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MASTER'S THESIS
ON THE TOPIC:

«Digital transformation of financial management at the enterprise»

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ЗАВДАННЯ

до магістерської роботи

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Вихідні дані до роботи: materials of statistical reporting, instructions and regulations, materials of monographs, periodicals, textbooks and manuals, data of financial statements, organizations and institutions, etc.

Зміст основної частини роботи (перелік питань, що підлягають розробці):

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ESSAY

Graduate work: pages 45, pictures 5, tables 14, sources 25, formulas 9.

The aim of the graduation work is to study theoretical knowledge in the field of corporate technologies in financial management of the enterprise; analyze the market of ERP systems; consider the necessary conditions for the implementation of the ERP system, as well as the difficulties that may arise when trying it. **The object of the study** - is information technology (IT) in the financial control system at the enterprise.

Research methods: comparison and graphical (for the analysis of corporate technologies at the enterprise), index (for selection of the optimum variant of the project of implementation), automatic (excel), economic-mathematical and other methods of economic substantiation.

Elements of scientific novelty: the existing provisions concerning the concept of information technologies (IT) of financial management are specified and deepened; the system of methods of the analysis of information technologies of management at the enterprise is improved; the basic measures for improvement of information technologies of management at the enterprise are offered.

Work structure: The main part of master thesis consists of three sections.

The first section tells about the history of financial controlling, when it begun and how it was operating. Also, this part defines controlling tools and the place of controlling in the management system.

The second section is about theory and practice of modern software in the field of financial management; analysis of the most popular ERP systems, their advantages and disadvantages and the efficiency of the investment budget in the implementation of IT, which is allocated for these purposes by enterprises.

The third section analysis domestic and world experience in implementing ERP systems in financial management of the enterprise; defines alternative options of the ERP-system implementation at the enterprise on case study and shows economic efficiency of implantation of ERP-system, pros and cons of each project and also gives recommendations for improving information technology in financial management at the enterprise.

DIGITAL TRANSFORMATION, FINANCIAL MANAGEMENT, FINANCIAL CONTROLLING, ERP SYSTEMS, INFORMATION TECHNOLOGY, ECONOMIC EFFICIENCY

CONTENT

INTRODUCTION

Relevance of the topic of the thesis. In conditions when the economy is characterized by a high level of competition, participants in any type of entrepreneurial activity require prompt and high-quality information that they can obtain from accounting activities, and on its basis, carry out planning and control functions, make balanced strategic and tactical management decisions. Modern information systems facilitate the routine and multi-stage process of obtaining effective information, help to present information in a form convenient for a particular user, speed up and simplify operations for its input and processing, and increase the clarity and simplicity of the required reports. The existing ranks of software are constantly replenished with both foreign and domestic innovations, and the technological achievements accumulated over the years are being improved by progressive versions, more adapted to the requirements of the changing business environment. Many large and medium-sized enterprises in Ukraine are shifting their priorities towards digitalization of business processes.

On the domestic and global markets, there are many management information systems for optimizing business processes of an enterprise: personnel management systems, customer relationship management (CRM), Warehouse Management System (WMS), Supply Chain Management (SCM), Business Process Management (BPM). Of these, the most controversial and most in demand by the majority of enterprises are the Enterprise Resource Planning systems - ERP. In this regard, issues related to the choice of an ERP solution are becoming relevant [1].

One of the characteristic features of financial controlling is that its information base is currently subject to significant changes. In a transformational economy, the quality of information used in management decisions depends largely on the amount of financial resources, profits, market value of the enterprise and other economic parameters that shape the level of welfare of business owners and the pace of its economic development.

Management of financial resources of the enterprise involves the solution of both current management tasks associated with the implementation of specific production problems, and long-term strategic objectives that determine its long-term development. Information support of financial controlling is a process of purposeful continuous selection of relevant indicators necessary for accounting, analysis, planning, control and effective management in making management decisions in all areas of financial activities of the enterprise [2].

Analysis of recent research and publications. The issue of implementation of ERP-systems is actively studied by scientists abroad, because the level of technical equipment in many countries has reached unprecedented heights. Research institutes and publications have been established to study and analyze statistics related to resource planning systems. Among foreign and domestic scientists dedicated to ERP-systems their scientific works F. Joseph, Lee Dang, E.J. Umbble, R. Ronald, D. O'Leary, J. Hunton, R. Poston, and A.P. Borsukov, E.M. Zueva, I.V. Kalnytska, D.V. Karpova, D. Lyubovina, P. Mikhailov, M. Popova, Zh.A. Prorochuk, V.Ya. Tsvetkov, B.A. Savenkov, and others.

The main purpose of the study:

- improvement of theoretical knowledge in the field of information technologies in financial management of the enterprise;

- analyze the market of ERP systems;

- consider the necessary conditions for the implementation of the ERP system, as well as the difficulties that may arise when trying it;

- develop recommendations for improving information technology in financial management at the enterprise.

The object of the research is IT in the financial control system at the enterprise

The subject of the research is a set of theoretical and methodological principles for the construction, functioning and optimization of IT support for financial management functions.

Work structure: to define the importance of financial controlling in the financial management of the enterprise; Corporate Information System and Enterprise Resource Planning System; the place of controlling in the management system; to analyze the most popular ERP-systems on the market; domestic and foreign experience in implementing ERP-system at the enterprise; to find alternative options and economic efficiency of implementing ERP-systems at the enterprise and to give recommendations how to improve IT in financial management at the enterprise.

The actual basis of the work is scientific and research works of foreign and domestic authors, materials of scientific and practical periodicals, international statistics, Internet sources, as well as analytical data during the study and the results of surveys of specialists at the enterprise-object of study.

1 Theoretical principles of financial controlling in the system of financial management of the enterprise

1.1 Financial controlling in the financial management system of an enterprise

Controlling has been actively implemented in Europe since the 1970s. The competences of the controller in the financial sphere also extended to the spheres of marketing, supply, logistics, production.

Financial controlling in a broad sense is a system of information support of financial and economic decisions, which involves the use of methods and procedures for budgeting, strategic planning, management accounting, financial diagnostics, investor relations, risk management and internal control, which together ensure coordination of individual management subsystems and focused on optimizing financial decisions and increasing the value of the company.

The analysis of job descriptions of financial controllers at domestic enterprises, where the relevant services have been operating for a long time, shows that mostly financial controlling is entrusted with such tasks as strategic and operational planning; preparation of management reports (for management, board of directors, shareholders); analysis and development of proposals to improve the procedures of financial transactions, management and accounting systems, to improve the efficiency of material, financial and labor resources, the application of prices and tariffs, compliance with settlement and payment discipline; establishing a system of regular control and risk assessment; methodological support to management and leading specialists in risk assessment, financial transactions and accounting regulations, transformation and analysis of reporting in accordance with international standards.

At the enterprises there is a need:

- or in the expansion of accounting functions (supplementing its planning, analysis, control, future orientation, organizational link to the process of drafting decisions);

- or in the formation of an additional link of information processing, which uses both accounting and non-accounting data, past data and forecasts, and presents them in the form of possible solutions.

Both areas are reflected in the concepts of financial controlling. The first of these is characteristic of the Anglo-American concept. Management accounting with advanced functions is essentially financial controlling. Therefore, the term "controlling" is not accepted in the United States, it is replaced by the concept of "managerial accounting". The second direction is characteristic of the German concept, which defines controlling as a link between the accounting system and management itself [3].

The organization of management accounting at Ukrainian enterprises was significantly influenced by the peculiarities of domestic business. Today, most medium-sized domestic companies are informal holdings, i.e. a set of organizations that are legally independent of each other (due to reduced risks of aggressive takeovers, creditors' claims, problems with tax authorities, etc.), but actually belong to one owner and are managed by general management.

In order for the owners and managers of the holding to have an objective idea of the work of their company, the company maintains management records, which reflect only real information.

The introduction of controlling in domestic enterprises is due to the need for information support and coordination of the planning system, synchronization of different types of accounting, analysis of deviations and control, internal and external transparency of management decisions, information and methodological support of management, support at the appropriate level of risk management [2].

The functioning of the financial management system is impossible without information support, that is, the presence of a set of processed data on the state of the object. Information resources play an important role in providing information for decision-making and is one of the factors that reduce production costs and increase its efficiency in general.

An important task of the financial controlling service is to improve the system of information flows, change the algorithms for passing documents, and automate the transfer of information.

Corporate Information System

The current level of organization and support of business processes of the enterprise in the system of financial controlling requires prompt processing and further analysis of large amounts of various information. Technical support for solving such tasks is usually carried out using flexible corporate information systems.

Corporate information system (CIS) is a management ideology that combines the business strategy of the enterprise and advanced information technology. It is designed to comprehensively automate the management of all types of economic activities of large and medium-sized enterprises, including corporations, consisting of a group of companies that need a single management. In this case, "corporatism" in the term CIS means compliance with the requirements of a large firm with a complex structure, a large number of interacting components with a hierarchy of subordination of the objectives of their activities to the overall purpose of the system. Information systems of individual divisions of the firm (financial, production, marketing, etc.) can not be corporate. Only a fully functional system can really be described as a CIS.

Corporate information systems allow you to solve the following tasks:

- organize effective planning of all financial and economic activities;

- increase investor confidence through the formation of maximum business transparency;

- reduce risks and increase profits through prompt decision-making and their accuracy, intuitive management system, delimitation of access to information in accordance with the positions of employees, and the implementation of its security functions;

- reduce the loss of working time by eliminating duplication of work by different services and the organization of unimpeded data exchange between departments of the enterprise [4].

Enterprise Resource Planning system

On the basis of modern computer technology in the early 90's of last century, a generation of management systems was created, called ERP (Enterprise Resource Planning, i.e. resource management systems). Such systems make it possible to work on the integrated information field of many remote users, which provides maximum effect in the management of large industries and corporations.

ERP-systems - a set of integrated programs that comprehensively, in a single information space support all major aspects of management - enterprise resource planning (financial, human, material) for the production of goods (services), operational management of plans (including supply, sales, contracts), all types of accounting, analysis of business results.

The main requirements for modern ERP-systems are: centralization of data in a single database, close to real-time operation, maintaining a common management model for enterprises in any industry, support for geographically disparate structures, support for different accounting systems, multiple currencies and languages (which is very important for multinational companies) [5].

The ancestor of the ERP-systems market was the German company SAP AG (Systems Applications Products) with the product R / 3 [4].

1.2 Operational and strategic controlling tools

Depending on the goals, functions performed and tools, financial controlling is divided into strategic and operational. The fundamental difference between these areas is the nature of the objects of strategic and operational planning and, accordingly, control.

Strategic Controlling defines the goals and objectives for operational controlling, i.e. sets a regulatory framework. At the same time, operational controlling realizes its functions in a short period of time - up to a year [6].

Practical tools and principles of strategic controlling

To avoid (or neutralize) strategic problems in the enterprise should be introduced mechanisms of strategic controlling. According to the most authoritative experts in the field of corporate finance and controlling (R. Folkart, P. Horvat, A. Könenberg), strategic controlling appears as a set of functional tasks, tools and methods for coordinating strategic planning and control to ensure long-term financial management, cost and risks. The time horizon of strategic controlling is unlimited.

The most important target of strategic controlling is to ensure the viability of the enterprise in the long run based on the management of existing potential and the creation of additional success factors.

For the developed strategy to be correct, it is necessary to have an information system for early detection of future trends outside the enterprise, i.e. in the surrounding world and within it. External "indicators" should inform about economic, social, political and technological trends. Internal "indicators", which in practice are individual indicators and their systems, are designed to inform management about the current "health and well-being" of the

enterprise, as well as to predict crisis situations at the enterprise as a whole or in certain areas of its activity.

First of all, we are talking about methods of analyzing competition, markets, product life cycle, strengths and weaknesses of the enterprise, prospects for product diversification, taking into account the dynamics of capacity and market share.

Accordingly, the tools of strategic controlling are presented in Table 1.1

Table 1.1 - Practical tools and principles of strategic controlling

№	Tool	Contents
1	SWOT analysis	Analysis of strengths and weaknesses of the company, opportunities and threats
2	GAP analysis	A quantitatively oriented strategic method that allows you to establish the deviation of the desired state of production from the expected
3	Portfolio analysis	Analysis of the distribution of enterprise activities by individual strategies in relation to products and markets
4	Analysis of enterprise potentials	Identifying the potentials of the enterprise that can be used for a long time to achieve additional profit
5	Analysis of the product life cycle concept	Correct definition of a business strategy for each stage of the life of a product on the market
6	Analysis of the location of the enterprise	The method of assessing an enterprise when choosing its location, assessing the main positions of an operating enterprise
7	BCG Analysis	Determination of the present and future position of the business by determining the ratio of the market share owned by the enterprise to the market share owned by competitors
8	McKinsey 7C model	The method of researching enterprise development by factors: strategy, sum of skills, system, etc.
9	Pilot method	Assessment of the market potential of the company as a result of discussion of a number of issues of varying complexity: from the mission of the enterprise to individual product projects

* complied by the author based on [7]

For example, the practice of applying the SWOT analysis methodology has proven its exceptional to be extremely effective as a way to assess the state of a problematic management situation in an organization. The consultants recommend that you conduct a SWOT analysis of the organization's activities on a regular basis, at least once a year, using your own resources.

In addition, when conducting strategic analysis, one of the important issues is the company's future product portfolio. It is necessary to understand what these areas of activity will be, how they will be financed and what will be their positioning in the future. Therefore, when developing a strategy, it is recommended to use one of the standard techniques:

• matrix of Boston Consulting Group (BCG);

• the McKinsey matrix.

In accordance with these methods, all areas of the company's activities are positioned in the coordinates: the attractiveness of the market and the competitive status of the company in this market.

The BCG matrix uses the hypothesis that each of these metrics can be assessed using a single dimension. The market growth rate is used to assess the attractiveness of the market, and the market share occupied by the company is used to assess the competitive status of a company in this market.

The McKinsey Matrix uses a more sophisticated methodology for assessing attractiveness market and the company's competitive status in these markets. It can be used in both growing and stagnant markets. This is the main difference between the BCG matrix and the McKinsey matrix.

In strategic controlling, the results of the analysis are used at all stages and can influence the change in the direction of activity, on their basis the goals of the organization (and subsequently the strategy) are determined.

Practical tools and principles of operational controlling

Operational controlling is focused on short-term results, therefore its tools are fundamentally different from the methods and techniques of strategic controlling (Table 1.2).

Operational controlling is a control and information system aimed at ensuring the achievement of the company's current goals, primarily profitability and liquidity. The need to assess the ongoing business processes, analysis and an attempt to look into the future require the development of appropriate indicators in the form of quantitative indicators.

Table 1.2 - Practical tools and principles of operational controlling

	Tool	Contents
1	Analysis of production break-even	Analysis of the level of product sales, at which the activity of the enterprise remains profitable
2	Relative metrics system	Allows you to see the structure of changes in the enterprise, in its divisions, deviations occurring in the course of production activities and their causes
3	ABC analysis	Knowledge of detailed process information for cost estimation and performance management
4	CVP analysis	Analysis of the cost / volume / profit ratio
5	Enterprise budgeting system	A tool for managing income, expenses and liquidity of an enterprise

* complied by the author based on [7]

It is the use of operational controlling tools that prevails at domestic enterprises, since until recently, many domestic companies had the main goal of their activities to maximize profits "here and now", respectively, all management efforts were concentrated in the field of operational activities. The controller's job is to transform this mass of data into useful information for decision making.

German economists view operational controlling as a "noise control" system; ongoing identification, analysis and elimination of interference in the operation of the enterprise.

Operational controlling is understood as the procedure for day-to-day control of phenomena and processes in the activities of the holding, as well as their changes and deviations from the plan. This type of controlling is used for the timely identification and measurement of the influence of various factors on the dynamics of financial indicators, diagnostics of their causes and timely adoption of optimal management decisions to maintain the financial stability of the enterprise [6, 7, 8].

1.3 Information support of financial controlling at the enterprise

The main role in management is played by the operational exchange of data, which takes up to 60% of the time of the controlling specialist. Experts, when making decisions, face the

problem of studying and generalizing the whole set of factors on which the coordinated functioning of the system analyzed by them depends. In this regard, various information technologies have become widespread and are used, which allow to make optimal management decisions regarding the operation of the enterprise. Comprehensive and in-depth use of various information technologies allows you to send documents within the organization, send, receive and process messages from different workplaces, hold meetings of experts who are at a considerable distance from each other, and all for the operational possession of strategically important information.

The purpose of informatization of the financial management controlling system is to provide management with information about the current state of affairs and to predict the consequences of changes in the internal or external environment.

Based on the outlined, the main requirements for the information system to ensure the management process and the controlling system in particular are:

- minimize requirements to the user and source of information;

- have the elasticity and ability to change in accordance with the requirements without changing the qualitative basis;

- be unified and understandable for managers of different levels and different subsystems;

- be characterized by completeness and reliability in the transfer of data and information.

In order to build an effective system of controlling in the context of financial management, it is necessary to clearly understand the role and place of controlling in the management of financial institutions, it depends on the amount and completeness of information we receive [9].

Based on the European (German) approach to understanding the controlling system as management accounting, and summarizing other approaches to interpretation on Picture 1.1 defines the place of controlling in the general management system.
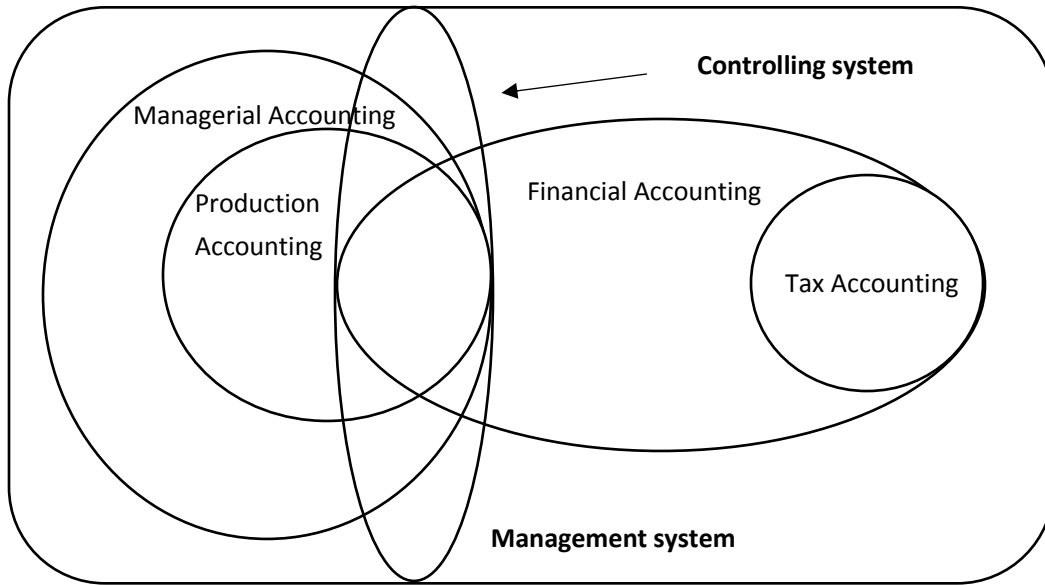
Picture 1.1 - The place of controlling in the management system

*complied by the author based on [9]

2 Information technologies of corporate financial management: theory and practice

2.1 Functionality and capabilities of modern software in the field of financial management

The information system of financial controlling should provide the necessary information to the management staff and owners of the enterprise, to satisfy the interests of a wide range of external users.

Formation of the information base of financial controlling at the enterprise is a process of purposeful selection of the corresponding economic indicators focused on acceptance of strategic decisions and effective current management of financial activity. The formation of a system of informative indicators of financial management for a particular enterprise is associated with its industry characteristics, organizational and legal form, volume, degree of diversification of economic activity and other factors.

The main users of financial information are:

- internal users - use the external information base of financial management of the enterprise, supplementing it with internal information and information that is a trade secret.

- external users - they use mainly information about the results of financial activities of the enterprise and its financial condition. Most of this information is contained in the financial statements of the enterprise;

The main users of financial information

Internal users
- Heads of enterprises
- Financial managers of all levels
- Owners (shareholders) of enterprises
- Other internal users

External users
- Creditors of the enterprise
- Potential investors
- The company's counterparties for operating activities
- Tax authorities
- Audit firms
- Financial advisers and experts involved from the outside
- Stock exchange (during the quotation of securities issued by the company)
- Other external users

Picture 2.1 - Characteristics of the composition of the main users of the financial information of the enterprise *Complied by author based on [10]

The formation of the information base of financial controlling has the following basic requirements: significance, completeness, reliability, timeliness, clarity, relevance, comparability, efficiency.

The set of indicators included in the information base of financial controlling can be grouped by type of information sources.

The first group includes indicators that characterize the general economic development of the country. These include indicators of macroeconomic development, containing informative data used in the financial management of the enterprise. This group includes the following indicators:

- the value of gross domestic product and national income;

- cash income of the population;

- volume of money issue;

- deposits of the population in banks;

- inflation index;

- discount rate of the central bank, etc.

The formation of indicators of this group is based on the publication of state statistics.

The second group includes indicators that characterize the industry affiliation of the enterprise. The system of indicators of this group contains informative materials of the industry, necessary for making managerial decisions on operational financial activities. This group includes the following indicators:

- volume of produced (sold) products and its dynamics;

- the total value of the assets of the enterprise, including current;

- the total amount of capital used, including equity;

- the amount of balance sheet profit of the enterprise, including the main (operating) activities;

- product price index, etc.

The source of formation of indicators of this group is the publication of reporting materials in the press, relevant ratings, etc.

The third group includes indicators that characterize the state of the financial market. This information is necessary for making management decisions on the formation of a portfolio of long-term financial investments, short-term investments and other operations. This group includes the following indicators:

- types of quoted main stock instruments (stocks, bonds, etc.) traded on the exchange and over-the-counter stock market;

- quoted prices of supply and demand of the main types of stock instruments;

- prices and volumes of transactions in the main types of stock instruments;

- free index of price dynamics in the stock market;

- deposit and credit rates of commercial banks;

- official exchange rates of individual currencies;

- buying and selling rates of individual currencies on the interbank currency exchange and commercial banks, etc.

The sources of formation of the system of indicators of this group are the data of commercial publications.

The fourth group includes indicators formed from internal sources in the enterprise. The system of indicators of this group is the basis of the information base of financial management. These data are the basis for analysis, forecasting and operational management decisions in all areas of financial activities of the enterprise. This group includes the following data:

- indicators that characterize the financial condition and results of financial activities of the enterprise as a whole;

-indicators that characterize the financial results of individual structural units of the enterprise;

- regulatory and planning indicators related to the financial development of the enterprise.

The advantage of this group's indicators is their unification, regularity of formation, high degree of reliability, which is determined by the appropriate status of financial statements and generalized financial indicators calculated on its basis [11].

2.2 Comparative analysis of the ERP systems market

Microsoft Dynamics vs. SAP Alternatives

Each criterion was chosen for the discussion of Microsoft Dynamics against SAP, as each of them relates to the areas where the greatest obstacles are most often encountered when adopting any new system. For example, how much software costs affects cash flow, at least in the short term. Similarly, if functionality is limited and the volume of your operations is wide, ERP fails no matter how much you invest in terms of time, effort and money. With this in mind, we will discuss each parameter in more detail below.

Microsoft Dynamics vs. SAP - Overview

Generally speaking, SAP vs. Microsoft Dynamics is best for retail users because it has the right custom product development features as well as reliable quality control functionality. In addition, it offers practical tools for cash management and accurate mapping of goods on the go. However, it is less intuitive and less customizable than AX. Although implementation for SAP is faster and it suffers from fewer service outages, these disruptions tend to last longer.

On the other hand, Microsoft Dynamics AX vs. SAP is relatively more flexible and easier to use. The user interface is browser-based, therefore, more intuitive than SAP, with strong support for interoperability. Dynamics also offers reliable manufacturing, MRP, and trading capabilities through powerful Business Intelligence integration (mostly thanks to Microsoft Power BI).

First, you need to consider some interesting features of both SAP and Microsoft Dynamics systems in order to choose the most suitable ERP for business. Although the question of the best ERP system is still open, a quick comparison of their key characteristics will help determine the right solution for the business. But, first of all, it is necessary to briefly introduce both of these players in the ERP market.

Microsoft Dynamics

Microsoft has developed and maintains Dynamics for finance and operations. This system is really the best and is low cost and easy to implement compared to SAP and other systems. It is built on Microsoft's robust infrastructure and can be easily integrated with many Windows business applications, such as GoToMeeting, TouchMail and OneNote. The simple appearance and the short amount of time it takes to learn it are also an advantage of Microsoft Dynamics. However, Microsoft Dynamics requires many different programs to provide the full

interface as in SAP. One of Microsoft's key positions is to pay only for the right items, but experience has shown that this is often a mistake when the initially low cost of subscription increases rapidly depending on business requirements. This is completely different from SAP, where all modules are included in the starting price, which means no future cost surprises.

SAP

SAP is undoubtedly the market leader in ERP software. With more than 232,000 customers and revenue of 16.22 billion euros, SAP has proven to be the perfect ERP for organizations. SAP ERP can meet the diverse business needs of multinational corporations and small and medium enterprises. Although slightly more expensive than other ERP systems, SAP is the best solution for companies looking for consistent and advanced ERP software. SAP is easy to implement, and third-party solutions are easy to customize in software.

Table 2.1 - Comparative analysis between Microsoft Dynamics and SAP

Company	Microsoft Dynamics	SAP
Address	Redmond, Washington, USA	Waldorf, Germany
Site	https://dynamics.microsoft.com/	https://www.sap.com/
Supported platforms	stationary, mobile, cloud	stationary, mobile, cloud
Ease of Use and Functionality	Many flexible features with user-friendly, web-based user interface (UI)	Standardized features but with complicated UI
Cost and Pricing	Starting from $8 with options for monthly and one-time payments. Also, quote based	Quote based
Implementation and Integration	Performs best when integrated with other Microsoft apps. Third-party integrations are limited but amazon, Shopify, magento connectors would be useful.	Integrate with most third-party and SAP applications
Customer Service	Full support including training	Full support without training

Company	Microsoft Dynamics	SAP
Solutions for small and medium businesses, startups	YES	YES
Solutions for large enterprises	YES (corporate version)	NO

* complied by the author based on [12, 13, 14, 15]

Comparison of features between SAP and Dynamics

In a competitive business environment, you need to consider the features and functionality of ERP software. You need to choose an ERP system that simplifies the process through workflow management, and that provides reports and meets different business needs.

When it comes to small and medium enterprises, it is proven that SAP B1 has a clear direction and, unlike Dynamics 365, provides control and flexibility, while maintaining the needs of the enterprise. Moreover, the price of Dynamics 365 has changed several times since its release, and yet the price is still volatile. An ERP solution can affect a business in the long run, as well as increase its value if the ERP solution fails to deliver the desired goals.

A useful list of SAP and Microsoft Dynamics features to help evaluate both platforms.

• **SAP**: sales reporting, business intelligence module, sales and human resources module, inventory management module, production and purchasing module, accounting module. Moreover, SAP is highly scalable and provides a wide range of applications to meet the ever-changing needs of growing businesses.

• **Dynamics**: Budgeting and forecasting, basic accounting, time and cost tracking, and fund accounting are some of the key features of Dynamics. This application has many languages and offers fast information transfer. But then support for Microsoft Dynamics with different platforms is limited, and it is difficult to integrate with tools other than Microsoft.

SAP software may be the best choice for small and medium businesses and startups, while large companies may choose Microsoft Dynamics. But then SAP has an advantage over Dynamics, thanks to regular updates to the new version of the platform [12, 13, 14, 15].

2.3 Cost-effectiveness of Information Technology investments: methods and estimates

Business informatization is a process of constant improvement not so much of the information systems themselves as of management as a whole. Therefore, to assess investment in the automation of the company, it is important to know the success factors and risk factors of such projects, it is important to balance the cost of the information system and the benefits in terms of financial and organizational prospects. The level of such knowledge will ensure the effectiveness of investments in information technology and business in general.

To assess the economic efficiency of investments in IT, the following models can be applied:

- assessment of the Total Cost of Ownership of information systems (TCO);

- assessment of Return on Investment (ROI);

- standard methods for assessing the economic efficiency of investments (return on investment);

- return of assets;

- shareholder price;

- assessment of one-time costs for the implementation and purchase of software and hardware systems.

Assessment of the total cost of ownership of IS

The concept of total cost of ownership for IT was pioneered by the Gartner Group in the late 1980s (1986-1987). TCO is a key indicator of information technology and information systems (IS) in a company, as it allows you to estimate the total costs of IT, analyze them and, accordingly, manage IT costs to achieve the best return.

The total cost of ownership of IT is one of the most important criteria when considering future projects, as it determines their economic feasibility.

The main purpose of calculating this indicator, in addition to identifying excessive expense items, is to assess the possibility of returning funds invested in information technology.

In this case, the key point is to compare the TCO of your enterprise (for example, in terms of one user of the system) with the TCO of other companies of a similar profile. It is often quite difficult to assess the direct economic impact of IT (that is, the profit from their implementation). By comparing the TCO indicators, the IT manager can prove to the

company's management that the economic indicators of the project are not worse than the industry average, or even better.

Such comparisons are usually made with industry-average peers and with the "best in the group". Even if the direct economic effect of IT implementation is determined, it must always be compared with the cost part, that is, with the TCO.

The TCO model is based on two categories of costs: 1) direct (budgetary); 2) indirect.

There are two groups of sources of indirect costs associated with the use of IT.

The indicator of the total cost of ownership of IS is calculated by the formula:

$$TCO=Dc+Ic^1+Ic^2 \tag{2.1}$$

Where,

Dc - direct costs;

Ic^1 - indirect costs of the first group;

Ic^2 - indirect costs of the second group.

Wherein:

$$Dc=Dc_1+Dc_2+Dc_3+Dc_4+Dc_5+Dc_6+Dc_7+Dc_8 \tag{2.2}$$

Where,

Dc_1- capital expenditures;

Dc_2 - IT management costs;

Dc_3 - expenses for technical support of hardware and software;

Dc_4 - expenses for the development of application software by internal forces;

Dc_5 - outsourcing costs;

Dc_6- travel expenses;

Dc_7- expenses for communication services;

Dc_8- other groups of expenses.

TCO must not only be calculated when considering a new project, but also constantly monitored in the future.

The total cost of ownership of information technology is a qualitative key characteristic that reflects the economic aspects of the state of IT in a company and shows the effectiveness of their work.

Assessment of return on investment

The ROI model is owned by the Gartner Group and calculates the return on investment in enterprise infrastructure. The analysis of this indicator is seen as a way to demonstrate the need for investment in information technology.

To assess the revenue side, as a rule, they first analyze those areas of business, those goals that need to be achieved by introducing an information project or with the appearance of some new products that provide fundamentally new information. They take measurable business indicators (for example, reducing operating costs, maintaining a competitive state, improving internal control) and make estimates of the effect based on them. Further, according to the methodology, the return on investment in the infrastructure of the enterprise is calculated by the formula:

$$ROI = Ef/I \tag{2.3}$$

Where,

Ef - the effect of IT implementation;

I - investments in IT.

Western companies use TCO as an expenditure side and ROI as a calculated one.

Standard Methods for Assessing the Cost-Effectiveness of Investments

In this case, investments in information technology are viewed not as costs, but as investments in the core business. Accordingly, the same tools and procedures are used to assess economic efficiency as in any investment project.

All standard methods for assessing the economic efficiency of investments can be subdivided:

1) simple methods:

- method of calculating the payback period of investments;

- method of calculating the investment efficiency ratio

2) discounting methods:

- method of calculating the net present value;

- method of calculating the return on investment index;
- method of calculating the rate of return (profitability) of investments [16].

Accounting Rate of Return (ARR) is calculated by the formula:

$$ARR = \frac{Incremental\ Accounting\ Income}{Initial\ Investment} \tag{2.4}$$

Where,

Incremental Accounting Income is equal to the additional revenue from the asset minus the incremental operating expenses. The latter also includes asset depreciation;

Initial Investment is an amount of investment initially required to purchase the asset[17].

Net Present Value (NPV) is calculated by the formula:

$$NPV = -IC + \sum_{i=1}^{n} (CF_i/(1+r)^i) \tag{2.5}$$

Where,

NPV - the net present value of the investment project;

CF - cash flow;

r - the discount rate;

n - the total number of periods (intervals, steps) i = 0, 1, 2,…, n for the entire investment period [18].

Return on assets

According to Gartner Group forecasts, such a model will be relevant in the near future. The information system is viewed as an enterprise asset that must bring a certain return. The efficiency of capital use is assessed based on the alternative rate of return (for example, the information system gives a higher return than investing in high-yield stocks). To do this, the ratio of the excess of the IT return rate over the alternative rate of return is calculated using the formula:

$$C = Rr^{it}/Rr^{alt} \tag{2.6}$$

Where,

C - coefficient of excess of the IT rate of return over the rate of alternative profitability;

Rr^{it} - IT rate of return;

Rr^{alt} - alternative rate of return.

Shareholder's "price"

This method is promising for industrial applications. In the near future, the value of company shares and the attraction of new shareholders will be determined by the company's qualifications in e-business and the widespread use of all IT services offered by the market. The owners of the company will evaluate investments in information technology and IT services as investments in increasing the capitalization of their companies. Then it will become relevant to assess the cost effectiveness in terms of attracting one shareholder and increasing the value of shares. For these purposes, the calculation of the efficiency of investments in IT for attracting one shareholder and the growth rate of the share price is performed according to formula:

$$Ef^{shar}=Ef/(Q_1{}^{shar}-Q_0{}^{shar}) \qquad (2.7)$$

Where,

Ef^{shar} - efficiency of investments in IT to attract one shareholder;

Ef - the effect of IT implementation;

$Q_0{}^{shar}$ - the number of shareholders before the introduction of IT;

$Q_1{}^{shar}$ - the number of shareholders after the introduction of IT;

Assessment of one-time costs for the purchase and implementation of software and hardware systems

Despite all the efforts of analysts, consultants and specialized publications, most entrepreneurs and managers in domestic countries are still interested only in these costs.

Visible costs include the following cost groups:

- capital costs (for hardware and software);
- IT management costs;
- expenses for technical support of hardware and software;
- expenses for the development of application software by internal forces;
- outsourcing costs;
- travel expenses;
- expenses for communication services;

- other groups of expenses.

The main motive for making a purchase decision is the cost of the supplier's proposal, i.e. visible costs. For these purposes, one-time costs for the purchase and implementation of software and hardware systems are calculated according to the formula:

$$C^{one-t}=\sum C_i^v \to min \qquad (2.8)$$

Where,

C^{one-t} - one-time costs for the purchase and implementation of software and hardware systems;

C^v_i - visible costs of the i-th group.

The choice of methods for such an assessment is made through determining the level of organizational maturity of the corporation.

To assess organizational maturity, companies use the classification proposed by the American SEI (Software Engineering Institute) and Carnegie Mellon University, which determines the level of development of the company depending on the degree of use of target management [16].

Table 2.2 - Methods for assessing the economic efficiency of investments in IT

Method name	Input parameters	Output parameters	Formulas for calculating impressions	Maturity stage
Assessment of the total cost of ownership of IP (TCO)	Direct costs; indirect costs	TCO indicator	$$TCO=Dc+Ic^1+Ic^2$$	3 specific, 4 controlled, 5 optimized
Assessment of return on investment (ROI) in enterprise infrastructure	The effect of IT implementation; IT investment	ROI indicator	$$ROI=Ef/I$$	3 specific, 4 controlled, 5 optimized
Standard methods for assessing the economic efficiency of investments	Primary investment; annual income; net profit; balance asset; liquidation value; the net profit of the enterprise; balance asset; desired income level; the amount of receipts by years; distribution of investments by years	Accounting rate of return Net present value	$$ARR=Pr/(1/2)\times I_{aver0}$$ $$NPV=-IC + \sum_{i=1}^{n} (CF_i/(1+r)^i)$$	5 optimized

Method name	Input parameters	Output parameters	Formulas for calculating impressions	Maturity stage
Return on assets	IT rate of return; alternative rate of return	Ratio of excess of the IT rate of return over the alternative rate of return	$$C = Rr^{it}/Rr^{alt}$$	5 optimized
Shareholder price	IT investment efficiency; number of shareholders before IT implementation; number of shareholders after IT implementation; the cost of the action before the introduction of IT; the cost of the action after the implementation of IT	Efficiency of investments in IT for an additionally attracted shareholder growth rate of the share price	$$Ef^{shar} = Ef/(Q_1^{shar} - Q_0^{shar})$$	5 optimized
Assessment of one-time costs for the purchase and implementation of software and hardware systems	Visible costs	One-time costs	$$C^{one\text{-}t} = \sum C_i^{v} \rightarrow min$$	1 initial, 2 repeatable

*complied by author based on [16, 17, 18]

Maturity stage:

Level 1 - Initial (Anarchy).

Level 2 - repeatable (folklore).

Level 3 - specific (standards).

Level 4 - controlled (measurable).

Level 5 is optimizable [16].

For greater clarity, the methods discussed above are summarized in the table 2.2.

3 Suggestions and recommendations for improving corporate management technologies at the enterprise

3.1 Analysis of world experience and Ukraine in the implementation of ERP systems in the field of financial management of enterprises.

The global corporate systems market is dominated by North America and Europe. Asia-Pacific and Latin America remain significant market segments, with rapid growth. The World Economic Forum uses a point rating scale to analyze the countries of the world on the use of information technologies: a country in which corporations do not master new technologies at all has a rating of 1 point; countries where it is customary to widely master new technologies - 7 points. Analysis of the countries of the world in the development of information technologies and their use in corporate governance in 2016 led to the conclusion that Iceland (6.2 points) and Japan, the USA and Norway (6.1 points each) are the leaders in the implementation of information technologies (Picture 3.1). According to the World Economic Forum, Ukraine ranks 100th among 139 countries being studied (4.2 points) [19].
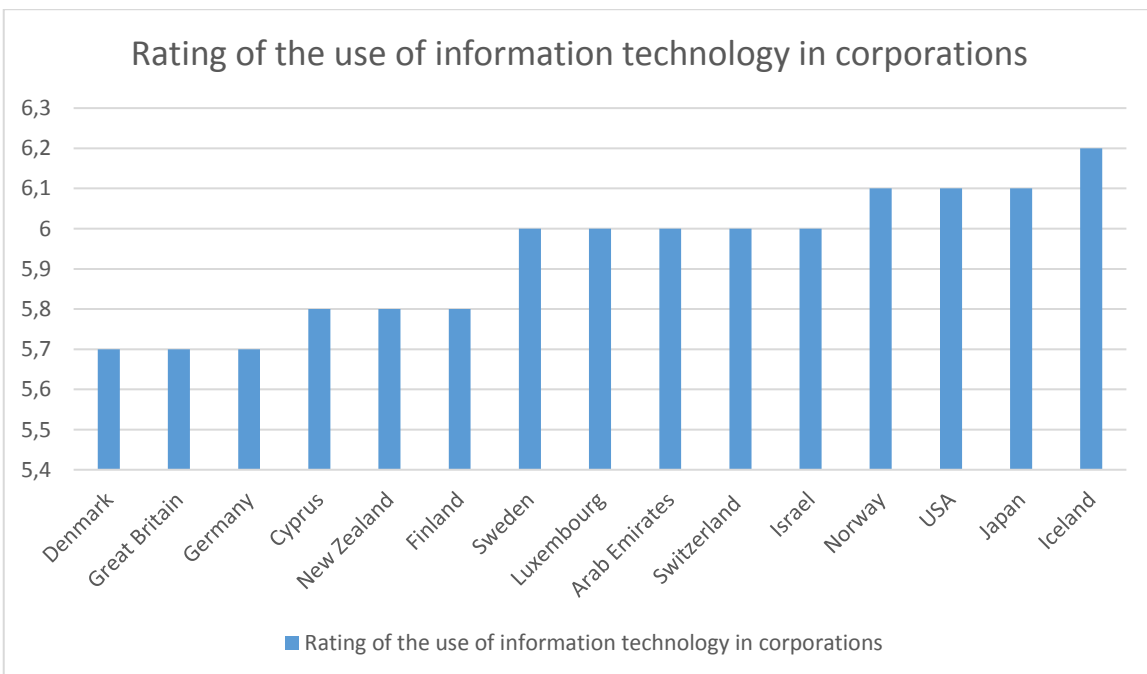
Picture 3.1 - Rating of the use of IT in corporations

*complied by author based on [19]

The main purpose of ERP - is the integration of all departments and functions of the company into a single system that can serve the specific needs of individual departments of the company. To do this, a typical ERP system uses many different software and hardware components, modules [20].

Panorama Consulting Solutions [21] conducted a survey of 215 respondents who assessed the main objectives of the implementation of modern information systems for planning and use of resources. This study found that about 80% of respondents belong to companies that have already implemented or are still implementing information systems, and 14% are still in the process of finding effective software.
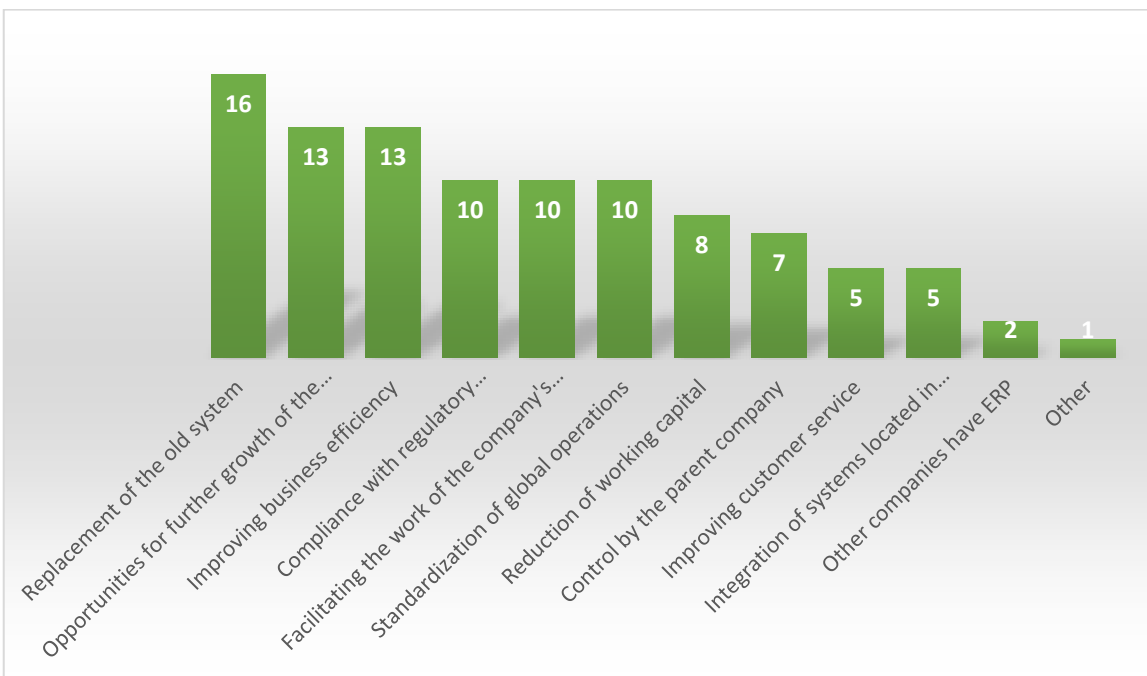
Picture 3.2 - The main objectives of the implementation of modern ERP-systems
*complied by author based on [20]

On picture 3.2 the main goals of enterprise implementation of modern ERP-systems are given. As you can see, among the main reasons for the introduction of ERP-systems were identified: the replacement of the existing - the old system, the need to improve business efficiency and find new ways to further business growth through information systems. In addition, it was noted that the reasons for the introduction of new information systems are: global economic processes, which necessitate the standardization of global operations.

The study found that more than 50% of ERP system implementations were rated as successful by respondents, while about 7% - on the contrary - did not live up to expectations.

When choosing a new ERP-system, the company's management uses such criteria as: the best set of implemented functions (46%), the optimal price-quality ratio of the proposed system, etc. [20].

The main reasons for the failed implementation of corporate information systems, as noted by solution providers, are primarily as follows:

- the company's unwillingness to change;
- insufficient level of managerial knowledge of the customer's management specialists;
- no real need for the system by the customer;
- only own automation department is responsible for implementation;
- blurred goals and objectives of the project, unclear formulation of customer needs;
- lack or weak support of the project by the company's management;
- budget reduction during implementation [22].

Among the main players in the market of modern ERP-systems should be noted such companies as: SAP, Oracle, Microsoft and others.

The management of the companies that participated in the survey was asked to choose from the proposed list of companies that they would choose as a supplier of ERP-systems [20]. In the table. 3.1 shows the results that reflect the frequency of selection and brand recognition among companies - suppliers of ERP-systems.

We can conclude that SAP, Oracle and Microsoft have experienced distributors, huge advertising budgets and benefit from the popularity of their brands in the ERP market.

Table 3.1 - Dynamics of project implementation costs

ERP implementation costs	Number of respondents,%
Spent less than planned	12
Within the budget	35
Exceeded the budget	
Up to 25 %	31
26-50 %	16

ERP implementation costs	Number of respondents,%
51-75 %	4
Over 76 %	2

*complied by author based on [21]

The market for management systems is quite wide, but more and more large enterprises prefer the management system SAP R / 3 ERP.

For example, SAP R / 3 is installed in the following companies: Chevron, Colgate, Palmolive, COMPUSA, Deutsche Telekom AG, Eastman Chemical, ENI SPA, Fiat SPA, Minolta, Mott's, Pirelli SPA, Robert Bosch GMBH, Royal Philips Electronics, Security National Servicing, Siemens AG, Sony, Statoil, Telecom Italia SPA and Volkswagen AG.

SAP customers include well-known companies such as BMW, Mersedes-Benz AG, Adidas, General Electric, Philips, IBM, Telecom AG and many others.

When choosing to optimize processes in the enterprise in favor of the SAP ERP system, managers face a number of problems, but gain significant advantages in managing their own business.

Among the Ukrainian enterprises that have implemented SAP ERP, it should be noted: National Bank of Ukraine, "Fast-Ukraine", Azovstal, Ukrtatnafta [23].

3.2   Enterprise characteristics: Case study LLC "MEDSOYUZ+". Alternatives of ERP-system implementation

The medical center MedSoyuz includes a clinic, a pharmacy, its own clinical diagnostic laboratory, a hospital with a high level of epidemiological safety and an equipped operating unit. The headquarters of employees is about 250 people.

The multidisciplinary medical center MedSoyuz was established in 2007 and is constantly expanding by introducing not only medical equipment using the latest technologies, but also more modern IT products. At the moment, working on the MEDUCHET SKL and 1C program, in connection with the expansion of the business, the transition to other computer

programs with more advanced functionality is being considered, namely the transition to the Dock Dream medical program and controlling the enterprise in the field of accounting, logistics using a software product with broader functionality.

Alternatives of ERP-system implementation

Given the successful global experience of implementing ERP-systems, we can offer to implement such at the company LLC "MEDSOYUZ +". To do this, we need to determine how the implementation will be carried out, namely to find the most effective option. There are the following alternatives:

- Development of own software (Project A)

The company can hire employees who can create a set of software for each structural unit of the company. This choice will take more time, will create additional costs for the creation of the development department, but will be cheaper in cost and specialized in a particular enterprise.

- Purchase of software (Project B)

The company that chooses to buy the software must be willing to pay a large amount of money to obtain this product. If the company does not have enough own funds, it will have to attract investors or take loans.

However, by purchasing the software, the company will be able to implement an ERP system much faster, as well as free itself from development costs and subsequent current rental costs.

- Software rental (Project C)

Software rental is a payment for used licenses on a monthly basis. This will allow the company not to make capital investments in the purchase of software, but to include the cost of rent in operating costs. The advantages also include the ability to quickly scale with active business growth, in cases of seasonal peaks or when reducing activity.

The cost of owning an ERP system consists of the price of licenses and services for its implementation. In general, the cost depends on the number of employees working in the program and the level of user licenses. Company management and accounting need full licenses to access all analytics and financial indicators. And for other workers, to do their job, enough limited licenses, which are cheaper.

As defined earlier, the most popular and reliable software for enterprise information systems of the ERP class is SAP R / 3 ERP.

Therefore, in the case of purchase or lease, we choose it.

We will analyze the attractiveness of projects A, B and C in order to identify the most expedient option for us to implement at MEDSOYUZ + LLC.

Attractiveness analysis [24] evaluates the project taking into account the consistency of the results of this project with the strategy and development of the company. The potential efficiency of the project is determined taking into account the possibility of achieving the set goals as a result of the project. Thus, projects are screened out according to the criterion of the project's inconsistency with the tasks that are being solved by the enterprise.

Let us consider the methodology for assessing the economic attractiveness of a project in stages.

At the first stage, development goals are established and their priority is determined. As criteria for comparing projects, we can choose the following:

- the necessary costs for 1 workplace;
- making a profit by the company after the implementation of the project;
- the profitability of the project.

After highlighting the priority criteria, they should be ranked, determining the value of the specific weight of each criterion in the value of the overall attractiveness.

The second stage of evaluation is the calculation of the quantitative value of the previously established criteria. It measures the degree to which the project contributes to the achievement of the set economic development goals. The data needed to determine these indicators are taken from the financial statements submitted after the financial analysis of the project.

As a basis for calculations, we use the analysis of the total cost of ownership of the ERP system that was determined by expert method.

One of the most important criteria for evaluating an investment project is the discount rate.

The discount factor of cash flows is a numerical indicator that can be used to understand how much money can be received after a certain time, taking into account the time factor and possible risk. Thus, the future money flows are brought to the state of the day of analysis.

We calculate the discount factor for each project using the formula:

$$DC = 1/(1+R)^n \qquad (3.1)$$

wherein:

DC - discount coefficient;

R - the established value of the discount rate;

n - the number of periods (steps), representing the number of years from the future to the current moment [25]. In our case we took a period of 10 years.

Table 3.2 - Discount factor for each project (Basic version, A, B, C)

		1	2	3	4	5	6	7	8	9	10
0,20	1,00	0,83	0,69	0,58	0,48	0,40	0,33	0,28	0,23	0,19	0,16
0,28	1,00	0,78	0,61	0,48	0,37	0,29	0,23	0,18	0,14	0,11	0,08
0,24	1,00	0,81	0,65	0,52	0,42	0,34	0,28	0,22	0,18	0,14	0,12
0,27	1,00	0,79	0,62	0,49	0,38	0,30	0,24	0,19	0,15	0,12	0,09

 * complied by author

The resulting indicator is always less than one. It shows the value of one invested monetary unit after a certain time, subject to the conditions of those accepted for the calculation.

The most important component for calculating the coefficient is the discount rate. For its definition, there are a number of techniques. For our calculations, we have chosen the cumulative method.

The difference between income minus outflow for each year is multiplied by the discount factor. And the discount factor assumes a different discount rate for each project due to the fact that each project has its own specific risk when introduced to the enterprise.

The discount rate includes the rate of return, inflation compensation and risk premium. Considering that the risk of implementation of each project is different, therefore, the premium is different.

It has been established by expert method that projects of this class have a certain risk, therefore, we believe that this risk premium leads to a change in the interest rate precisely because of the risk factor. Because the risk premium is part of the interest rate structure.

To make it easier to calculate and compare projects A, B and C, we will start from the basic data listed in table 3.3

Table 3.3 - Basic version

	0	1	2	3	4	5	6	7	8	9	10
Income	0,0	4832,0	5147,7	5207,0	5941,5	5494,6	6542,8	6836,4	7332,0	7451,9	7301,4
Costs (outflow)	0,0	2987,7	3129,0	3285,6	3834,6	3305,5	4180,8	4420,7	4803,7	4781,0	4703,0
Net Cash Flow	0,0	1844,3	2018,7	1921,4	2106,9	2189,1	2362,0	2415,7	2528,3	2670,9	2598,3
Discounted Net Cash Flow	0,0	1536,9	1401,9	1111,9	1016,1	879,7	791,0	674,2	588,0	517,6	419,6
Cumulative Discounted NCF	0,0	1536,9	2938,8	4050,7	5066,8	5946,5	6737,5	7411,7	7999,7	8517,3	8937,0

* complied by author

To calculate the costs of project A, add the software development costs. To do this, we need to exclude the cost of acquiring licenses in the amount of UAH 3,2 million and create a department that will carry out this area of work, namely, hire design managers (2 people) with a salary of UAH 10,520, IT developers (2 people) - UAH 20,833, testers (2 people) - UAH 15,416, administrators (2 people) - UAH 10,520.

The calculations of development costs are given in Table 3.4

Table 3.4 - ERP system software development costs (first year)

Category	Unit	Measuring amount
Development. Direct costs		
Annual salary costs by areas of development:		-0,17
Design	Million, UAH	0,23

Category	Unit	Measuring amount
Development	Million, UAH	0,52
Testing	Million, UAH	1,260
Documentation	Million, UAH	1,440
Total development costs	Million, UAH	1,375
Annual costs of consulting	Million, UAH	0,54
Total annual development costs	Million, UAH	1,745

* complied by author

The remaining direct and indirect costs will remain unchanged

Table 3.5 - Project A "Development of own software", thousand UAH

	0	1	2	3	4	5	6	7	8	9	10
Income	0,0	4832,0	5147,7	5207,0	5941,5	5494,6	6542,8	6836,4	7332,0	7451,9	7301,4
increase in revenue by speeding up order processing	0,0	241,6	360,3	624,8	713,0	934,1	1308,6	1367,3	1833,0	1863,0	1825,3
increase in revenue due to software specialization at this enterprise	0,0	9,7	20,6	31,2	41,6	49,5	65,4	1025,5	2199,6	2980,8	3650,7
Costs (outflow)	0,0	2987,7	3129,0	3285,6	3470,6	3003,5	3826,8	4054,7	4423,7	4423,0	4341,0
Consulting services	0,0	540,0	270,0	250,0	20,0	20,0	20,0	20,0	20,0	20,0	20,0
Additional salary costs of the project team	0,0	1375,0	1200,0	700,0	15,0	15,0	15,0	15,0	15,0	15,0	15,0

	0	1	2	3	4	5	6	7	8	9	10
Savings (reduction of thefts and shortages)	0,0	-170,0	-160,0	-160,0	-170,0	-170,0	-170,0	-170,0	-170,0	-170,0	-170,0
Software testing and optimization services	0,0	0,0	0,0	0,0	0,0	37,0	37,0	37,0	0,0	0,0	0,0
Net Cash Flow	0,0	350,6	1089,6	1787,5	3360,5	3572,6	4188,0	5272,4	7075,8	8007,7	8571,4
Discounted NCF (i=28%)	0,0	273,9	665,0	852,3	1251,9	1039,8	952,2	936,6	982,0	868,2	726,0
Cumulative Discounted NCF	0,0	273,9	938,9	1791,3	3043,1	4082,9	5035,1	5971,7	6953,7	7821,9	8547,9
Discounted NCF (i=20%)	0,0	292,1	756,7	1034,4	1620,6	1435,7	1402,6	1471,4	1645,6	1551,9	1384,3
Cumulative Discounted NCF	0,0	292,1	1048,8	2083,2	3703,8	5139,6	6542,1	8013,6	9659,2	11211,1	12595,4
probability of a pessimistic scenario (i=0,2)	0,35										
probability of an optimistic scenario (i=0,28)	0,65										
Risk-weighted average cumulative discounted cash flow	**9964,54**										

* complied by author

The basic income of 4832.0 will be supplemented by an increase in revenue due to the acceleration of order processing in the amount of UAH 241.6 thousand and due to the specialization of software at this enterprise in the amount of UAH 9.7 thousand.

Thus, the costs, which amounted to UAH 2,987.7 million, will decrease by UAH 170,000 due to savings from the reduction of thefts and shortages and will increase by UAH 540,000 for consulting services and additional salary costs for the project team, which will amount to UAH 1,375.0 million.

According to project B, the basic income of 4832.0 will be supplemented by an increase in revenue due to the acceleration of order processing in the amount of UAH 338.2 thousand and an increase in revenue due to the reliability and security of software in the amount of UAH 24.2 thousand.

Table 3.6 - Acquisition of licensed software

	0	1	2	3	4	5	6	7	8	9	10
Income	0,0	4832,0	5147,7	5207,0	5941,5	5494,6	6542,8	6836,4	7332,0	7451,9	7301,4
increase in revenue by speeding up order processing	0,0	338,2	1029,5	1041,4	1188,3	1098,9	1635,7	1709,1	1833,0	1863,0	1825,3
increase in revenue due to the reliability and security of software	0,0	24,2	51,5	78,1	89,1	82,4	654,3	341,8	1466,4	2235,6	2190,4
Costs (outflow)	0,0	2987,7	3129,0	3285,6	3470,6	3003,5	3826,8	4054,7	4423,7	4423,0	4341,0
Acquisition of a license	3200,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0
Additional salary costs of the project team	0,0	270,0	250,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0
Software testing and optimization services	0,0	0,0	0,0	12,0	12,0	12,0	12,0	12,0	12,0	12,0	12,0
Additional costs for software upgrades	0,0	124,0	73,0	73,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0
Savings on laid-off workers	0,0	-43,7	-43,7	-43,7	-43,7	-54,2	-54,2	-72,0	-72,0	-72,0	-72,0
Net Cash Flow	-3200,0	1856,4	2820,4	2999,6	3780,0	3714,6	5048,2	4892,6	6267,6	7187,5	7036,1
Discounted NCF	-3200,0	1497,1	1834,3	1573,3	1598,9	1267,1	1388,7	1085,4	1121,3	1037,0	818,7

	0	1	2	3	4	5	6	7	8	9	10
Cumulative Discounted NCF	-3200,0	-1702,9	131,4	1704,6	3303,5	4570,6	5959,3	7044,7	8166,0	9203,0	10021,7

* complied by author

Thus, the costs, which amounted to UAH 2,987.7 million, will decrease by UAH 43.7 thousand due to savings on the number of dismissed employees and will increase by UAH 3.2 million due to the purchase of a license and additional costs for software upgrades - 124.0 thousand UAH and the salary of the project team - 270 thousand UAH.

Let's move on to project C

Table 3.7 –Project C "Lease of licenses from the supplier", thousand UAH

	0	1	2	3	4	5	6	7	8	9	10
Income	0,0	4832,0	5147,7	5207,0	5941,5	5494,6	6542,8	6836,4	7332,0	7451,9	7301,4
increase in revenue by speeding up order processing	0,0	338,2	1286,9	1301,7	1485,4	1373,6	1635,7	1709,1	1833,0	1863,0	1825,3
Costs (outflow)	0,0	2987,7	3129,0	3285,6	3470,6	3003,5	3826,8	4054,7	4423,7	4423,0	4341,0
Software rental costs	0,0	420,0	420,0	420,0	420,0	420,0	420,0	420,0	420,0	420,0	420,0
Additional salary costs of the project team	0,0	250,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0
Software training testing and optimization services	0,0	117,0	7,0	7,0	7,0	7,0	7,0	7,0	7,0	7,0	7,0
Additional costs for software upgrades	0,0	115,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0

	0	1	2	3	4	5	6	7	8	9	10
Savings on laid-off workers	0,0	-43,7	-43,7	-43,7	-43,7	-54,2	-54,2	-72,0	-72,0	-72,0	-72,0
Net Cash Flow	0,0	1324,2	2922,3	2839,8	3573,0	3491,9	3978,9	4135,8	4386,2	4536,9	4430,7
Discounted NCF	0,0	1042,7	1811,8	1386,4	1373,5	1056,9	948,3	776,1	648,1	527,9	405,9
Cumulative Discounted NCF	0,0	1042,7	2854,5	4240,9	5614,4	6671,3	7619,6	8395,7	9043,9	9571,7	9977,6

* complied by author

To do this, we will calculate the amount of purchased licenses - UAH 3.2 million and will include in the lease costs, which is calculated by our export method as 7.6% of the total amount of software purchase. For Medsoyuz + LLC, this amount is UAH 420,000 per year.

Therefore, the total cost of ownership of software, subject to the lease of software licenses, will amount to 46.658 mln. UAH.

3.3 Economic efficiency of the implementation of ERP systems at the enterprise

Calculated the cumulative discounted net cash flow from the tables (3.4, 3.5, 3.6, 3.7) will enter the data in a separate table 3.8 for each project.

Table 3.8 - Cumulative discounted net cash flow

	0	1	2	3	4	5	6	7	8	9	10
Cumulative discounted NCF	0,0	1536,9	2938,8	4050,7	5066,8	5946,5	6737,5	7411,7	7999,7	8517,3	8937,0
Cumulative discounted NCF	0,0	273,9	938,9	1791,3	3043,1	4082,9	5035,1	5971,7	6953,7	7821,9	8547,9

	0	1	2	3	4	5	6	7	8	9	10
Cumulative discounted NCF	-3200,0	-1702,9	131,4	1704,6	3303,5	4570,6	5959,3	7044,7	8166,0	9203,0	10021,7
Cumulative discounted NCF	0,0	1042,7	2854,5	4240,9	5614,4	6671,3	7619,6	8395,7	9043,9	9571,7	9977,6

* complied by author

From the table 3.8 we make a chart comparing the cumulative discounted net cash flow for each project.
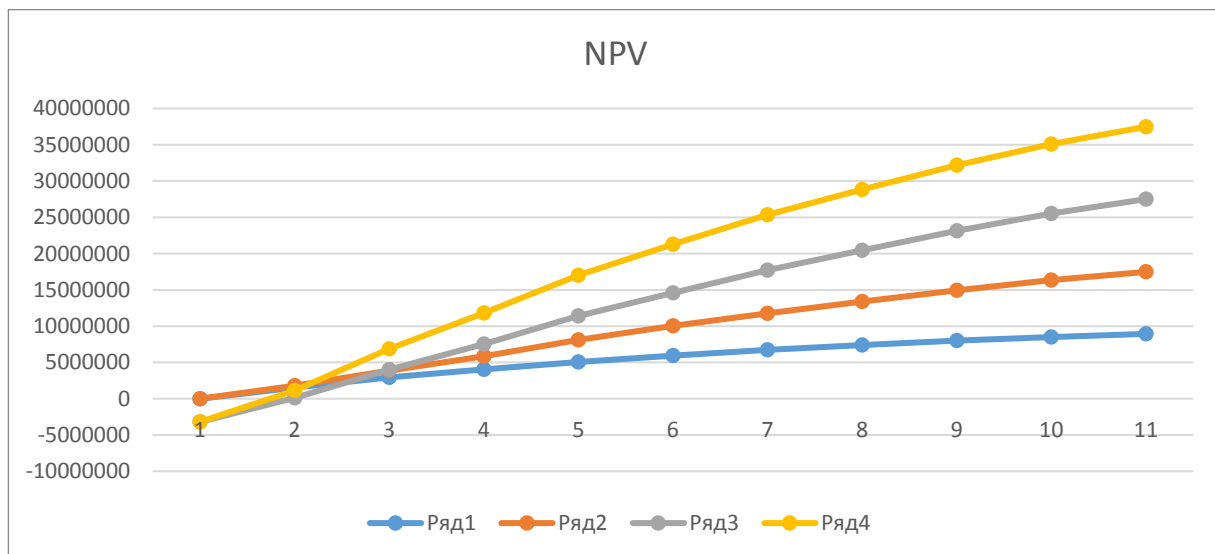
Picture 3.3 – Net Present Value chart * complied by author

The rating series of values of criteria on the complex project (see tab. 3.8) show conformity of results of the project to the set purposes. Therefore, the most attractive project is determined for each criterion and the criterion index for each project is calculated by dividing the criterion value for a specific project by the value of the best rating in this category (If the value of the best rating in this category is less than the criterion for a specific project). Criterion indexing makes it possible to compare different, often difficult to compare projects, identifying the most attractive in terms of overall well-being.

Table 3.9 - Assessment of the economic attractiveness of the project

Criterion	Specific weight of the Criterion	The value of the criterion		
		Project A	Project B	Project C
Necessary costs for one workplace, thousand UAH	0,3	20,48	28,57	31,86
Profit, UAH million	0,4	7009,27	8217,76	8181,66
Profitability of the project, %	0,3	0,38	0,27	0,506

* complied by author

At the final stage, the assessment of the overall attractiveness of each project is calculated as a weighted average of the project indices. The highest weighted average value indicates the economic attractiveness of the project.

The weighted average index of the project A = 0.3 * 20,48+ 0.4 * 7009,27+ 0.3 * 0,38= 2809,97

The weighted average index of the project B = 0.3 * 28,57+ 0.4 * 8217,76+ 0.3 * 0,27= 3295,76

The weighted average index of the project C = 0.3 * 31,86+ 0.4 * 8181,66+ 0.3 * 0,506= 3282,371.00

Table 3.10 - Weighted integrated efficiency indicator

Weighted integrated efficiency indicator:		
A	B	C
2809,97	3295,76	3282,37

* complied by author

In our example, the most attractive is project B, whose weighted average index is higher than in projects A, C. Thus, according to the results of calculations, we can select project B - Acquisition of licensed software, as one that best meets the goals of LLC "MEDSOYUZ +", as over time it will bring more benefits from implementation and in this way the least time will be lost.

CONCLUSION

In the first section of the master's thesis the theoretical aspects of financial controlling at the enterprise, essence and types of controlling tools were investigated. Corporate information systems are also considered.

It was found that ERP-systems are a set of integrated programs that comprehensively, in a single information space support all major aspects of management - enterprise resource planning (financial, human, material) for the production of goods (services), operational management of plans (including supply, sales, contracts), all types of accounting, analysis of business results.

Also, the place of controlling in the management system were defined and the main requirements for the information system to ensure the management process and the controlling system in particular were considered.

In the second section, the set of indicators included in the information base of financial controlling were discussed and the main users of financial information were defined.

 A comparative analysis of ERP systems that are market leaders was made and it was concluded that SAP software may be the best choice for small and medium businesses and startups, while large companies may choose Microsoft Dynamics. But then SAP has an advantage over Dynamics, thanks to regular updates to the new version of the platform.

The next step methods and estimates of cost-effectiveness of Information Technology investments were studied where were defined that to assess the economic efficiency of investments in IT, the following models can be applied: assessment of the Total Cost of Ownership of information systems (TCO); assessment of Return on Investment (ROI); standard methods for assessing the economic efficiency of investments (return on investment); return of assets; shareholder price; assessment of one-time costs for the implementation and purchase of software and hardware systems.

In the third section, the world experience in the implementation of ERP systems at enterprises was considered. Panorama Consulting Solutions conducted a survey of 215 respondents who assessed the main goals of implementing modern information systems for planning and using resources. This study showed that about 80% of the respondents surveyed belong to companies that have already implemented or are still implementing information systems, and 14% are still at the stage of searching for effective software.

Among the main players in the market of modern ERP systems, it should be noted such companies as: SAP, Microsoft Dynamics, Oracle, etc.

The market for management systems is quite wide, but more and more large enterprises prefer the management system SAP R / 3 ERP. When choosing to optimize processes in the enterprise in favor of the SAP ERP system, managers face a number of problems, but gain significant advantages in managing their own business.

Next, 3 projects for the implementation of ERP-systems at the company LLC "MEDSOYUZ +" were proposed, namely: the development of the actual software, purchase of ready-made software and lease of ready-made software. The attractiveness of the projects was analyzed and it was found that the most effective for MEDSOYUZ + LLC is the purchase of ready-made software, because in this way the least time will be lost and over time this project will bring more monetary benefits to the company.

Undoubtedly, ERP systems have a number of advantages. They help speed up the execution of certain types of work (such as order processing, calculation of financial indicators, reporting, balance sheet). After the implementation of the system, the manager can quickly make management decisions due to the availability of complete, reliable information stored in a single database. There is a reduction in time for routine work, which, in turn, increases the time for analytical work. It is also possible to reduce the number of low-skilled workers.

The introduction of ERP-system in the enterprise automates and simplifies the process of inventory management, and optimizes the processing of archival data and internal business processes. This frees managers from routine work. As a result, we can expect an increase in the efficiency of the enterprise and its competitiveness. Large and medium-sized enterprises should pay attention to ERP-systems and implement modern Western standards, using the experience gained over the years by developers. The best way for Ukrainian companies to restructure their business processes in accordance with the algorithms proposed in ERP-systems. They are quite flexible and can be successfully implemented in enterprises that have long been operating in the market, but need to restructure existing business processes. However, the question of expressing the effect of the introduction of ERP-systems in numbers remains open. Currently, this effect can only be assessed by experts, so it is necessary to develop a number of indicators that will allow managers to assess all the benefits.

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