization of energy resources as a fundamental principle within their operations. This approach involves strategic planning and implementation of practices aimed at minimizing energy consumption, reducing waste, and maximizing the use of renewable or sustainable energy sources. Such companies focus on optimizing energy efficiency across various operational areas, including manufacturing processes, supply chain management, transportation, and office facilities. Embracing energy-efficient technologies, adopting green practices, and complying with stringent environmental

standards are integral components of their strategy. The goal is to not only reduce operational costs but also to mitigate the environmental impact, demonstrating commitment to sustainability and responsible resource management on a global scale.

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