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**Keleti Károly Faculty of Economics
Institute of Business Development and Infocommunications**

DEGREE PROJECT

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THESIS ASSIGNMENT

Student's surname, forename (s): Merrey Batyrbek

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Branch of study: Technical Management

Specialization: Electrical Engineering
Corporate Strategy

Thesis title: Implementation of an ERP system

Task description:

1. Give a brief overview of ERP systems!
2. Examine the emerging opportunities and threats!
3. Do your own research about the implementation of a certain ERP system!
4. Draw your conclusions and make recommendations!

Institutional consultant's name: Dr. Viktor Nagy

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.....
Director of Institute

The Thesis is suitable for submission:


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Institutional consultant

.....
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STUDENT'S DECLARATION

I the undersigned student named Merey Batyrbek (Neptun code: XXXXXXXXXX) hereby declare that the degree project is the result of my own work; I referred to the special literature and the means used in an identifiable manner. The results included in the degree project completed are allowed to be used by the university and the institution announcing the task for their own purposes free of charge, subject to any restrictions on classification as confidential.

Budapest, 15th day Dec month 2023 year

student's signature

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1. INTRODUCTION

The object of research is the process of implementing an ERP system in an enterprise.

The purpose of the work is to analyze the key factors for the successful implementation of ERP systems in the framework of the problems of interaction between management, company employees, and the external environment.

During the study, the following were carried out:

1. analysis of the ERP systems market; identification of the main trends, problems, and prospects;
2. highlighting the main advantages and disadvantages of implementing an ERP system in an enterprise;
3. analysis of approaches to assessing the economic efficiency of the implementation of the ERP system;
4. summarizing the experience of implementing an ERP system at specific enterprises, evaluating the effectiveness of implementation;
5. development of recommendations for replication of the ERP system in accordance with the analysis.

The study found that:

1. Implementation of ERP systems is a costly and resource-intensive process that distracts the company's management and production staff from their main activities for a long time. In this regard, studies of mechanisms for reducing these costs are relevant. Typification of the process of implementing ERP systems will reduce the negative factors.
2. A qualitative assessment of the effectiveness of the implementation of an ERP system in a company allows not only to assess how effective the use of ERP is, but it can also be used as a full-fledged implementation project management tool at all stages of the project life cycle. The application of the project approach allows you to evaluate the effectiveness of the use of both individual functions and the system as a whole.

3. Implementation of SAP ERP in Kaztransoil in particular is a significant project for the energy sector of our countries. The main difficulties for the project are the large number of declared functional requirements for the system, a significant number of business processes that require the transition to ERP, and a large number of internal regulatory documents, the fulfillment of which is mandatory for the functioning of the company.

Scope: Formulated conclusions and recommendations can be used in the development of programs for the implementation of ERP systems at large enterprises, as well as when replicating existing ERP solutions to branches.

The economic efficiency and significance of the work lie in the generalization of the theoretical and practical material on the problem of inefficient implementation of ERP systems at a Kazakhstani enterprise, as well as in the formulation of recommendations to reduce time and financial costs for the implementation of ERP systems.

In the future, it is planned to apply the acquired professional knowledge to the problems of implementing ERP systems in practice.

The term ERP was first introduced in the 1990s and was a logical continuation of the MRP (manufacturing resource planning) concept. ERP systems began to serve not only manufacturing business processes but also personnel management, finance, budgeting, tax accounting, and more, covering the entire enterprise. The theory and practice of ERP system implementation are reflected in the works of scholars such as L. Eric, V. Kale, V. Dick, S. Peterkin, S. Harwood, and G. Glenn.

As of today, ERP systems are recognized as a competitive advantage and a factor contributing to effective production planning and overall enterprise development. However, the implementation of ERP systems is a complex procedure that requires extensive preparation and involves a high degree of uncertainty due to the lack of a typical scenario for transitioning to ERP principles. Because ERP system implementation is associated with significant costs, it requires in-depth research to identify patterns leading to successful or unsuccessful outcomes, confirming the relevance of this research and defining its goals and objectives.

The main goal of the research is to analyze key factors for successful ERP system implementation within the problem of interaction between management, company employees, and the external environment. This goal is achieved by solving the following tasks:

1. Market analysis of ERP systems, identifying major trends, issues, and prospects.
2. Highlighting the main advantages and disadvantages of implementing an ERP system in the enterprise
3. Analyzing approaches to assessing the economic efficiency of ERP system implementation
4. generalizing the experience of implementing ERP systems in specific enterprises and evaluating the effectiveness of implementation.
5. Developing recommendations for the replication of ERP systems based on the analysis conducted

The object of the research is the process of implementing an ERP system in the enterprise. The subject of the research is the features of the production and financial-economic activities of AO "KaztransOil" during the implementation of SAP ERP.

The scientific novelty of the master's thesis lies in summarizing theoretical and practical material on the implementation of ERP systems in domestic and foreign enterprises, as well as developing practical recommendations for the implementation of new and replicated ERP solutions in large domestic enterprises. The conducted research was based on a systemic-synergetic approach to the studied processes and objects. The research used methods of systemic analysis, expert assessments, comparative analysis of domestic and foreign experience in ERP system implementation, and problematic analysis of corporate governance interactions.

The methodological basis of the research included fundamental concepts and hypotheses considered in classical works on economic theory, as well as studies by modern domestic and foreign economists on issues of comprehensive enterprise resource management. The information-empirical basis of the research included legislative and normative acts, educational materials, local normative acts, data provided by domestic enterprises, materials from scientific publications and articles, monographs, and press publications.

2. THEORY AND PRACTICE OF IMPLEMENTING ERP SYSTEMS

2.1 The Concept of ERP Systems

The Kazakhstani software market is diverse, shaped by growing client demands, developer preferences, and regulatory changes. ERP system classification, considering accounting specifics and organizational size, demands a comprehensive approach. Often overseen by the IT department, ERP selection tends to prioritize technical specs over functionality and user-friendliness. The inability of some ERP systems to adapt to changes necessitates a multi-criteria approach. Domestic accounting systems may fall short due to fiscal focus, lack of transparency, and delayed information provision, prompting a significant shift to Western ERP systems. Foreign companies stress control, information accessibility, real-time relevance, transparency, and diverse reporting tools. Actively introduced by Western companies, ERP systems contribute to replacing domestic programs with global standards, typically featuring a three-tier architecture. (Monk,2012)

The ERP system comprises three levels: a unified database for data storage, an application server for processing operations, and a user-friendly interface presented through a specialized program. These levels operate within a network infrastructure. Information security in ERP involves aspects such as database, network, application server, and end-user computer security (Leon,1999) .

Automated data processing systems, categorized as medium and large, aim to facilitate effective planning and management of production processes, often incorporating advanced accounting functions. Their implementation involves complex architecture and significant time investment. (Bradford,2015) The duration of ERP system implementation depends on factors like formalized business processes, personnel availability and qualifications, organizational staff expertise, hierarchical levels, geographical remoteness, knowledge base, statistical information, and classifiers.

The impact of these factors varies, and mitigation approaches differ. Human resources, particularly their availability and qualifications, play a crucial role, with internal personnel forming the core of ERP implementation teams. Organizations with higher internal qualifications often achieve more successful implementations. (Collins,2001) The ultimate

success post-ERP implementation is closely tied to the company's goals during the implementation process.

According to the Gartner analytical agency, the SAP R/3 system leads in all four segments of the ERP market: asset management, production management, financial accounting automation, and personnel management. The German company SAP demonstrates an annual growth rate of an average of 21.4% in this market. Regarding the structure of the Kazakhstan ERP system market by industries, manufacturing is the most automated with a share of 46%, followed by telecommunications services (12.1%), wholesale trade (6.8%), extraction and processing of raw materials (6.5%), and the fuel and energy complex (6.5%). Other industries constitute 22.1%.

2.2 Key Approaches to ERP Selection

Criteria for choosing ERP systems include compliance with legislation and business practices, sufficient system functionality, tools for configuring business processes, adaptability for business development, ease of modification, performance, replication capabilities, use of standardized IT technologies, integration with other programs, implementation process simplification, coherent operation of components, compatibility with office programs, standardized implementation, timely updates, recommended implementation period, personnel quantity and qualification, availability of specialists, and technical support (Sumner, 2004).

It should be noted that, in addition to the criteria mentioned above, the most crucial aspects for domestic enterprises currently are the cost characteristics of ERP systems, encompassing implementation expenses, license costs, and annual fees. For example, the price for a SAP ERP license per user starts from 4800 euros, and maintenance costs are approximately 22% of the license cost (erpresearch.com). Regardless of recent currency fluctuations, such prices are substantial for any domestic enterprise. It is important to understand that even the most sophisticated ERP program cannot solve all the company's pressing issues. ERP serves as a tool to enhance management efficiency by aiding in making informed strategic decisions based on accurate information. The leadership of the company should be particularly interested in the right choice of ERP system, viewing its implementation as a strategically important and long-term financial investment. (Pratico, 2016)

The following factors are highlighted for the successful implementation of ERP systems:

- The sophistication of the system and the contractor's expertise in implementation.
- Achieving short-term economic benefits.
- Pre-developed business processes aligned with the ERP system before implementation.
- Involvement of company management in the implementation.
- Involvement of company employees in the implementation.
- Leadership's clear goals and requirements for the system.
- Formulated enterprise strategy.
- Documented and formulated implementation plan .

Examples of factors hindering ERP system implementation are also worth mentioning, including:

- Employee corruption within the enterprise.
- Insufficient staff qualifications.
- Legislative changes.
- Insufficient funding levels.
- Lack of readiness among staff and management for changes.
- Absence of formulated project goals.
- Lack of formalized business processes.
- Limited attention from management.

Motives driving the implementation of ERP systems include:

- Competition.
- Business transparency.
- Company reputation and status (Pelphrey,2015).

An automated system should be viewed as a comprehensive effort to configure and organize the management process, enhance the enterprise and its business processes, coupled with the exploration of optimal methods, tools, and information technologies. For large vertically integrated companies, typically owned by a group of stakeholders, system requirements

should include provisions for group management and the generation of various consolidated financial reports.

Key advantages of implementing an ERP system for an enterprise include:

1. Integrated Information System:

- Not directly linked to the production process as it is not an automated system for managing the technological process. However, it works with the digital model of the technological process.
- Functions to enhance the enterprise's business processes, optimize financial and raw material flows based on information provided by company employees.
- The entire cycle of planning and managing the company's activities is consolidated in a single program, from material procurement to product shipment to consumers.
- Information is entered into the system only once, locally in the department where it originates. It is stored in a unified database and is used repeatedly by all relevant structural units. (Magal,2011)

As a result, ERP-class systems can enhance the coherence of all company departments, reduce direct and indirect costs, and eliminate the problem of data interdependence from various applications. These systems serve as tools for increasing management efficiency and making informed strategic decisions.

2. The implementation of an ERP system significantly strengthens a company's competitive advantages by optimizing business processes and reducing costs. Developed as a tool for managing the cost of goods produced and achieving competitive advantages, these systems provide planning and management using the following methods:

- Operational Inventory Management: Real-time adjustment of inventory levels, preventing shortages or excess goods, thereby reducing storage costs.
- Reduction of Work in Progress: Planning based on demand, allowing for the initiation of production at the optimal moment and reducing the amount of work in progress.
- Assessment of Order Feasibility: Real-time assessment of the feasibility of fulfilling an order, considering available resources, both raw materials and human resources.

- Improvement of Production Efficiency: Reduction of costs and time spent on production, real-time monitoring of production performance, and adjustments as needed.
- Flexibility in Responding to Demand: More flexible response to changes in demand due to the shortened production cycle and order fulfillment time.
- Enhancement of Customer Service Quality: Adherence to delivery deadlines, contributing to improved customer and partner service. (Osipova ,2016)

The algorithms employed in ERP systems for flexible company management provide a significant competitive advantage. In the contemporary Kazakh economy, major industrial enterprises, as subsidiaries of Western companies, consistently collaborate with foreign partners on production and financial matters (Shamonin,2012) . Transitioning to International Financial Reporting Standards (IFRS), adhering to IAS (International Accounting Standards), and GAAP (Generally Accepted Accounting Principles) are prerequisites for normal collaboration with Western partners. Implementing an ERP system enables a company to meet these requirements efficiently, relying on proven management planning and IT practices used by major US and Western European companies.

The comprehensive enterprise management system implementation in kazakh industrial companies will:

1. Enhance Management Planning and Control: Improve the quality of management planning and control over enterprise activities.
2. Construct Integrated Business Processes: Design business processes within a unified system based on a shared information space.

These systems incentivize process optimization, boost the efficiency of daily operations in organizational units, and establish an environment for storing and controlling information. The essence of an ERP system comprises functional, methodological, and informational components, with the implementation process itself being a separate entity. According to "Information Week," the application of the SAP ERP system yielded tangible improvements and enhanced results for companies. For instance, Harrods' CEO attested that, before implementing the system, certain business processes, such as food product scanning during customer purchases, produced inaccurate results due to the previous system processing products based on general item numbers rather than specific SKU information.

Harrods faced inaccuracies in reporting product sales and customer dissatisfaction due to a flawed barcode scanning system. The lack of precise product sales assessment hindered competent planning and product share allocation. After SAP ERP implementation, Harrods achieved accurate sales tracking down to individual SKUs, reducing errors to 0.01%, enhancing issue detection, and promptly addressing challenges. For instance, losses from theft and document discrepancies decreased to 0.7%, below the industry average of 1.2%.

The overall business efficiency at Harrods improved with SAP ERP, enabling a 50% reduction in IT department staff and potential outsourcing. IT expenses as a percentage of total sales dropped to 0.7%, outperforming regional competitors at 2-3%.

However, evaluating the effectiveness of costly software in diverse business processes requires careful consideration, involving economic models (Phillips,2013). The tangible impact of ERP system implementation becomes visible over a medium-term period, with subjective changes at the departmental and user levels, making a standardized quantitative assessment challenging. The uniqueness of each enterprise's business processes further complicates precise economic evaluations.

Despite the high cost and complexity of implementing ERP solutions, enterprises gain significant benefits, often recovering costs within 3-5 years. Successful companies highlight a substantial indirect economic impact, estimating a payback period of three to five years. The assessment of ERP implementation effectiveness in Kazakh businesses is diverse, requiring an individual approach. The effect is divided into economic (in monetary terms) and process-oriented (non-economic), expressed in the improvement of enterprise operations and control over business processes. The effectiveness of ERP implementation is formulated as the optimal balance between costs and results. However, the assessment does not solely focus on financial indicators, considering the importance of aligning ERP functions with the enterprise's goals. Existing assessment methods face criticism for insufficiently evaluating expenses and the inability to adjust the project at different stages (Sagegg ,2023).

The assessment of the economic impact of ERP systems is influenced by their key properties, including:

- Versatility: Applicable to any market.

- Production Planning: Capable of planning production at various levels.
- Integrated Resource Planning: Ensures interconnected resource planning within the enterprise.

ERP systems unite all structural units and business processes, creating a single information environment accommodating multiple subsystems, including managerial functions (finance, logistics, marketing, HR). As ERP implementation is a complex process with various influencing factors, it often involves specific risks that can diminish its effectiveness (Phillips ,2013).

Major risks include:

- Misalignment of Actual Impact: Deviation from the anticipated value and short-term positive dynamics.
- Human Factor Risks: Challenges associated with personnel adaptation.
- Significant Efficiency Reduction: Potential decline in enterprise efficiency due to unsuccessful ERP implementation and loss of management control tools.
- Mismatch with Daily Tasks: Misalignment of system functions with daily company tasks.
- Budget Overrun: Probability of exceeding the project budget, resulting in missed benefits due to an incorrect program configuration. (Phillips ,2013)

Risks gain significance when standard Western ERP solutions are implemented without considering the specifics of domestic enterprises. Misalignment between the program's functionality and the enterprise's goals implies underutilization, with the company paying for unused functions. Recent optimization practices include post-implementation restructuring to align with ERP, emphasizing the need for pre-optimized structures to avoid issues.

Early-stage risks during ERP implementation, caused by discrepancies in technical solutions, lengthy staff training, and employee resistance, can lead to noticeable short-term declines in company performance. The stabilization period post-ERP implementation ranges from months to a year, depending on time, human resources, and finances. For example, the planned deployment of SAP ERP at "Nizhpharm," a pharmaceutical subsidiary of Stada, has a projected operational timeline of 14 months. (Camp ,2003)

Human factor risks, associated with insufficient managerial preparation for ERP, particularly at top and middle management levels, and potential employee resistance, impact the success, cost, and timelines of ERP implementation. While these risks aren't directly expressed in financial terms, informed decisions about ERP adoption necessitate the application of economic analysis methods. This involves evaluating the effectiveness of implementation, comparing costs and benefits, and considering alternative indicators. Economic analysis methods can be complemented by other tools for assessing ERP performance, such as surveys, temporal comparisons, and performance discipline comparisons. (Camp ,2003)

In economic analysis, various criteria for minimizing alternative costs are widely employed. Here are some examples:

1. Comparison of the most crucial performance indicators of the company before and after the installation of the information system.
2. Profitability comparison between implementing similar projects to enhance company operations (e.g., using domestic applications with simpler functionality) and full-scale ERP system implementation.
3. Comparison of the economic impact of ERP implementation in monetary terms with returns from investments in securities, bonds, bank deposits, and other assets (Goldston,2019).

Evaluating the effectiveness of ERP system implementation in large domestic enterprises involves economic analysis methods, offering clarity and expressing results in monetary terms. Another approach, the process-oriented method, analyzes overall company effectiveness in terms of individual internal processes, especially within ERP systems. However, the local impact of ERP on productivity necessitates a commitment to adopting new and efficient business processes for positive results. Successful implementation depends on continuous optimization and strategic commitment. Domestic companies are increasingly adopting ERP systems from advanced foreign counterparts, such as SAP, Oracle, SCALA, Axapta, reflecting a significant and irreversible trend.(profit.kz,2015)

2.3 Analysis and Features of Business Process Optimization in Enterprises

Optimizing business processes is the foundation for the algorithms embedded in ERP systems and for improving enterprise performance. From a cost minimization perspective, achieving a compromise between standard business processes inherent in ERP algorithms and unique proprietary processes is considered reasonable by company management. The standard optimization of a hypothetical business process can be divided into six main phases:

Phase I. Organization: Preparing for process improvement.

Phase II. Documentation: Choosing an approach.

Phase III. Analysis: Identifying opportunities for improvements.

Phase IV. Design: Creating a new administrative business process.

Phase V. Implementation: Implementing planned solutions.

Phase VI. Management: Administering administrative business processes for continuous improvement.

In the conventional approach, all phases and stages of optimization are conducted within the framework of a large-scale ERP system implementation project. The system itself (automation platform and integrating company) is chosen first, followed by the optimization of business processes. In this familiar approach, opportunities for improvement are automatically limited by the functionality of the implemented system and the embedded "best practices" of business organization. As described earlier, this approach can lead to missed opportunities for innovation, hindering the development of proprietary business processes and losing a strategic advantage over competitors. The life cycle of implementing a standardized ERP solution differs from that of a traditional project implementing a unique ERP system configuration. These differences are both quantitative and qualitative. Accounting for such distinctions is necessary to identify common elements in the implementation process and to develop tools that determine the balance between typical and unique aspects at the early stages of ERP system implementation. When optimizing business

processes within an enterprise, several approaches can be employed in the classic scenario. Here is a brief description of the main approaches:

Firstly, FAST (Fast Analysis Solution Technique): A breakthrough approach where a group focuses on a specific process during a one- or two-day meeting. Decisions made during these sessions serve as the basis for improving the process over the next 90 days. Before the meeting concludes, enterprise management approves the proposed improvements. Essentially, this method is a translation of the traditional brainstorming tool for business process optimization. In its implementation, a team of consultants is present, which, in agreement with the company's management, identifies the most problematic areas and, through meetings and brainstorming, proposes improvements to specific business processes. The implementation of FAST results takes place on average about three months after the proposals are developed.

Secondly, Business Process Benchmarking: This is a step-by-step, methodological comparison of internal processes and products with the processes and products of the best partner enterprises chosen for comparison, based on predefined criteria. These companies are selected either within the organization's own structure or in the external organizational structure of another company that is most similar to the improved one. The goal of benchmarking is to improve one's own business processes using such a "model." The essence of benchmarking is to compare the current business processes of a company with the best practices within the industry. Typically, several "model" companies whose business processes are better organized than those of the analyzing company are identified. The reasons for the deviations are then determined, explaining why the business processes of the competitor are better organized than those of the analyzed company. The main problem of this approach is the difficulty of obtaining reliable information about the production organization of the competitor due to the secrecy of the business. With partner organizations and agreements in place, this process is significantly simplified; however, orientation towards leaders implies not only obtaining general information but also a detailed analysis of the business processes of competitors. Accordingly, the complexity of obtaining such information leads to the need to involve additional consultants with extensive capabilities for obtaining the necessary data, possibly with experience working in such companies or in the field of business process optimization. Often, the use of business process benchmarking serves as a basis for implementing an ERP system at the initiating company, especially when competitor companies implement their own business applications. It is believed that such tools

significantly improve both the internal structure and the financial results of the organization. Based on this information, the management of the initiating company can decide on the need to implement an ERP system at their own enterprise. Some drawbacks of this decision-making approach are described in the previous chapter. At the same time, using business process benchmarking as a part of the business process analysis system allows achieving a positive effect and conducting a more accurate optimization, as it takes into account critical factors of the enterprise's activities and is aimed at implementing promising innovations.

Thirdly, Business Process Reengineering (BPR): This is a modern approach to improving company operations, where all operations related to materials, information, data, and reporting are grouped into interconnected technological chains with an initiator, performer, and end consumer for each chain. Business process reengineering can be divided into two parts: redesigning existing chains and developing new processes.

Reengineering is applicable to processes currently operating with moderate efficiency. During reengineering, a simulation model is constructed to capture the current state. Subsequently, the model undergoes the application of the following rationalizing tools:

- Elimination of unnecessary bureaucracy
- Analysis of value addition at each stage
- Removal of duplication
- Simplification of operation methods
- Reduction of cycle duration
- Implementation of error safeguards

-Restructuring of responsible departments

-Standardization and development of a unified methodology

-Automation using information technologies.

When engaging in process reengineering or broader optimization initiatives, the deployment of business applications should follow the establishment of a benchmark model for these operational sequences. Essentially, the reengineering of existing processes incorporates the

previously outlined analysis methods, as reengineering represents more of a holistic approach to optimizing any given process, in contrast to analytical methods like FAST and benchmarking. On one hand, the creation of a new process, inherent in pure reengineering, introduces a novel perspective on the objectives of the process, disregarding the existing one with its strengths and weaknesses. This facilitates substantial enhancement of business processes. However, this approach demands significant investment, and surpassing a certain critical threshold of new business processes may necessitate organizational restructuring, potentially causing considerable disruption to the company. Most organizations can effectively implement no more than a single such change at a time. An examination of existing methods and approaches to optimizing business processes indicates that optimization itself should precede the ERP system implementation process. This is attributed to factors such as the need to consider historical intricacies of operation, the ability to select multiple "best practices," and the preservation of the option to introduce innovations into unique operational chains to gain a competitive edge through well-established processes.

2.4 Methods for Evaluating the Effectiveness of Actual ERP System Implementation

At the moment, in the business process optimization sector of enterprises through the use of ERP systems, there are numerous approaches to assessing the effectiveness of their implementation. Market experts categorize these approaches for two. First is the Economic component of effectiveness assessment, which includes Approach based on investment management methods and Economic analysis. Second is the "Internal" or "process" component, which stands for Approach based on project management methods and Elements of process management. (Wallace ,2001)

The overall assessment of the feasibility of implementation may consist of several integrated investment indicators. The most commonly used method for evaluating the effectiveness of ERP system implementation is profitability analysis, for which the return on investment (ROI) is calculated using the formula:

$$ROI = (CBI - TCO) / TCO$$

where:

ROI is the return on investment coefficient after the implementation of the ERP system.

TCO is the total cost of ownership of the ERP system.

CBI is the benefit from the implementation of the ERP system.
(precisionsg.com,2019)

All quantities are calculated in monetary terms. The total cost of ownership is understood as the sum of all initial and subsequent expenses until the moment of system implementation, including costs for internal and external consulting and integrator services. In the analysis of total costs, it is necessary to focus on expenses occurring at all stages of the system's life cycle.

In addition to being a component of the calculated ROI indicator, TCO is used as an independent measure. Within this approach, an assessment can be made of the costs of acquisition, administration and installation, relocation and modernization, technical support and maintenance, downtime, and other expenses. The TCO methodology is primarily used to calculate current cost parameters. With its help, one can thoroughly analyze the effectiveness of individual subsystems, functions, or a set of functions.

According to T. Meyer, TCO is an effective approach to determining the best "price-quality" ratio for service-oriented enterprises. This is based on the consideration of key business processes such as recovery from failures and downtime, management of modernization, and technical support for users. However, the TCO methodology does not account for risks and does not allow for aligning technology with the company's strategic goals and the task of enhancing product competitiveness in the market.

Another method that can be used is Cost-Benefit Analysis (CBA), which involves a detailed examination of each cost item. Essentially, the CBA method is a heuristic method, meaning it involves expert assessments of the profitability of alternative investment options.(softwareshortlist.com) As an alternative solution, the retention of the old (existing)

information system is considered. The benefits and costs of this option are evaluated separately.

In addition to the return on investment (ROI) indicator, common investment analysis tools such as Net Present Value (NPV) and Internal Rate of Return (IRR) are used for the economic component of effectiveness assessment. (Chou ,2006)

An alternative to the NPV calculation approach is the methodology of calculating economic value added (EVA). According to the EVA methodology, when assessing the effectiveness of ERP system implementation, all investments need to be taken into account, including initial monetary investments, expenses for technical support, training costs, etc. All these expenses are considered as payment for the anticipated benefit, which will subsequently contribute to increased turnover and reduced internal costs.

To assess the effectiveness of ERP system implementation, the Total Economic Impact (TEI) approach is also used. The Total Economic Impact methodology aims to reduce risks and provide "flexibility," meaning expected or potential benefits that go beyond the analysis of costs and benefits. In the TEI approach, several key parameters are considered: the cost of the system, its benefits, and flexibility. For each of them, a certain level of risk is determined. Cost analysis is usually carried out using the Total Cost of Ownership (TCO) method. (Gefen,2004)

In addition to financial and investment methods for evaluating the effectiveness of ERP system implementation, economic analysis methods are also used, with some elements applied in cost-benefit analysis methodology. In general, any economic analysis is necessary to assess how effective the implementation of an information system is based on a comparison of costs and benefits, as well as alternative indicators.

Various expressions are used in economic analysis for the criterion of minimizing alternative costs, including:

- Comparing performance metrics with and without the information system.
- Analyzing the profitability of other projects to improve the company's operations (for example, using simpler and more familiar office applications).

- Comparing the benefits of implementing the system in monetary terms with returns on investments in securities or other assets.

Like all economic methodologies, economic analysis is characterized by a certain transparency of internal processes in the implementation project. This transparency arises from working with digital indicators that do not reflect the multifaceted specificity of business processes entirely. This limitation can be compensated for by using project and process management methods, which can be loosely associated with a "process" or "internal" component of the effectiveness assessment of implementation. (Gattiker ,2005)

When employing project management methods, the analysis of ERP implementation effectiveness is carried out through a step-by-step aggregation and detailing of all operations involved in the implementation project. Traditional PERT/COST (Program Evaluation Review Technique) analysis methodologies, as well as the concept of C/S CSC (Cost/Schedule Control System Criteria), serve as the foundation. Let's take a closer look at the C/S CSC methodology.

This method is based on well-known network models for planning the cost and time of a project. It allows for the development of various development scenarios and evaluates the effectiveness of implementing an information system at the level of individual operations, up to the initial stage of implementation. Within the framework of time and cost indicators, effectiveness can be assessed both at the level of aggregated stages and individual operations of the ERP implementation project based on two indicators: the ratio of planned and completed work and the ratio of planned and actual costs.(habr.com.2022)

The evaluation of ERP implementation based on a process-oriented approach involves considering the ERP implementation project in terms of the efficiency of internal processes. The main distinction from project management methods is the bidirectional focus of planning and control processes. Process planning occurs "top-down" (starting from the main goals, the project is broken down into key processes, each of which consists of subprocesses), while control occurs "bottom-up," based on the performance indicators of individual subprocesses, which are then aggregated at a higher level. The main advantage of the process-oriented approach lies in the ability to control project efficiency through so-called "responsibility

centers," whose task is to collect, analyze, and subsequently transmit information to higher-level centers.

Regarding financial and investment methods, the process-oriented approach allows, during the assessment of the income part of the ERP system implementation investment project, to evaluate the effect of implementation on business processes. Accordingly, in this approach, processes are identified where the implementation of the ERP system had a positive impact and business processes where the implementation process had a negative impact. Positive impact includes increased process productivity, reduced execution time, and decreased use of additional internal resources. In other words, any reduction in financial and time resource costs for executing a business process is considered an improvement. Negative impact of automation is any increase in costs for executing the process.

The key drawback of the process-oriented approach to analysis is the lack of differentiation in assessing the feasibility of implementation based on automation platform types. Additionally, when applying the process-oriented approach, there is the previously described issue of losing the innovation of the process. Most importantly, to apply such an approach, well-established functioning business processes are required, which need only be automated and possibly partially redesigned but not newly created and untested processes.

In addition to financial and investment methods for assessing the feasibility of implementation, qualitative methods are also used, including the Information Economics method. The idea of this method is that the top management of the company and the IT department establish a certain coordinate system—define priorities in the company's business development and set priorities for project criteria—prior to considering any IT project. These priorities for effects and criteria are determined by the IT director, under the control of top management. To reduce the level of abstraction, this method is often combined with portfolio project management, where these effects are considered across the entire portfolio of IT projects as a whole. The key drawback of the method, in addition to its high level of abstraction, is the lack of formalized procedures for forming criteria and the absence of an analysis of how well these criteria match not only a pre-selected ERP system but all systems that may meet the company's needs.(Alpin Business Books,2006)

Another qualitative method for assessing the feasibility of implementation is the IT Scorecard approach, based on an adapted Balanced Scorecard for the IT department, developed by

Kaplan and Norton to formalize and specify the company's strategic goals and their projection onto the results of the activities of departments and employees. In the IT Scorecard, four balanced directions of IT impact on the company's business are chosen. In the classical and most applied case, these directions are: assistance in the company's business development, improvement of product quality (quality for both internal and external users), improvement of decision-making quality, and increased labor productivity. Essentially, these are more specific criteria, which, like the Information Economics method, also have the same drawbacks. (Karpov, 2010)

Thus, we have examined all the main methods for assessing the effectiveness of ERP system operation. One of the drawbacks is their disjointed nature, as each method is suitable for analyzing only a part of the components of the effectiveness assessment of implementation. Economic analysis methods are based on investment indicators, which are challenging to evaluate before the start of the implementation process. Almost any estimate embedded in the ROI or NPV calculation model, initially based on empirical assessments, will ultimately differ significantly from reality and cannot accurately predict the return on investment in an ERP system. Process analysis methods involve assessing efficiency through project management and control methods, but they do not allow for a pre-investment assessment of effectiveness and the selection of an ERP system that best meets the company's needs.

In conclusion of this section, it is necessary to note that currently, in decision-making and assessing the effectiveness of implementation, there is a prevailing trend towards standardizing the approach to implementation and minimizing individual criteria when choosing an IT application. The author identified this trend during the analysis of published research and scientific works available up to the time of writing the dissertation. In this case, it is evident that the standardization of the approach and the reduction of the number of unique project characteristics simplify the analysis and decision-making process for implementation by more accurately calculating financial and investment indicators of the project. This is because for the base (standard) configuration of the system, there are predicted values for key indicators such as "staff reduction," "reduction of time costs," etc.

Indeed, if a decision is made by the enterprise management to carry out additional development of the system, it should be noted that in this case, the project changes from standard to unique, which affects the assessment of effectiveness. A classic example of the

need to bring a company's business processes to a standardized form is the financial activity of the company, particularly the management and accounting. The finances of enterprises are the most clearly defined and regulated by legislation business processes of any company. However, even in the existing realities of Kazakhstan's "double" accounting system, there are unique business processes in this area that require automation to the same extent as standard financial processes.

An example of such duality in financial accounting processes could be the process of writing off materials by construction companies. These companies operate both within the framework of the approved project estimate (project cost estimate documentation, work project), and based on their own work schedule, where deviations from approved timelines are possible. This leads to a gap between the formal and actual write-off of materials. Consequently, companies need the ability to conduct accounting simultaneously with managerial accounting – in the first case, official reporting is carried out for the write-off of materials, and in the second case, internal reporting reflects the actual consumption of materials over a period.

The analysis presented in the first three sections of this chapter demonstrates that indicators based on quantitative analysis are largely ephemeral. This is because financial investment analysis methods have several inherent shortcomings that prevent decision-making based on them under conditions of uncertainty regarding the ultimate outcome of implementation. Modifying the source code of certain modules in an ERP system to accommodate unique business processes increases the implementation cost. (lpgenerator.ru) However, on the other hand, if an enterprise cannot adapt its business processes to standardized ones, the implementation of these processes is not possible without modifying the IT system. As a result, despite the apparent advantages of standardizing business processes during ERP system implementation, applying this approach without proper analytical preparation risks increasing the likelihood of unsuccessful implementation and the company losing the resources invested in the implementation.

Additional complexities associated with the use of financial investment analysis methods and the assessment of benefits from implementation are related to the timeframe for realizing business benefits from implementation, which takes at least 2 years. The impact of implementation can only be assessed after 3 years when the benefits of the system are

consistently realized. Foreign studies indicate that the benefits of implementation can only be assessed post facto, several years after ERP implementation.

A qualitative assessment of the effectiveness of implementing an ERP system in a company not only allows the evaluation of how efficiently ERP is utilized but also serves as a comprehensive project management tool throughout the project's lifecycle. Applying a project-oriented approach enables the evaluation of the effectiveness of individual functions and the entire system as a whole, including the early stages, and helps monitor deviations of actual metrics from planned ones.

3. BRIEF RESEARCH ON THE ERP MARKET OF KAZAKHSTAN

3.1 Overview of the Kazakhstan market

Kazakhstan is one of the leaders in economic growth in the CIS region. Enterprises are growing and developing, but management methods are not keeping up with their development. For many large companies, the tasks of increasing the efficiency of business processes, reducing costs, optimizing supplies, obtaining operational management and financial reporting, managing product quality, and equipment maintenance are becoming relevant. The common practice for solving such tasks is the installation of an ERP/ERP II class information system at the enterprise.

The volume of the Kazakhstan market for enterprise resource management (ERM) applications in 2013 reached a mark of 60 million US dollars. In recent years, there has been steady growth in this area, and according to experts, the market capacity has not yet reached its maximum. Moreover, new technologies can radically change the principles of ERM-system functioning and even become the main driver of the market. In this review, we will analyze only the area of applications for enterprise resource planning or ERP systems.(profit.kz)

If we talk about any statistical data, the global and some regional markets are monitored very well, however, the situation is more complicated with Kazakhstan. IDC provided data,

according to which the volume of the local market for Enterprise Resource Management (ERM) software amounted to \$60 million in 2013. In general, a positive market development dynamic can be observed, especially after the crisis in 2009: in the last 5 years, the volume of the ERM-system market has grown almost 5 times.

Market volume of enterprise resource management applications, million dollars.

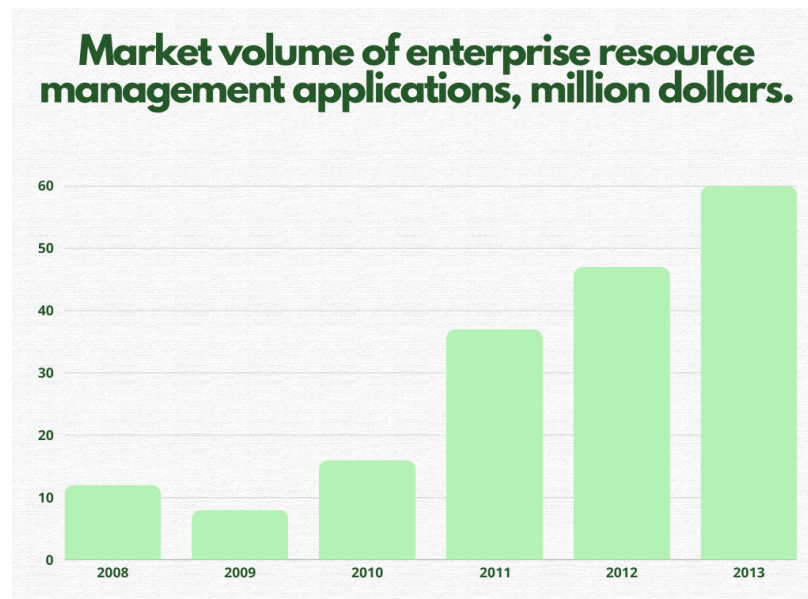


Figure.1 : Market volume of enterprise resource management applications, million dollars.

Source : IDC Kazakhstan

It remains only to guess the market shares of the vendors. It is known only that SAP is a leader with a market share of over 70% (idc.com). How the remaining 30% is distributed remains unknown. Representatives of Western vendors unanimously responded to questions about their company's market share with surprising consistency: company policies do not allow disclosing data for individual markets.

Nevertheless, vendors were not hesitant to express that they are successfully growing. Microsoft stated that the growth of MS Dynamics ERP in recent years has been in double digits, and the company is growing confidently compared to competitors. Oracle responded expansively, mentioning that the company currently has more than 50 product and industry categories where it is a leader according to external analysts' assessments and holds leading

positions in key markets. SAP modestly referred to the "Expert 200" ranking, according to which 13 out of the top 20 companies in Kazakhstan use SAP solutions. Only representatives of the Russian "Galaxy" stated that, according to their calculations, they occupy about 5% of the market. (tadviser.com)

For comparison, let's consider Gartner's global ERP market data and the corresponding figures for Kazakhstan. But the most important point, as emphasized by Mrs. Sapa, is that the market is traditionally measured in monetary terms. However, the cost of solutions from vendors differs significantly: the price of SAP is several times higher than the cost of "1C-Enterprise," so the quantitative distribution turns out to be entirely different. What exactly it is hard to say.

The market shares of players in the global ERP solutions market in 2013 (with a market volume of \$25.4 billion and a growth rate of 3.8%) were as follows:

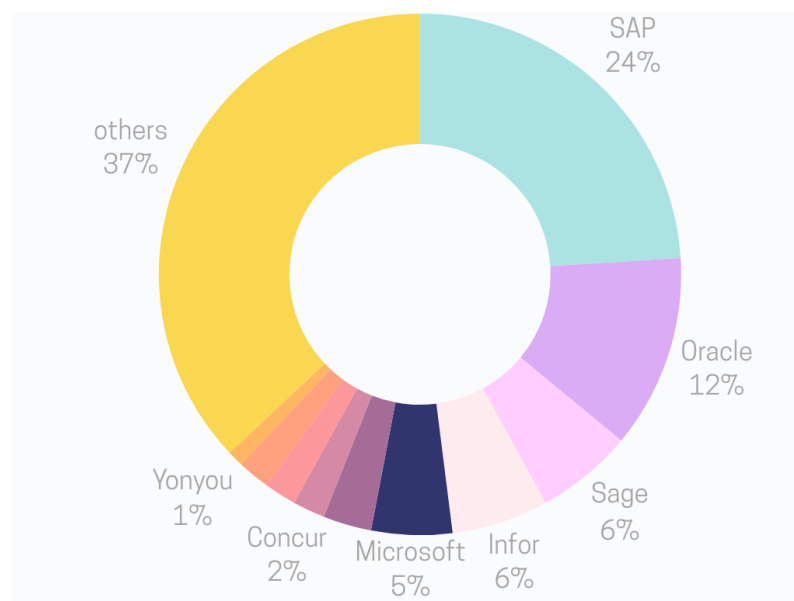


Figure 2. The market shares of players in the global ERP solutions market in 2013

Source : 1c.ru

The market shares of players in the Kazakhstan ERP solutions market in 2013 were as follows:

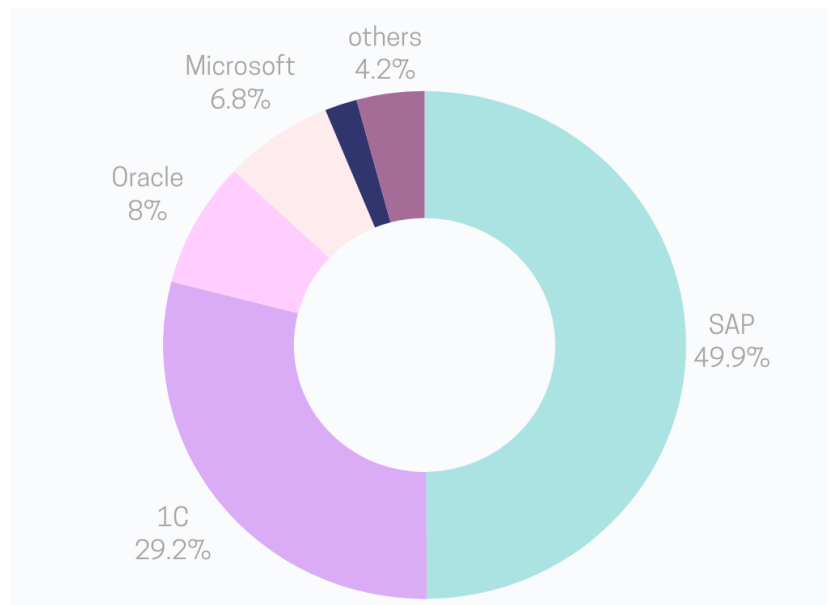


Figure 3. The market shares of players in the Kazakhstan ERP solutions market in 2013

Source : 1c.ru

From the graphs above, it is evident how much regional data differs from global figures. Assuming SAP holds a 70% market share, all other vendors collectively account for only 30%. This implies that it is unlikely for any of them to claim more than 6-8% of the market.

As mentioned earlier, the German company is a global market leader, with 165 clients in 25 industries, including leaders in the Kazakh economy. The vendor's specialists anticipate further market share growth in strategic sectors such as the public sector, oil and gas industry, banking, transportation and energy, metallurgy, and extractive industries.

3.2 Market giants

The year 2013 was noteworthy for the SAP office in Kazakhstan due to the translation of SAP ERP into Kazakh. The localization process took about 2 years, and approximately 25 million euros were invested in it. In 2013, there was also a noticeable increase in demand for SAP solutions in the medium-sized business sector, particularly in industries such as

industrial and civil construction, retail and distribution, logistics, and manufacturing of goods. However, the annual report published on the official SAP AG website indicates that the company has been operating at a loss in Kazakhstan for the past two years.

Representatives of the office attribute this to investments in product localization (though the major investments were made in 2012), market development, and partner training. They also link the losses to the specific accounting methodology within the company. (Alimbekova ,2021)

SAP KAZAKHSTAN	Total income, million euro	Profit, loss after tax, million euro	final capital, million euro	number of employees, million euro
2013	20,234	-1,122	3,814	23
2012	27,735	-0,344	5,191	20
2011	33,086	3,955	5,567	15

Table 1.SAP profit in Kazakhstan from 2011 to 2013

Source : sap.com

Oracle

The American corporation offers more than 50 product and industry categories, where it is considered a leader according to external analysts. However, Oracle's key product is still the Oracle Database, along with the assets of the acquired company Sun Microsystems. In Kazakhstan, the corporation has around 100 partners. Last year, Oracle opened a representative office in Astana to strengthen collaboration with government entities. Notably, among Oracle E-Business Suite's major clients is the Treasury Committee of the Ministry of Finance of the Republic of Kazakhstan. Significant projects are also underway in the extractive industry and the education sector. According to company representatives, Oracle

holds leading positions in key markets in Kazakhstan (though it's worth noting that SAP accounts for 70% of the ERP system market).(profit.kz)

Microsoft, Epicor, Galaktika, 1C

Even within Microsoft's products and services, MS Dynamics is not the foundational direction. Nevertheless, Dynamics has shown positive growth dynamics in recent years. Microsoft in Kazakhstan has a diverse portfolio of projects in the financial sector, retail, and the extractive industry. One of the Dynamics AX implementation projects was awarded the title of the Best IT Project of the Year.

The main revenue for Epicor, 84%, comes from North and South America. The EMEA region contributes 11%, suggesting that Kazakhstan holds very modest positions. Nevertheless, the company is present in the Kazakh market, with key clients in manufacturing and distribution sectors.

Russian "1C" held its first conference in Kazakhstan in 2013, dedicated to the company's solutions and their practical application. "1C" has been operating in the ERP field since 2004, with four distributors and around 400 franchise partners in Kazakhstan.

As for "Galaktika," this Russian company has been operating in the Kazakh market for 17 years, serving clients in the oil and gas and extractive industries.(1c.kz)

3.3 Chance to make a progress

Research firm Panorama Consulting, in its annual ERP market report, notes that despite the active promotion of cloud ERP solutions in the media, customers remain fairly conservative and currently prefer on-premise installations (61% of respondents) or as a service (26%), while only 12% of users have opted for cloud solutions. Afterwards, we may say that the market of erp system is quite *conservative* .

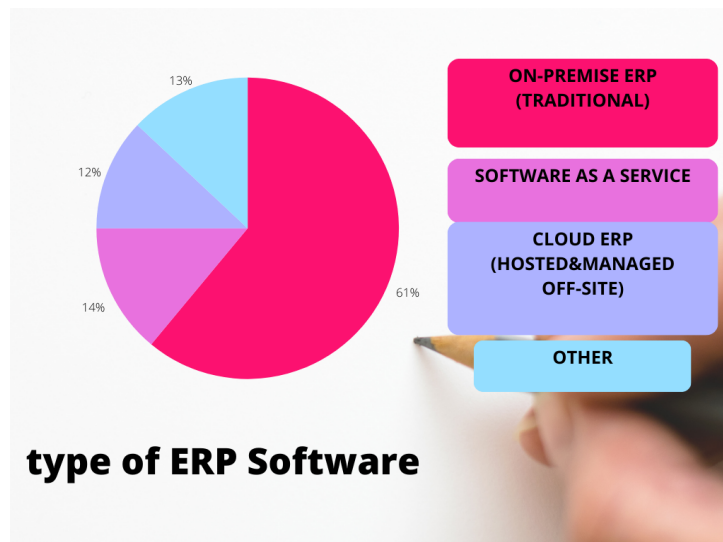


Figure 4. Types of Software

Source : Panorama Consulting

Based on vendor reports and media materials, it appears that the largest customers are in the extractive industry, oil and gas sector, financial sector, telecom, and energy. Considering that the Russian company "1C" is actively operating in the ERP solutions segment, one can add small and medium-sized businesses, which are increasingly looking towards "1C-Enterprise" and other cost-effective off-the-shelf solutions.

According to IDC data for 2012, the share of software in the structure of the domestic IT market is only 2%, which is remarkably low. The government recognizes the importance of ICT development and has set a goal to increase the industry's capacity to 4% of the GDP within the "Information Kazakhstan 2020" program. Despite the attention given to software developers, international solutions still dominate the enterprise management systems segment, and the market is unlikely to turn its attention to domestic developments. Additionally, foreign developers offer their clients industry expertise, international partner experience, and implementation methodology. However, due to local legislative, accounting, tax, and other peculiarities, Kazakhstani companies opting for products from foreign vendors often require significant adaptation of their solutions, leading to extended project implementation timelines and increased support costs.

It is known that SAP implements solutions in major companies in Kazakhstan, including enterprises of JSC "Samruk Kazyna." In the near future, the vendor expects new major projects as business transformation programs within the "Samruk" group of companies are currently unfolding. Maxim Lamskov, Managing Director of SAP Kazakhstan and Central Asia, notes that the goal of such programs is to implement optimal business models aimed at improving the operational and financial efficiency of the company. In this process, SAP is prepared to act as a strategic partner, leveraging its 40 years of experience in enhancing the efficiency of global corporations. (forbes.kz)

Some consultants suggest that at the high level, "Samruk" seriously considers the possibility of implementing SAP in all its subsidiaries. However, not all companies are ready for SAP implementation for very objective reasons.

Considering SAP's localization of software and the nature of its system, implying a kind of lifelong commitment, no changes in market segmentation are expected. This means that other vendors will either have to settle for their niche or explore new industries where mass ERP implementation has not yet occurred.

Oracle believes that the peculiarities of the ERP market in Kazakhstan are determined by the varying development of different industries or, more precisely, the readiness or unreadiness of companies from specific industries to adopt ERP-class solutions. For instance, differences exist in the utilities sector—Russian companies in this industry, such as water utilities, already operate in ERP systems, while in Kazakhstan, utility companies less frequently prefer large-scale ERP projects.

Microsoft also emphasizes the low level of awareness about ERP among local companies in Kazakhstan. Many do not understand the need for such solutions and show little interest when learning about the resources required for implementation. (cnews.ru)

However, as noted earlier, changing the positions of leaders seems challenging. Nurzhan Toishy, the CEO of the "Galaktika" corporation in Kazakhstan, believes that large holdings collaborating with international companies prefer SAP, Oracle, etc., while the majority of medium and small companies work with "1C." Selling ERP systems to new clients is extremely difficult because the market is already divided. Nevertheless, there are niches in specialized solutions, such as TORO (technical maintenance and equipment repair),

personnel management, Business Intelligence (reporting, modeling, risk management), finances, budgets, and other specialized solutions with in-depth development that can integrate with any ERP systems.(kaznu.kz)

3.4 Market problems

In SAP's view, the business applications market in Kazakhstan is characterized by a significant share of in-house developments and non-industrial solutions in the corporate and government software segment. These solutions, according to SAP, fall short of modern requirements, show weak development, and require constant substantial investments. Despite these challenges, there is an IT specialist shortage in the SAP solutions field due to increasing demand, impacting SAP's further development in the ERP market, as noted by Maxim Lamskov, Managing Director of SAP Kazakhstan and Central Asia.

Overall, enterprise system implementation challenges in Kazakhstan mirror global issues: business process specificity, employee resistance, insufficient staff training, improper design approach, consultant qualification gaps, hidden costs, etc. Frequent reports emerge of projects exceeding acceptable timelines or system rejection. SAP, often criticized for cost, implementation duration, and effectiveness, faced a recent inquiry by the State Duma of the Russian Federation regarding its activities and potential corruption in Russia. However, such scandals involving major foreign companies are relatively common.

World-leading ERP solution providers offer "boxed" solutions for SMBs based on typical industry-specific processes. While SAP may possess excess functionality for small companies, Western solutions still lag behind Russian ones in price. Nonetheless, global company partners express optimism regarding "boxed" solutions.(erp.kz) BI-Consulting specialists in Kazakhstan believe that by adopting SAP ERP as the ERP system standard, many mid-market companies can make significant strides in optimizing their business within 4-6 months, reducing costs, analyzing costs, and enhancing business transparency.

In any case, ERP systems like SAP, Oracle, SAS, etc., are tools that require skillful implementation and utilization.

3.5 Partners and Vendors

In local markets, software developers often collaborate with local companies for the sales, implementation, and maintenance of their solutions, as they do not actively promote their products independently. The partnership principles among ERP system developers are generally similar, involving seminars, webinars, conferences, training programs, and certification. SAP in Kazakhstan has 26 partners with over 500 consultants, aiming to increase this number in the next two years. Oracle, with 25 Platinum-level partners in Kazakhstan, emphasizes their expertise in various Oracle products. Microsoft invests in local partner network development, but smaller companies risk losing market share to foreign competitors if not proactive. In contrast, Epicor focuses on genuine partnerships with specific specializations rather than creating a large reseller channel. Some partners express concerns about the increasing influence of Russian players, squeezing out local companies. Microsoft's relationships with partners are straightforward, providing software and a share of the license fee based on sales volume. However, in the CIS countries, the standard for accounting is "1C Accounting," making it challenging to sell products like MD NAV. Despite challenges, 1C's advantage lies in system localization for industry standards, with regular updates, appealing to progressive leaders interested in "1C-Enterprise" for its association with industry standards over "1C Accounting."

3.6 Threats and Opportunities

As noted earlier, some companies perceive specific threats from Russian players who, within the framework of the Customs Union, may not only feel more confident on our country's territory but also participate in tenders and competitions of state-owned companies. These concerns are characteristic of Kazakh consultants, while global companies implement their products worldwide, and it is less crucial for them which company deploys the product here or there. Moreover, Microsoft believes that Russians and Belarusians primarily bring their experience and solutions to the Kazakh market, thereby aiding local partners in development and progress.

However, there is currently a significant threat from crisis-hit Ukraine, where a cheap yet skilled workforce originates, as highlighted by "1C-Sapa and Slava VC." Due to the low population density in Kazakhstan, our specialists are more expensive. "What saves us is that

we are more progressive in technology, have development programs—though criticized, they still provide something. In Ukraine, there are 7 enterprises with around 3000 programmers. They don't care which product to code for," says Tatyana Sapa. "In Kazakhstan, if a company has over 30 programmers, it is considered large. So, rapidly raising the level of personnel is unrealistic." The talent shortage is also acknowledged by "Galaktika": there are few specialists in the market for moderate salaries.(1c-sapa.kz)

As a way out of this situation, exporting to Kyrgyzstan or Turkmenistan is suggested, but these are small markets.

3.7 Market forecasts

The main problem, according to Elena Shilkova from SynConsult Master, lies in the fact that businesses are not fully legalized yet, so the market potential is not fully utilized: "We see that a lot is being done in Kazakhstan to bring businesses out of the shadows. In these conditions, there will be demand not only for accounting systems but also for management accounting systems. This is exactly what MD NAV is for, and there are no competitors for it in the medium business segment. So, we are looking to the future with optimism." SAP noted that in developed markets, the share of IT in the country's GDP structure is about 20-30%, indicating market maturity. "The potential for the development of the ERP market in Kazakhstan represents enormous opportunities for market participants in terms of adding value to their businesses," says Maxim Lamskov, Managing Director of SAP in Kazakhstan and Central Asia.(tadviser.ru)

Since there is even talk at the state level about interest in information systems as a service, it will be interesting to know what consultants think about this. "In our view, for companies belonging to large businesses, analytics, cloud solutions, and specific specialized solutions considering the specifics of organizations will be the most interesting in the near future. This is because ERP solutions are almost universally implemented in the large business segment, and companies will continue to develop them," believe BI-Consulting.

Regarding cloud solutions, companies have diametrically opposite views on this issue: BI-Consulting believes that this direction is undoubtedly interesting and will be widely used in Kazakhstan companies in the coming years. However, SynConsult is confident that while

the future may be in the "clouds," a significant part of the business is still in the shadows, and there won't be much interest in cloud solutions for now.

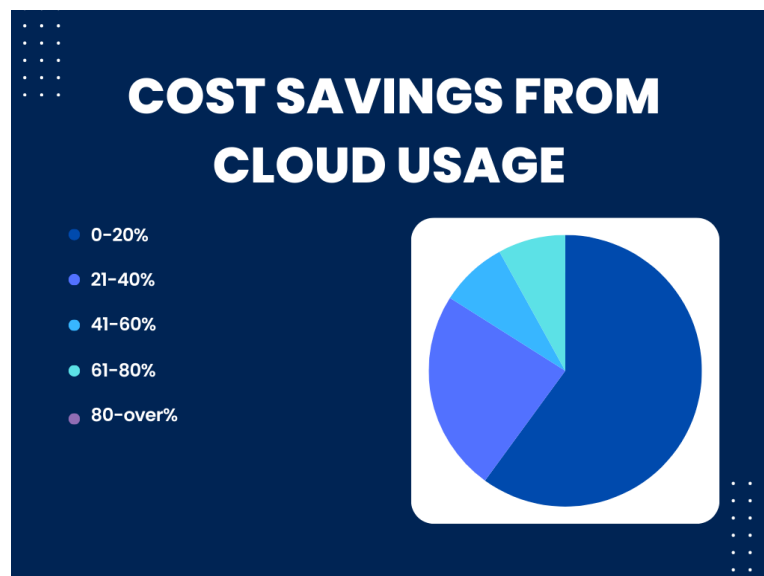


Figure 5. Cost savings from cloud usage

Source : Panorama Consulting

In conclusion, let's present another chart from the Panorama Consulting study, indicating that respondents, on the whole, don't have a high level of trust in the "cloud" and are aware of the technology's efficiency in terms of costs. Panorama researchers believe that this market will continue to grow.

4. IMPLEMENTATION OF THE SAP ERP SYSTEM IN "KAZTRANSOIL" JSC

4.1 About the company

KazTransOil JSC is a Kazakhstani oil pipeline company that offers services for transporting oil within the domestic market, as well as for transit and export purposes.

Mission of «KazTransOil» JSC is to ensure maximum benefits for the shareholders of «KazTransOil» JSC and to meet the strategic interests of the state in the field of transportation of oil on the main oil pipeline.

Vision by 2028 defines «KazTransOil» JSC as a competitive company with a diversified pipeline system, corresponding to best practices in the field of sustainable development, safety of production activities, environmental protection, and management of productive assets.

KazTransOil JSC operates a vast network of main oil pipelines, spanning a total length of 5,372.994 km. Oil transportation is facilitated by 36 oil pumping stations, 67 oil heating furnaces, and a tank farm with a storage capacity of 1.386 million cubic meters. Oil transshipment is managed by 4 railway overpasses for draining and filling, as well as equipment for loading oil into tankers at 2 active berths at the Aktau sea oil terminal. Following the Resolution of the Government of the Republic of Kazakhstan on October 8, 2012 (No. 1273), KazTransOil JSC was appointed as the national operator for the trunk oil pipeline. (kaztransoil.kz)

As a national operator, the primary goals of KazTransOil JSC include:

- Protecting the interests of the Republic of Kazakhstan and other stakeholders during the transportation of products via trunk oil pipelines to both domestic and international markets;
- Ensuring innovative development of the oil trunk pipeline system and its integration into the global energy system;
- Participating in the development and execution of state and national programs related to the development of the oil and gas sector, specifically in terms of oil transportation through trunk pipelines;
- Developing and submitting proposals to the authorized body regarding draft regulatory legal acts aimed at improving Kazakhstan's legislation on main pipelines;
- Participating in the development of regulatory and regulatory-technical documentation projects in the field of trunk oil pipelines;
- Engaging in the development and implementation of international agreements regarding oil transportation via trunk pipelines;

- Participating in the execution of international projects aimed at enhancing energy security and diversifying oil transportation routes.

KazTransOil JSC carries out the following functions within the scope of its right to provide services for organizing transportation through pipeline systems of other countries, transporting oil from the territory of the Republic of Kazakhstan via trunk pipelines owned or legally operated by the national operator (single routing operator activity):

- Enter into contracts with product senders to organize oil transportation through pipeline systems of other countries;
- Based on the concluded contracts for organizing oil transportation through pipeline systems of other countries, sign relevant contracts with organizations, including those from other countries providing services for oil transportation, oil transshipment through sea terminals, freight forwarding services for oil transshipment through sea terminals, and other contracts necessary for ensuring the transportation of oil from the territory of the Republic of Kazakhstan via trunk pipelines owned or operated by the national operator through the pipeline systems of other countries.

It is noted that currently, its subsidiaries use a large number of diverse systems for personnel management tasks with local databases of regulatory and reference information. At the same time, in most cases, a single system covers only basic functionality. In particular, the "Galaxy" system is used for personnel management, accounting, tax, warehouse, and managerial accounting in most industry-standard cases. The company started using its payroll calculation module back in 1998, and the personnel management module since 2008.

4.2 Problems of the company

Key issues related to enterprise accounting automation include the lack of ability to obtain analytical and consolidated reporting due to the absence of a single database for all subsidiaries, only partial support for management business processes in this area, and the lack of integration with other existing IT systems.(profit.kz) To address these problems, a decision was made to create a unified enterprise management information system. To this end, "KazTransOil" established a special company called "Limited Liability Company Center for

Development and Implementation of Information Systems" at the end of 2012. In October 2013, the company "KazTransOil" and its subsidiary "KAZAKHSTAN-CHINA PIPELINE LLP" launched a project to create and implement a comprehensive Integrated Information Management System (IIMS). The system includes several modules covering inventory accounting, contract accounting, financial accounting, tax accounting, production planning and supply, equipment maintenance and repair, and personnel and managerial accounting. A key condition is centralized architecture, allowing organizations to work within a single database according to their authority.

4.3 Implementing the SAP ERP system

For the development of the special system, the company chose a solution based on SAP ERP products and signed a cooperation agreement with SAP CIS LLC. It was decided to develop 3 main modules of information system based on SAP ERP:

- Human Resources
- Finances
- Assets

Functionality of the system above as part of SAP ERP, covers almost all accounting and business operations carried out in JSC "KazTransOil". (kaztransoil.kz) Implementation of such a large-scale system carried out in the company in several stages:

1. Terms of Reference - at this stage, developed general requirements for input data, functionality, screen forms and reports in the system; The terms of reference were formed by three parties: contractors for the implementation of SAP ERP, by the method of group seminars and face-to-face consultations.

2. Preparatory stage - at this stage, training took place personnel, simulation of the system operation with test data in order to check functionality of modules and screen forms, as well as for educational purposes, migrating real data to a productive system.

3. Trial operation - at this stage, the company's employees fully worked in the system, with real data, fixing all errors and shortcomings in the work of SAP ERP using a special tool

"Create incidents." Each such error or such deficiency (incident) was fixed, and, in case of impossibility of its prompt correction, included in a special list. This list has been considered tripartite seminars, and a decision was made either on a significant finalizing of the system as part of further adjustments, or on adjusting technical tasks.

4. Commissioning - at this stage, all incidents created in the system and, if the current business process management is in SAP ERP completely coincided with the Terms of Reference, a decision was made on the final commissioning of the system into permanent operation.

The first decision was made to introduce modules 1 and 2. They did not directly affect the production process and provided personnel, tax, accounting, warehouse and contractual accounting, replacing the existing system at the enterprise - "Galaktika". In view of features of the 3-module, it was decided to phase in the implementation of these systems. These include: direct impact on the production process, planning and acquisition of materials and equipment, works and services for maintenance and repair equipment, which implies increased requirements for reliability and correctness of functioning; a large number of processed business processes, each of which has its own characteristics; a significant amount of equipment used, which required certification and the introduction of all significant characteristics in system.

An essential feature of the SAP ERP implementation process in the company was the territorial remoteness of all project participants. It should also be noted that practically all business processes are rigidly fixed by internal regulations documents that fully describe the frequency and procedure development, coordination, adjustment and execution of all types of plans and programs. For implementation of an ERP system opportunity to adjust business processes in order to adjust them to the "best practices" embedded in SAP ERP, not there was practically no possibility. The order of operation of the various business processes (development, approval, reporting) could significantly differ. Thus, to all participants in the SAP implementation process the task was to combine a tough and diverse production structure with global capabilities of the ERP system.(erp.kz)

One of the main requirements for an ERP system, formulated by the company was the centralized management of all data governing the production process in SAP. In practice this

means that for the correct output of the final information by the system (for example, a procurement plan for material and technical resources for the next year), it must be processed internally by the system (with the help of customized algorithms), agreed within the system (competent users, according to predefined roles) and, most importantly, important, initially entered into the system (from the lowest level). Exactly such a scheme - from the bottom up - from the input of requirements at the level of the worker site/service/department in the regional oil pipeline department and up to the bidding department - was taken as a basis, since it provides centralized processing of all data. This required a significant redesign of business processes, previously existing. System "Galaktika", which was used in the company until 2014, provided stable management of accounting, tax, personnel, warehouse and management accounting, recording the actual transactions. The functionality of planning, processing and coordinating any data in it was absent or did not meet the requirements. All necessary for planning the purchase of materials and equipment, works, services, personnel loading information formed decentralized, each functional unit separately, often in the form of tables in Microsoft Word or Excel applications, without fixings for pieces of equipment. Compliance check regulatory requirements (for example, for a sufficient frequency certain types of work) was carried out ex post, if necessary, rather than planned at the planning stage. Much of the quality of this work depended on the competence of one or two people in the functional division, which was almost impossible to check in advance. At this approach, the only way to check the correctness of planning was to have no emergencies and a significant shortage of materials and equipment. The transition of production planning to SAP ERP forced almost all departments and services of the company to take a fresh look at daily business processes, pointing out weaknesses in the organization of current activities companies. In fact, in most cases, in the early stages, this led to additional amounts of work. Employees of the enterprise had more time to complete data entry into the system, data analysis, proper allocation of resources.

4.4 Key objective benefits, achieved through the implementation

According to the HR :

1. The accuracy of employee training planning has increased. If before the frequency of training, the list of courses and the training plan for the year were essentially three different documents, then with the input it became enough to enter courses and attach employees of the

enterprise to them (according to activity profile). Based on these data, the training plan for the year is generated automatically.

2. The time for preparing output forms of documents for accounting for personnel operations: during the operation, output forms (for example, orders to hire, transfer or dismiss employees) printed automatically.

According to the Finances :

1. Increasing control over current accounts payable and receivable indebtedness, including planning for such indebtedness. Maintaining such work became possible due to the creation of a single database in the system contracts, in which a separate card was created for each contract. At the same time, the processes of accounting for work or materials reflected in the budget income and expenses, and payment processes reflected in the budget of the movement funds are divided within the card, which allows you to plan and manage debt at the level of a specific contract.

2. Reduce the time for the formation and approval of applications for payment. Previously, payment requests were created manually in Microsoft Word, printed out and signed on paper by the inspectors and guides. At the same time, difficulties often arose associated with the loss applications, the need to redo and re-sign the application in case of the absence of any of the coordinators. Also significant were the temporary costs of moving and waiting for the approval of applications "on paper". With the commissioning of the Financial Management system, the formation and approval of applications for payment is made in the system, in electronic form. However, the payment amount and the maximum possible information about the payment (counterparty, banking details, contract number) to be pulled up from the information generated in the system debt (for post-payment) or from the contract card (for advances).

According to the Asset Management system:

1. Elimination of the possibility of errors in quantity planning MTP for maintenance and repair of equipment. With transition on SAP ERP for each technological operation were developed as called "Technological maps" (for example, "Technological map average repair of shut-off valves"), which indicated how much the operation requires materials, by type. Ultimately this allows employees, by setting the number of operations, to immediately form

the need for MTR for them.

2. Adequate planning of the workload of personnel. The technological maps described above also indicate the labor costs for performing operations. All labor costs were determined by the fact, using timing studies. This one is huge scale work eventually allowed to form a uniform workload of personnel, eliminating the possibility of planning work that requires more labor than is available in the working time fund of teams maintenance of technology.

To understand the subjective aspects of implementing SAP ERP at JSC "KazTransOil" a survey of company employees was conducted. The criteria for selecting respondents were as follows:

- primary (daily) work in the SAP ERP system;
- the respondent should have worked at the enterprise before and during the implementation of SAP ERP;
- preferably, the respondent should work in multiple ERP modules simultaneously;
- a broad coverage of structural units (from the personnel department to technical services) is desirable.

A total of 12 respondents participated in the survey. The questionnaire with questions and response options is provided in Appendix 1. Let's analyze the results of the conducted survey.

4.5 Company research

Question number 1: In which modules of the ERP system do you work?

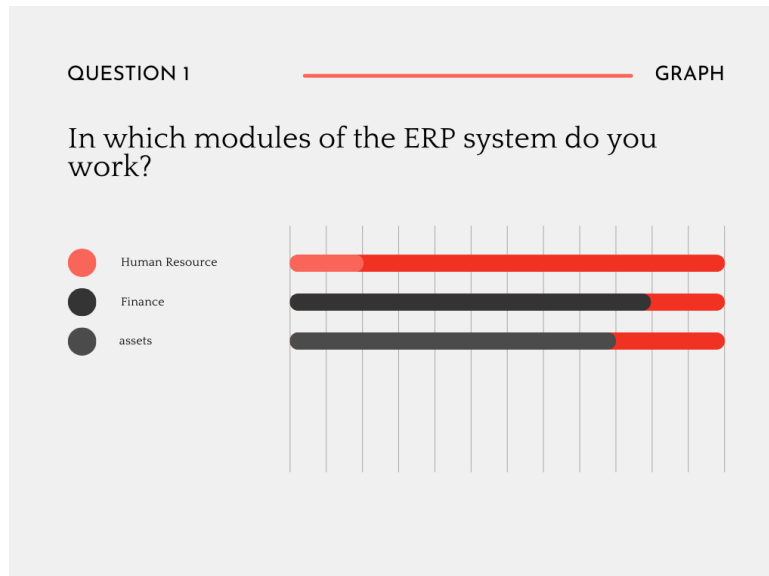


Figure 6. In which modules of the ERP system do you work?

Answer options:	Quantity:	Share:
Human Resource	2	17%
Finance	20	83%
Assets	9	75%

Table 2. In which modules of the ERP system do you work?

Of the 12 interviewees, two work for HR, 10 for FMIS and 9 for AMS. It can be seen that on average 1 respondent works in two systems, the most sought after of which is FMIS.

Question number 2: What are the benefits of implementing an ERP system
Do you feel at work?

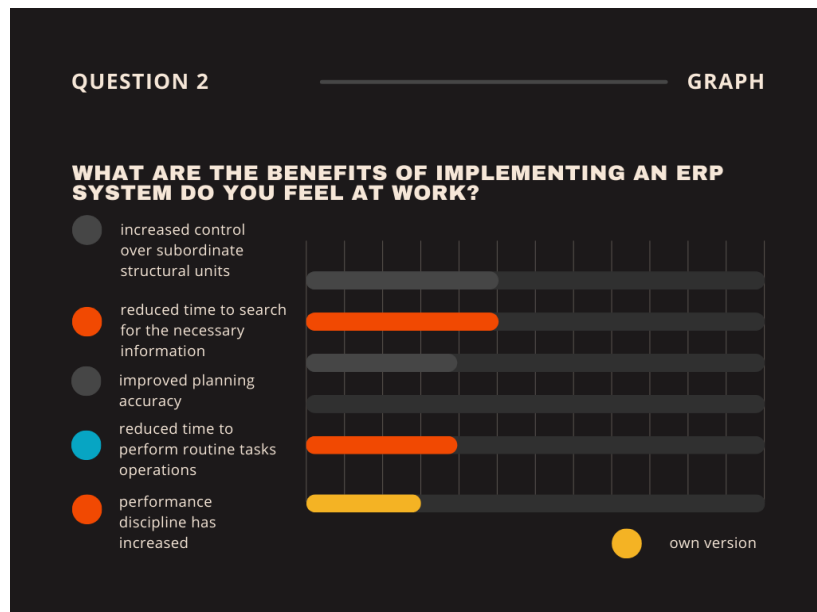


Figure 7. What are the benefits of implementing an ERP system Do you feel at work?

Answer options:	Quantity:	Share:
increased control over subordinate structural units	5	42%
reduced time to search for the necessary information	5	42%
improved planning accuracy	4	33%
reduced time to perform routine tasks operations	0	0%
performance discipline has increased (your personally and your colleagues)	4	33%
own version	3	25%

Table 3. What are the benefits of implementing an ERP system? Do you feel at work?

Of the 12 respondents, no one singled out any unambiguous advantage for each of them. Votes distributed evenly between increased control, reduced search time, increasing the accuracy of planning and the growth of executive discipline. At the same time, it is noteworthy that none of the respondents noted the item on reduction of time for performing routine operations. In the transcript for the item “their own version”, 3 respondents indicated following:

1. "No benefits";
2. "Detailing of the process, easy search in databases";
3. "There is no advantage at the level of the performer."

Question number 3: What factors contributed to the implementation of the ERP system in your company?

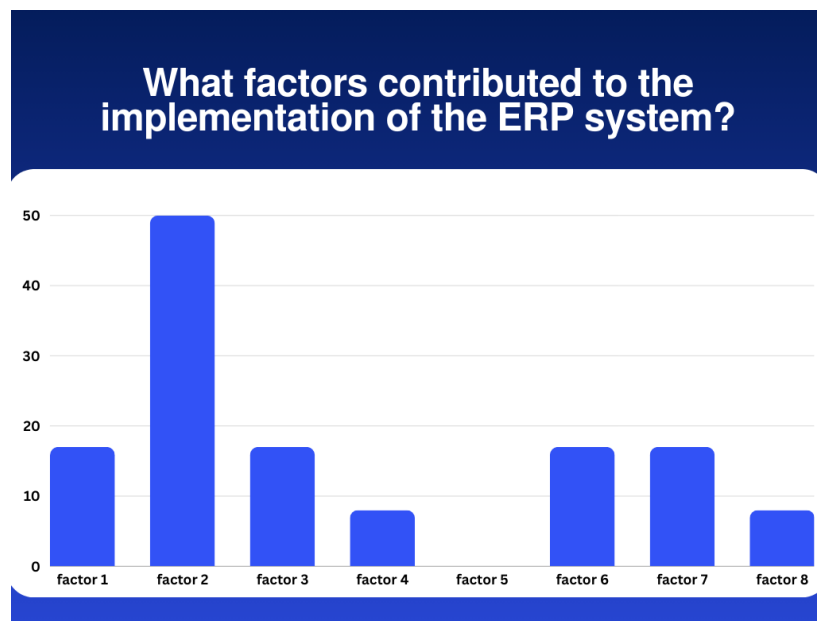


Figure 8. What factors contributed to the implementation of the ERP system in your company?

Answer options:	Quantity:	Share
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fast response of technical support	2	17%
participation and control of the Society's management in the implementation	6	50%
quality staff training	2	17%
clearly written instructions for working in the system	1	8%
intuitive system interface	0	0%
thorough testing of the system before commissioning	2	17%
involvement of all stakeholders in the discussion of system requirements	2	17%
own version	1	8%

Table 4. What factors contributed to the implementation of the ERP system in your company?

Of the 12 responses of respondents, the item “participation and control of management” stands out, which was chosen by half of the respondents. This is probably a consequence of the fact that the parent company was interested in the quality and timing of the implementation. project. The “intuitive interface” option was not chosen by any of the respondents, which also indicates the difficulties in learning and the additional time spent on operating ERP. It is also noteworthy that, despite the possibility of multiple choice, in general, very few items were selected for the question (only 16 items for 12 respondents).

In the transcript to the item “your own version”, 1 respondent indicated following:

1. “The allocation of additional numbers for the formation systems, the formation of a specialized department in the parent company ”

Question number 4: What, in your opinion, factors hindered implementation of an ERP system?

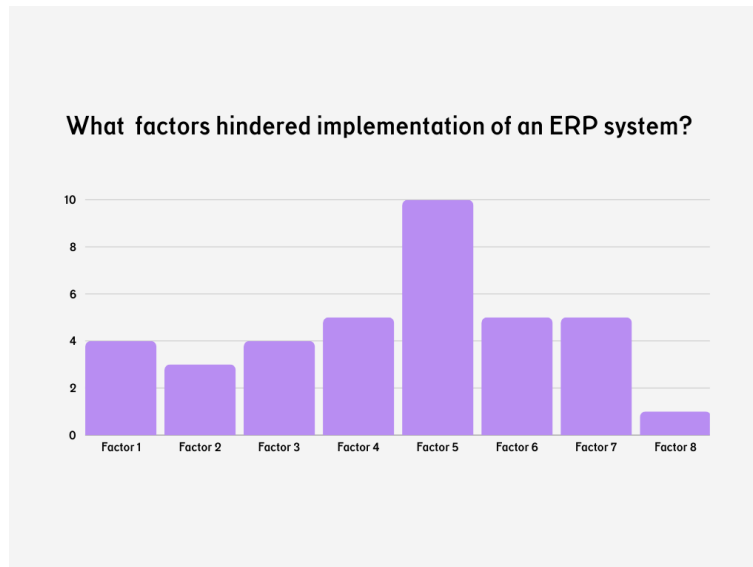


Figure 9. What, in your opinion, factors hindered implementation of an ERP system?

Answer options:	Quantity:	Share
slow service response technical support	4	33%
lack of management control over implementation process	3	25%
poor quality training employees	4	33%
poorly written operating instructions system	5	42%
complex system interface	10	83%
insufficient testing systems before commissioning	5	42%
system requirements discussed	5	42%

limited circle of interested persons		
own version	1	8%

Table 5.What, in your opinion, factors hindered implementation of an ERP system?

Question number 4 and the answers to it are a mirrored reflection to question number 3. Of the 12 people, almost all respondents singled out the complex interface of the system, then a little less than half turned attention to the lack of testing, requirements discussion and low quality of instructions to the system. It is noteworthy that respondents generally chose the opposite answer options in question #3 and question #4. This indicates that in various structural divisions of the company, the implementation process could proceed in different ways, with their own characteristics, at different paces and with different quality.

In the transcript to the item “your own version”, 1 respondent indicated following:

1. “The introduction of new business processes has not been backed up structural changes within the organization.

Question #5: What should be considered the most in the process of implementing an ERP system in other organizations?

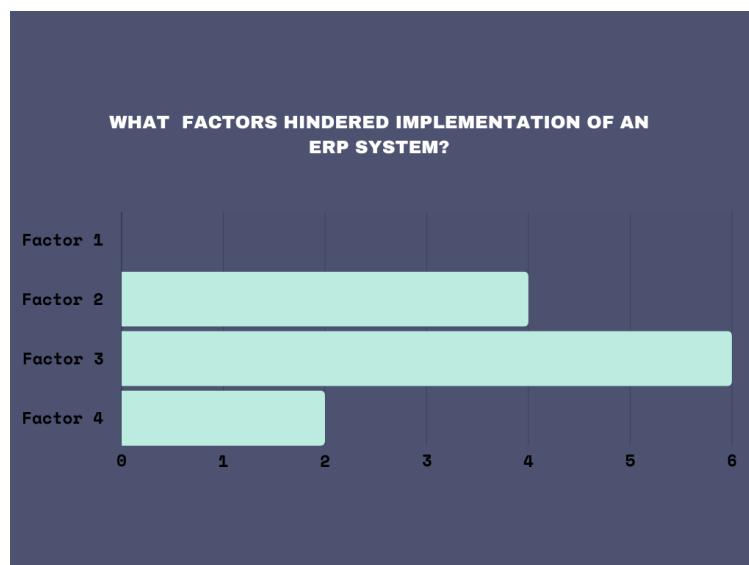


Figure 10.What should be considered the most in the process of implementing an ERP system in other organizations?

Answer options	Quantity	Share
performance of equipment and lines connections	0	0%
training of company employees	4	33%
system testing before launch exploitation	6	50%
own version	2	17%

Table 6. What should be considered the most in the process of implementing an ERP system in other organizations?

Of the 12 respondents, the most important factor was system testing before commissioning, then training employees. None of the respondents indicated speed equipment and communication lines, which may indicate a lack of claims to this aspect of implementation in a particular company, and low priority of technical aspects for ordinary employees.

In the transcript for the item “your own version”, 2 respondents indicated following:

1. “Control at the management level, eliminate duplication functionality outside the system and in the system”;
2. “A clear understanding and designation of complex and particular tasks when entering the system. In general, the survey shows that the implementation of an ERP system in an enterprise is a complex process in which there are a lot of questions and difficulties. Implementation of SAP ERP no doubt made employees of the enterprise to rework their usual business processes to new requirements.

5. DEVELOPMENT AND EVALUATION OF THE EFFICIENCY OF MEASURES TO SOLVE PROBLEMS AT THE ENTERPRISE JSC KAZTRANSOIL

5.1 Evaluating profitability of an investment

As it was mentioned before in the part 2.2 Methods for Evaluating the Effectiveness of Actual ERP System Implementation , we can calculate the ROI-Return on Investment as follows : the benefit (or return) of an investment is divided by the cost of the investment. The result is expressed as a percentage or a ratio.

A positive net ROI indicates that an investment is likely beneficial. However, when there are alternative opportunities offering higher ROIs, these cues assist investors in either eliminating or choosing the most favorable options. Conversely, investments with negative ROIs should be avoided as they signify a net loss (sap.com).

A sum of 66.67million USD (28 billion tenge) was attracted for development through the initial public offering of shares of JSC KazTransOil. Immediately following the results of 2012, dividends were paid in the amount of 68.57million USD (28.8 billion tenge), representing more than 85% of the company's profit. Kaztransoil invested 5.95million USD (2.5 billion tenge), especially in SAP ERP implementation (kaztransoil.kz,2014).

In this case,

$$\begin{aligned} \text{Return on Investments (ROI)} &= \frac{\text{Net Return}}{\text{Cost of Investments}} \\ \text{ROI} &= \frac{68.57 \text{ million USD}}{66.67 \text{ million USD}} = 102.857\% \end{aligned}$$

Figure 11. ROI solution for Kaztransoil for 2013

Here, the value is more than 1 or 100 % , which makes the investments worthy .

Additionally, Net profit for the year 2013 amounted to 53.961 billion tenge, which is 31% higher than the plan and 113% higher than the result achieved in the 12 months of 2012.

Meanwhile, the revenue from the main activities of JSC "KazTransOil" for the year 2013 amounted to 168.215 billion tenge, which is 7.5% higher than the plan and 35% higher than the corresponding indicator for the 12 months of 2012.

The volume of oil transportation through the main oil pipeline system of JSC "KazTransOil" for January-December 2013 amounted to 53.924 million tons (an increase of 1% compared to 2012).

5.2 Development of recommendations on the methodology for implementing

Implementation of the SAP ERP system in other enterprises of the system (more than 20 enterprises) is planned for the period up to 2024. JSC "KazTransOil" was a pilot project for Firstly, the initial setup of the system was made, and secondly, the main screen forms, coordination and execution schemes were created business processes, and, thirdly, the implementation process itself was tested as training and work of employees under the new conditions.

Based on the results of the general analysis of ERP systems and specific implementation example, the following can be formulated recommendation blocks:

- Recommendations on the preliminary evaluation of the project;
- Recommendations on the preparatory stage of implementation;
- Recommendations on ERP-system functions;
- Recommendations for changes within the company.

Recommendations for the preliminary assessment of the project:

1. When assessing the economic efficiency from implementation of ERP-systems it is recommended not to assume the reduction of labor costs for conducting business processes in the company, as well as reducing the number of employees. Specific examples of the implementation of an ERP system show that to accompany this process, it is necessary to introduce an additional number of employees, both for training and user support purposes, and for the purpose of further work in the system. Reducing labor costs possible if input and output forms are translated into ERP, completely identical to those used previously, outside the system. If it is planned to develop new forms, reports and enter new data, with which previously, outside the system, the work was not done - then this inevitably leads to an increase in labor costs in the company. Moreover, the input additional headcount when implementing an ERP system is one of the factors contributing to the successful implementation of the project as a whole.

2. When evaluating the duration of the project implementation (even if its replication of the design solution) should not be laid down for the implementation a period of time shorter than recommended by similar projects, or general contractor. Moreover, you need to be prepared for an increase in the implementation time, and therefore, you should not tie it to completion by some critical date for the company. Migration period data and commissioning of the system (from a test version to a productive environment) must be planned for the time of the least turnover of financial and economic activity. In most cases, the most favorable period is from March to August.

Recommendations for the preparatory stage of implementation:

1. When choosing from two approaches to the implementation of ERP systems - the method "Big Bang" and the phase method - it is necessary to take into account the degree integration of the process of shipment of goods (provision of services) to counterparties in future ERP. If sales processes are integrated into ERP to a large extent, and it is possible that if the system fails, the company may suffer losses associated, for example, with untimely delivery of products - the least risky, phase method should be followed. If interaction with customers is poorly integrated into ERP and does not carry short-term periodic character, so implementation by the Big Bang method does not carry a significant risk of external costs.

2. With both methods of implementation, it is important to provide for a long phase of full testing of all functionality of the ERP system. Extremely it is desirable that the testing should take place not on real financial and economic transactions, but on virtual departments, materials, contracts and other. The more different variations of business processes will be tested, the less modifications will need to be made to the system for its normal functioning in the future.

3. It is extremely important to provide the most complete training employees work in the system. It is necessary to take this as seriously as, for example, training courses for working personnel in their specialty. Ultimately, the ERP system is the only tool that an office clerk in a large company will work with, which is in importance the analogy of a machine tool for a factory worker. The quality of planning, accounting and execution of, for example, the budget depends on how competently an employee of the company will handle the ERP system.

organization, which in importance significantly exceeds other business processes. In this issue, it is recommended to use all modern approaches to learning. A flexible set of courses (basic, advanced, functional modules that can be selected at will), video training, multimedia and interactive training programs.

4. Despite the fact that the competent implementation of an ERP system objectively provides advantages in the speed and accuracy of daily routine operations, employees of an enterprise may subjectively not feel these changes. Moreover, you need to be prepared for the negative perception of the implementation of the ERP system and take countermeasures. To maintain a healthy climate in the team, it is necessary to carry out explanatory work, an example showing the increase in the efficiency of operations. This will increase the motivation of employees to use ERP and will have an impact on the productivity of their work.

Recommendations for the functions of the ERP system:

1. The practice of implementing and using ERP systems shows that most of them (due to their flexibility and the ability to customize for any production) have redundant functionality. Ultimately, this is reflected in the complexity of the system interface, its screen forms. This is one of

the main factors that reduce the effectiveness of the implementation of ERP in the enterprise. To reduce risks, it is recommended to study screen forms for ease of use, the exclusion of all screen elements that are not involved in performing the necessary operations (extra fields, buttons, lines, menus, etc.). Significantly facilitate the work of employees in the system could hints for filling, or an indication of the order of filling in the fields and forms.

2. When implementing an ERP system in one of the organizations, a large companies, it is necessary to immediately take into account the requirements to eliminate duplication of work outside the system and in the system. A typical example is when reporting (for example, on the availability of balances in warehouses) in the ERP system is generated in one form, while regulatory requirements for reporting to the parent company require a different form. Such contradictions in reality lead to additional labor costs for the employees of the enterprise. Recommended at the stage of implementation of the functionality systems to immediately bring reporting forms in line with the current regulatory requirements in the organization, and strictly adhere to this rule, especially in a large organization with a large number of branches.

3. The functionality of the ERP system should be discussed by the widest possible circle of people. Even if the decision is ultimately made by the top management of the company, the opinion of ordinary employees can also be taken into account, at least in an introductory manner. Moreover, a simple pre-familiarization of employees with the functions of the future system will help prepare staff for training in further work.

Recommendations for changes within the company:

1. The implementation of an ERP system in an enterprise implies significant cash costs, most of which are payment for the services of contractors. As a rule, these are companies whose competencies include knowledge of IT areas and enterprise economics. Such companies rarely speak the language of business and understand the specifics of a particular production. In such conditions, the risks of unsuccessful implementation of the project are significantly increased. In order to minimize this factor, it is recommended to create a separate structural unit in the company responsible for interaction

with contractors implementing ERP. Employees of such a department must be proficient in both ERP terminology and the specifics of production. This approach will save both time and training ordinary employees of the enterprise in the features of ERP systems, and will reduce the risks of implementing and paying for excess functionality.

2. If a non-standard ERP solution is being implemented, and initial system setup is required, it is recommended to provide an additional number of employees in the structural divisions that are key when working in ERP. Designing business processes in an ERP system is an extremely important task, the quality of which depends on the quality of doing business after implementation. For the implementation of this tasks require additional labor costs, which should not be neglected.

3. When implementing an ERP system in an organization that has a large number of regulatory requirements (regulatory documents, local regulations), in accordance with which the effective work of all structural levels is historically organized, it is not recommended to change such requirements in favor of reducing the volume of ERP system settings. Such changes will lead to the fact that other organizations (branches) of a large company that does not have an ERP system will not be able to function effectively in this situation. In this case, it is recommended either to fully configure ERP in accordance with all regulatory requirements, or, in case of impossibility of compliance all requirements - reducing the functionality of the ERP system and continuing to work on some of the processes outside the system.

SUMMARY

In this study, an analysis of the ERP systems market was carried out, the main trends, problems and prospects of this market are identified, advantages and disadvantages of implementing an ERP system in an enterprise. There were also analyzed approaches to assessing the economic efficiency of implementing ERP-systems, generalized experience in the implementation of specific enterprises, evaluated the effectiveness of such projects, and recommendations have been developed for replication ERP systems. The practical part of this study focused on attention to the experience of implementing the SAP ERP system in Kaztransoil JSC. The following conclusions were made during the study:

1. There is a process of expanding interaction in the market with domestic enterprises with advanced foreign companies. In Kazakhstan, companies are stepping up the use of advanced methods controls applied by their foreign partners. The consequence of this interaction is the appearance on the domestic market of systems enterprise resource management (ERP systems) such as SAP, Oracle, SCALA, Axapta and others. This process is pronounced progressive and irreversible.

2. Implementation of ERP systems is costly and resource intensive, a process that distracts management and production staff from its core business for an extended period of time. Due to this relevant are the studies of mechanisms to reduce these costs. However, the current practice of implementing such systems shows that each project is implemented at domestic enterprises as individual and unique, which, in fact, is an additional source of high costs. Typification of the process of implementing ERP systems will reduce the negative factors listed above.

3. To date, domestic manufacturers' software ("1C", "Galaktika", "Sail", "Rosexpertiza" and etc.) significant experience has been accumulated in the implementation of standard economic systems. However, this experience mainly relates to specialized systems that automate some individual business processes management and accounting. When it comes to large-scale implementation projects integrated ERP systems such as SAP, Oracle, SCALA, Microsoft Dynamics, etc., then such techniques are inapplicable - there is the need to modernize them and bring them to new market requirements.

4. The implementation life cycle of a replicated ERP solution has differences from the traditional project of implementing a unique ERP system configuration. These differences are both quantitative and qualitative. Accounting for such differences is necessary to identify typical elements of the process. implementation, as well as to develop tools that allow you to determine the ratio of typical and unique in the early stages of the implementation of ERP-systems.

5. Qualitative assessment of the effectiveness of the implementation of the ERP system in company allows not only to evaluate how effective the use of ERP, but can also be used as a complete management tool implementation project, at all stages of the project life cycle. Application project approach allows you to evaluate the effectiveness of use, as individual

functions, and the entire system as a whole, including early stages, as well as to control the deviations of real indicators from planned.

6. Implementation of SAP ERP in JSC “Kaztransoil” is a significant project for the energy sector of our country. The main difficulties for the project are the large volume of declared functional requirements to the system, a significant number of business processes that require the transition to ERP, a large number of internal regulatory documents, the fulfillment of which is mandatory for the functioning of the company.

7. As the main recommendations for the implementation of ERP systems can be distinguished: paying increased attention to the testing stage with the study of all situations in production activities, effective work with personnel, including training, explanation, development of visual instructions, discussion of the functionality of the future system by the widest possible range of people, including all end users.

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