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Optimisation of business processes of an international IT company in the context of digitalisation

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Abstract. Digital technologies are becoming increasingly important in all areas of business, causing irreversible changes in the management of companies to improve their financial and economic performance, increase flexibility and competitiveness in the market. The use of powerful software, hardware and digital tools creates a company's competitive advantage in the international market, while the intensification of competition and the widespread use of information and communication technologies have created opportunities to improve business processes to ensure efficient operations. The study aimed to determine the development of digitalisation of business processes in the context of the formation of a modern mechanism for managing business processes of international IT companies and to generalise the directions of their optimisation in the digital space. General scientific and special research methods were

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used in the study: deduction and induction, analysis and synthesis, abstraction, generalisation, methods of statistical and economic analysis, systematisation, comparison and analysis, systemic and functional analysis. The status of digitalisation of business processes of international IT companies was analysed by determining the interaction between business processes at the organisational level and addressing the hierarchy of business processes of an economic entity. The study highlighted the components of the IT company's digitalisation process, which optimises the available resource potential, work time and improves the efficiency of business processes, thereby increasing the effectiveness of economic activity. A model of optimisation of business processes of an IT company in the context of international activity is formed using the method of functional modelling of the architecture of integrated information systems. The stages of optimising an IT company's business processes are formed, which can be used to find solutions to improve business operations and are manifested in the quantity and quality of services, cost and reliability of IT services, launching new services on the market or creating optimal conditions for the rapid implementation of new services. The practical value is determined by the proposed recommendations for creating optimal business processes in the context of international activities, which will increase the efficiency of the IT business

Keywords: IT enterprises; digitalisation of business processes; benefits of optimisation; reengineering; architecture of integrated information systems; international activities; information and computer technologies

INTRODUCTION

Since the beginning of the Fourth Industrial Revolution (since the mid-2010s), organisations have increasingly recognised the importance of effective management due to increased global competition, shorter product lifecycles and the need for comprehensive data analysis to make informed decisions. The growing dependence on technology has made corporate information systems key tools for processing large amounts of data, automating routine tasks and improving the efficiency of business processes. This, in turn, increases the load on the information system, increases the need for its continuous improvement and gradually affects its quality. Without the use of performance analysis, it becomes almost impossible to ensure effective management of business processes. This means that IT enterprises must not only monitor these changes but also constantly adapt their approaches and apply the analysis data to improve their operations and ensure their efficiency.

In this context, business process management (BPM), defined as "the management of the (re)design of individual business processes and the development of fundamental BPM capabilities in companies operating in different environments and with different goals", is central. It facilitates the integration of information systems with the organisation's business processes, which increases operational efficiency and adapts to market changes more quickly. Gaining new opportunities to optimise business processes and increase efficiency requires companies to be prudent, strategically planned and ready for change. These issues were discussed and considered by leading scholars and management practitioners. A. Baiyere *et al*. (2020) addressed the dominant logic of BPM by proposing new logics, which the authors conceptualise as lightweight sensing processes, infrastructure flexibility, and attentive agents.

R. Bouncken *et al*. (2021) investigated the key concepts related to business model digitalisation; the authors developed a conceptual matrix for portfolio considerations of a firm's business model digitalisation. The study systematised information on how leading companies plan and implement digital transformation (DT). These proposed roadmaps for the successful implementation of digitalisation, systematised organisational capabilities and the impact of DT on company performance. F. Wiesböck *et al*. (2020) investigated the role of IT capabilities (IT-C) in the specific context of digital product and service innovation. The study addressed the impact of on the performance of innovative digital products and services (DPI), which have different characteristics compared to traditional innovations. The study hypothesised that IT-C influences DPI both directly and indirectly through the development of internal organisational capabilities, in particular, the firm's DPI capabilities (DPI-C). To test this hypothesis, they use structural equation modelling based on survey data from DPI projects in Germany, Austria, and Switzerland.

The study by R. Teubner & J. Stockhinger (2020) on digital tools, such as social, mobile, analytical and cloud technologies (SMAC), which stimulate digitalisation, is notable. J. Aström *et al*. (2022) proved that digital tools significantly transform the organisational mechanisms of firms, changing the way they create, deliver and capture value. Due to its reprogrammability, imperceptibility, and simplicity, digital infrastructure reduces business dependence on physical locations, facilitating both the decentralisation of knowledge-intensive processes and the concentration of routine functions. The study also demonstrated that digital technologies increase the adaptability and resilience of companies to crises. According to Y.E. Chan *et al*. (2022), social media provides a firm with market visibility and establishes connections with its stakeholders; mobile networks also connect different actors in the business ecosystem and offer learning and continuous access to information anytime and anywhere. The cloud provides accessibility, storage and appropriate exchange of information, workflow monitoring and remote collaboration. Analytics facilitates understanding of business and customer needs, identifying opportunities and market trends, as well as recommending and delivering services and personalised communications.

The Ukrainian scientific discourse mainly studies the impact of DT on the business processes of international companies. The dissertation study by A.I. Papinko (2024) examined the specific principles of IT companies at different stages of business processes based on the development of information aspects of decision theory. The economic security management is disclosed, indicators are identified that can be used for assessing the effectiveness of business processes of IT enterprises, identifying possible problems and risks associated with economic security, and the performance indicators of business processes in IT companies in the context of risk management are investigated.

The ways and methods of creating information about the company's activities by business processes in management accounting have been improved, and recommendations for analysing business processes in IT companies have been provided. A.S. Zaverbnyj & Y.O. Sharovskii (2024) analysed the challenges and prospects of using innovative tools to optimise business processes of enterprises in the context of European integration and proposed a scheme for a phased process of reengineering business processes of enterprises based on an innovative approach in the context of European integration. V. Dergachova *et al*. (2021) analysed the organisation of business processes at enterprises in the context of digitalisation, considers various aspects of the perception of the process and presents the components of the digitalisation of enterprise business processes, which consist of certain procedures and areas of implementation, provides a logical and structural diagram of the technology for organising business processes.

The literature analysis indicates that there are controversial approaches to the interpretation of DT and its consequences at the micro and macro levels. Most of the studies reviewed summarise the practical experience of companies and digitalisation, examine its impact on the company's competitiveness, and systematise the importance of the human factor. However, the issues of generalising recommendations for optimising the business processes of international IT companies to overcome the challenges of DT remain unresolved. The purpose of the article was to identify trends in the development of digitalisation of business processes in the context of forming an effective mechanism for managing the activities of international IT companies, and to systematise the main factors that optimise processes in the context of DT.

MATERIALS AND METHODS

To achieve this goal, a combination of general scientific and special research methods was used: deduction and induction, analysis and synthesis, to determine the impact of modern digital technologies that significantly change business processes and ways of doing business. The study of theoretical sources on the practical experience of DT in IT companies identified the key elements of the digitalisation process and analysed its impact on the transformation of business processes by means of theoretical generalisation. The study, using the method of abstraction, addressed digitalisation as a general transformation process aimed to transfer activities, operations and interactions to a digital environment of solutions and changing organisational culture without reference to specific technologies or industries. The use of statistical and economic analysis methods in the study of the preconditions, scope, characteristics of the environment and factors of digitalisation and their impact on the business processes of international IT companies identified key trends in DT, assessed its dynamics and determined the relationship between the level of digitalisation and operational efficiency. The method was also used to identify the factors that influence the speed and scale of digital solutions implementation, as well as assess their impact on the competitiveness of companies in the global environment.

Systematisation methods were used to determine the hierarchical structure of business processes of an IT company and to develop a structural and logical scheme of organisation of business processes of an IT company based on digitalisation, as well as to provide recommendations for their further implementation to integrate digital solutions into the organisational structure of companies, radically changing the principles of their work by creating new business processes, customer interaction and organisational culture. The methods of comparison and analysis were used to identify the benefits of optimising business processes for the international activities of an IT company. The system-structural and functional approaches were used to build a model for optimising the business processes of an IT company in the context of international activities using the ARIS functional modelling method.

In the context of modern IT process management, considerable attention was paid to the process approach, which ensures consistent organisation of operations and result orientation. The methodological basis of the study was the ITIL/ITSM model, which, within the process approach, interprets a process as a sequence of interrelated operations aimed at achieving certain results. This approach can effectively structure the activities of IT departments, optimise the interaction between the functional elements of the organisation and ensure the quality of IT services following the business needs. The generalisation method was also used to formulate the research results. Using inductive and deductive methods, the conclusions were substantiated and proposals for further research were made. The abstract and logical method was also used in writing the conclusions and recommendations of the study. The information base for the study was formed by the works of researchers in the field of information technology, public information and specialised scientific research on the problems of modern trends in the development of the digital society, as well as on the optimisation of business processes in the implementation of digital technologies in the activities of international IT companies.

RESULTS AND DISCUSSION

The digitalisation process involves the use of modern information technologies to transfer a company's business processes into a digital environment. The simplest business processes, such as organising various events via video communication (meetings, conferences, seminars, personal interviews); consulting and customer support via online channels (for text messaging); using virtual and augmented reality to advertise products, promote services and company activities via a website, and demonstrate all the company's advantages to investors, partners and customers, are already present in many international IT companies.

The use of modern information and communication technologies in the organisation of business processes, as well as the introduction of digital management tools, contributes to the efficiency of enterprises. Digitalisation helps to eliminate excessive bureaucratisation of internal business process procedures, which ensures prompt management decision-making and flexibility in responding to changes in the external environment. At the same time, there has been a significant reduction in the time spent on core business processes and optimisation of the organisational structure by reducing the number of staff and management levels.

DT also enables the transition from traditional paper-based document management to cloud-based electronic systems, which significantly improves access to information and speeds up its processing. This process can be used to accelerate response to customer requests, which has a positive impact on customer satisfaction and builds sustainable customer loyalty. In addition, the shift to digital communication channels has resulted in a reduction in marketing costs, as cost-effective platforms such as social media and messengers (Facebook, Instagram, Telegram, etc.) are used instead of traditional advertising. A significant factor in increasing the transparency and accountability of management decisions is the introduction of automated reporting and control systems, which minimise time and labour resources while maintaining a high level of analytical accuracy at all stages of business processes.

The digitalisation of business processes involves the use of digital tools during a company's business activities. At the same time, a preliminary assessment of the company's existing information system is required to identify procedures and processes that need to be automated or digitised. An essential aspect of this process is to determine the interaction between business processes at the organisational level and to consider the hierarchy of business processes of the entity. The hierarchical structure of an IT company's business process is shown in Figure 1.

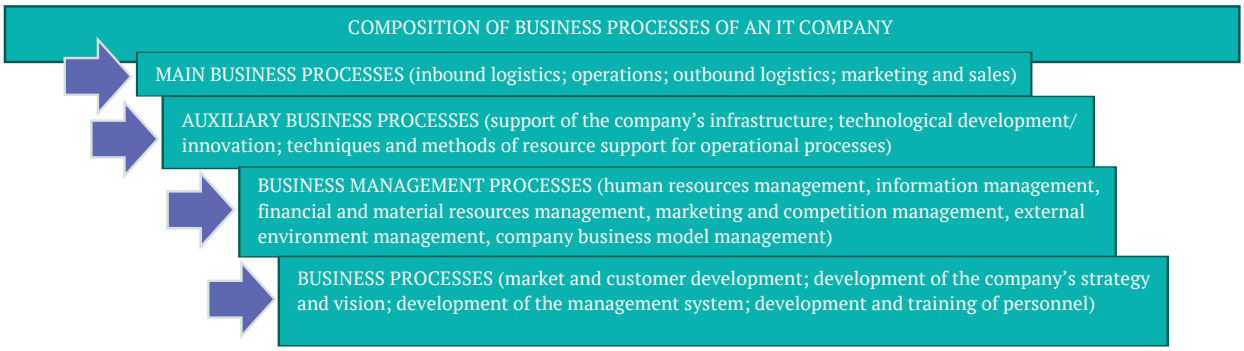

Figure 1. Hierarchical structure of IT company business processes

Source: compiled by the authors

The DT of the main business processes (digital work) that support the operational activities of IT companies is implemented through the introduction of a number of technological solutions. In particular, the key role is the information and communication technologies that ensure unified interaction between participants in business processes regardless of their geographical location, including video and audio communication tools (Zoom, Viber, Telegram, Skype, WhatsApp). An important component is the use of specialised business management software, such as BAS, BAS ERP, Bitrix24, which can be used to integrate planning, accounting and analysis functions. The effective functioning of the digital environment is also ensured using electronic data interchange (EDI), which accelerates the exchange of information between internal and external business entities. In addition, leading companies are implementing tools for processing large amounts of data, including big data technologies, which enable analytical market monitoring. Equally important are cloud computing and fog computing, which optimise data storage and access, as well as intelligent digital solutions, including machine learning and hybrid technologies, which increase the adaptability and flexibility of management processes (Zaverbnyj & Sharovskii, 2024).

The introduction of information technology into the organisation of business processes is based on electronic document management and the transformation of information resources (data) into tools for achieving business goals. The goal of digitalising an IT company's business processes is to optimise the available resource potential, working time and increase the efficiency of business processes, thereby improving the effectiveness of business activities. The modern procedure for organising business processes includes several key components that ensure its effectiveness in the context of DT. It includes the digitalisation of operational stages of activities, which enables automation of routine processes and increases the speed of information processing. An important component is to ensure continuous monitoring of the work performed and the quality of the final product, which helps increase the level of responsibility and standards in the company's internal environment. Effective interaction with staff and customers is realised through a well-established communication system based on digital channels and supported by the continuous development of feedback mechanisms between all participants in business processes. The logistics component is key in the structure of the procedure, as it plays an important role in the timely supply of inputs and delivery of finished products. Furthermore, the digitalisation of certain elements of the value creation process, including the modernisation of production approaches through the integration of information technology into the processes of using, processing and storing databases, acts as a catalyst for increasing the productivity and competitiveness of companies in the global market (Fig. 2). Digital document management tools provide easier and faster access to the necessary documents on demand; they can be used to store large amounts of information, which, after careful analysis, can be used for planning, organisation and control business processes in the future. Digital tools for collecting and analysing information are often part of the implementation of digital workplace programmes, providing managers with

information about the activities of their business units. Not only is this information available for evaluation and analysis at any time and on demand in a user-friendly format, but it is also stored for the required period and can be analysed effectively. These tools reduce the need for management intervention in the internal affairs of the unit, as interactive employee performance monitoring systems provide IT companies with a certain degree of automation. According to I.V. Orlov (2024), these tools provide a powerful information base for planning and organisational design processes.

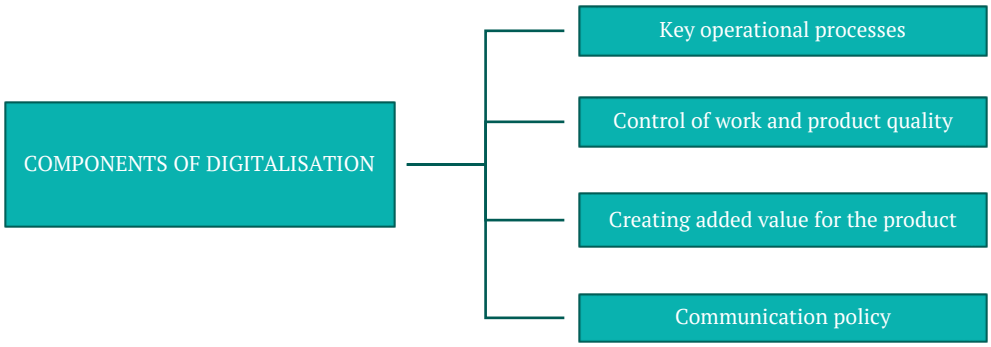

Figure 2. Components of the IT company digitalisation process

Source: compiled by the authors

The dashboard is becoming an effective tool for managers to track the dynamics of the company's economic performance. Aggregated data on the main areas of work provides a comprehensive view of the company's activities and respond quickly to negative changes in performance. Digitalisation of business processes in the digital environment offers many benefits, including economic predictability for companies, timely response to employee signals, automated time tracking processes, etc. The goal of digitalising business processes is to make them simpler and more flexible. A diagram of the logical structure of an IT company's business processes based on digitalisation is shown in Figure 3.

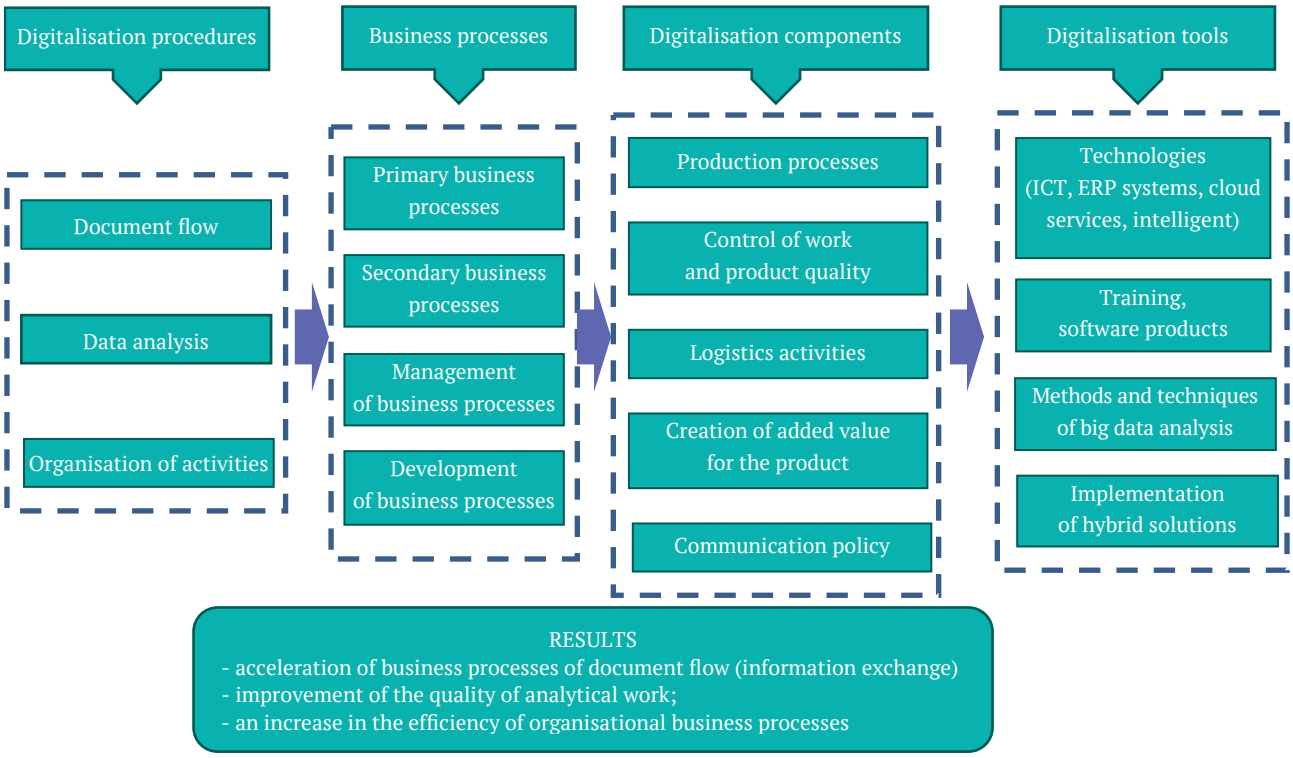

Figure 3. A structural and logical diagram of the organisation of the IT company's business processes based on digitalisation

Source: compiled by the authors

Figure 3 shows that the company has important technologies to organise business processes on favourable terms, including fast access to the company's digital database of digitalisation. With the help of information about business clients, types of economic activity, available resources and the potential of predictive modelling

to use such data correctly, the company forecasts trends and responds to international market challenges as quickly and accurately as possible. According to W.W. Baber *et al*. (2019), digital business models evolve as entrepreneurs move to new digital platforms, and this evolution is linked to the logic of effect and cause and effect. This proposed a digital business transformation framework that facilitates the successful implementation of new digital solutions.

The digitalisation of an IT company leads to changes in the external (in terms of interaction with government agencies and contractors) and internal (in terms of business processes covering the management area) environment. That is, IT companies are affected by digitalisation from two sides. On the one hand, in the course of business activities in the context of growing demand for their products and services, and on the other hand, in the organisation of core business processes in these companies, which determines the sequence of employees' work, information processing, organisation of auxiliary business processes, etc. The active introduction of digital technologies in all spheres of life and economic sectors increased the number of orders for software development, implementation and/or other additional services in this area.

Effective project management business processes are carried out by a project manager (PM), who is responsible for the "project triangle" of lead time, budget, and scope (scope). The life cycle of a "classic" project includes the phases of initiation, planning, execution, closure, and handover to the client. The responsibilities of a PM in outsourcing and product companies are the same: responsibility to the business, collaborating with the team to execute and complete the project on time, within a certain budget and the specified scope without changing the quality. Different projects of IT companies have different implementation durations. Sometimes clients ask to develop a feature, a small application, or a company website. Such projects can last for weeks or months, and the company delivers the finished product to the client without further support. Some of these have been in development for several years.

Working with digital project management tools, including JIRA, analytical metrics, and other project tools, takes time. In the process of project management, Atlassian JIRA is usually used, a bug tracking system designed to organise communication with users, available in two versions: Cloud and Server. JIRA currently includes three projects: JIRA Software (for developers), JIRA Service Desk (project support), and JIRA Core (project management). JIRA is currently one of the most popular project management systems for IT companies. Adapted to work with JIRA and other Atlassian software products, including Bamboo, Clover, Crowd, Crucible, and Fisheye, is Confluence, which is part of an integrated collaboration platform (used as a project wiki to store access, project documentation, descriptions, etc). Project data is usually stored on Google Drive, a data storage service owned by Google Inc. that stores relevant information on servers in the cloud and shares it with other users online.

Efficient organisation of accounting, incorporating methods of optimising business processes for more efficient and high-quality information support for managing the activities of an IT company, is relevant. Accounting is usually done with the help of modern software. According to N.L. Shyshkova (2019), well-established centralised IT process management systems ensure a high level of productive activity of IT company employees. Large IT companies with in-house accounting or accounting departments should prefer integrated business process automation solutions using modern ERP systems. Medium-sized IT companies can employ both options for modifying a standardised ERP system to meet individual requests, IaaS solutions, PaaS solutions that require software maintenance by in-house programmers, and options for purchasing a licensed ERP system with further installation, software support and administration, or a cloud-based SaaS solution (Kurhan, 2020).

O. Petruk & I. Hrabchuk (2021) conducted a thorough study of the peculiarities of accounting in IT companies in the context of digitalisation. They substantiated the feasibility of outsourcing accounting functions, emphasising its economic and organisational benefits for IT companies at the current stage of development. The study also revealed an approach to the selection of accounting software, incorporating the specifics of the outsourcing model. The researchers conducted a critical analysis of scientific sources and covering the peculiarities of the functioning of IT companies, which supplements the list of key issues that an enterprise should consider when choosing accounting software. These formulated criteria are of practical importance in the management decision-making process. In addition, as part of an integrated approach to automating business processes in IT companies, the study helped to identify appropriate options for implementing ERP systems depending on the needs and scale of the company's operations. The researchers identified four models of cooperation between outsourcers and customer companies based on the introduction of information and computer technologies: providing data through special services; import/export of data from the customer company's software products; "remote workplace"; and accounting in cloud services. According to O.I. Malyshkin (2020), the latter model is the most appropriate for IT companies, given the specifics of their activities. Cloud services are suitable for IT companies that keep records through outsourcing and in-house accountants. However, it is the conditions for the adoption of SaaS, DaaS and IaaS models that achieve the effect of computerised processing of basic documents, which renders accounting services more innovative.

The market of accounting and reporting software is represented by Ukrainian and American, German and Polish products in different price categories and with different functions. When choosing accounting software for IT companies, incorporating the needs for information provision and functionality, it is recommended to consider the following issues when choosing accounting software: whether the software has a cloud version; whether there are tools for generating reports based on user-defined sections; whether it is possible to modify the software in-house; and which applications/software it integrates with. Selection of a specific accounting software product is a difficult task for IT managers who are interested in reviewing and using reporting tools independently, and in consolidating management processes and IT services. This software product contains the reports most needed by managers in the form

of tables and diagrams. Thus, in the context of outsourced accounting, access to the information base is agreed upon with the head of the IT company.

The specifics of working in IT companies require constant monitoring of employees' working hours, as this indicator affects the cost of IT projects. For this purpose, time trackers are used in companies that work remotely and need to monitor their employees. R. Bacho & G. Loskorikh (2024) noted that the described digital tools can: increase work efficiency several times; demonstrate the real time spent, which explains the increase in time spent compared to the planned indicators; ensure transparent reporting to the clients of the IT company on the incurred resource costs and the actual justification of the cost of specific IT projects.

Analysing all the activities of an IT enterprise, international standards for typical methods of managing software development, including its projects, such as DSTU ISO 9000:2015 (2015), ISO/IEC/IEEE 12207:2017 (2017), ISO/IEC TS 33061:2021 (2021), should be addressed. Despite significant progress in the digitalisation of IT companies, there are still unresolved problems, including: high initial costs of operating information systems, relatively high transaction and transformation costs associated with the transition of companies to digital technologies; shortage of highly qualified specialists with experience in Western companies; lack of necessary unified standards, technical regulations and relevant legislation to regulate interaction between industry participants.

Analysing the aforementioned issues, it is worth noting that digitalisation does not always increase company profits. To avoid the negative consequences of the digitalisation process, it is necessary to balance all risks by determining the expected results of digitalisation and comparing them with the costs of implementation. Sometimes, the implementation of new processes is difficult, as established business processes can lose their advantages when moving to a digital environment, which can lead to errors and often changes in the company's operations. A tool to overcome this problem is a detailed analysis of each specific situation and an understanding of what problems rapid changes in business processes can cause during digitalisation.

The problem of information leakage arises when the introduction of digital technologies may have insufficiently developed systems and increase the risk of information leakage, especially in the area of personal data storage and processing of confidential information. The cost of implementing digitalisation is often high due to the need to ensure an adequate level of security. It is important to objectively weigh up these additional risks and their possible consequences, which may cause direct and indirect damage to the image of the business, its customers and counterparties. Another problem is the impossibility of digitising some business processes, when there are operations that necessarily require the presence of a person and the availability of conventional rather than electronic documents. Thus, digitalisation leads to significant changes in the activities of IT companies, on the one hand, stimulating the development of their activities (in terms of developing digital products), and on the other hand, requiring the introduction of modern digital technologies in their management activities.

Optimisation of business processes of an international IT company is one of the conditions for successful sustainable development, and the relevant decision is made by the owners in order to identify, analyse and improve existing business processes in the company. In the process of optimising BPM, IT companies use a variety of digital tools to ensure the efficiency of the company itself, realise its future potential, increase profits, improve productivity, reduce costs and improve the quality of products and services to meet customer needs. Business process optimisation is a set of interrelated management, organisational and information measures, unified by a certain technology, aimed at improving the parameters of individual processes and the overall performance of the company to meet the needs and expectations of stakeholders. Business process optimisation means the gradual development and implementation of a new method of company management using economic and mathematical modelling of business processes to adapt it to changes in the internal and external environment, international market requirements, as well as to expand operations and achieve higher performance indicators. The technology of business process optimisation must comply with certain principles (Fig. 4).

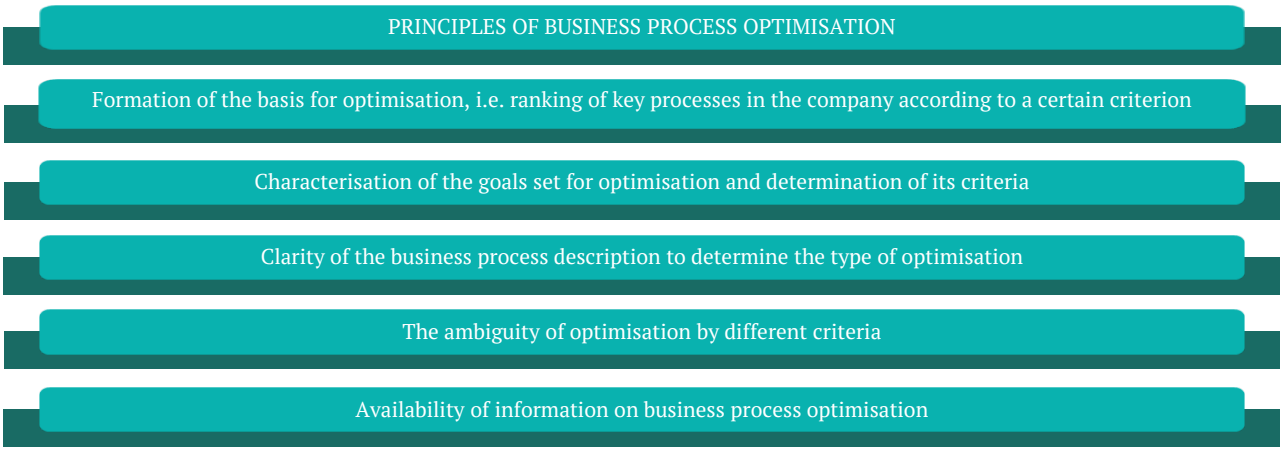

Figure 4. Principles of optimisation of IT company business processes

Source: compiled by the authors

Optimisation of business processes requires a systematic approach that comprehensively covers all areas of the company's activities and is based on the existing management functions of the company. The key to success in the effective management of business processes in a company's international operations is an understanding of the structure of an IT company's business processes, which can identify sources of signals about quality loss, management shortcomings, and a decline in strategic performance. Optimisation of business processes of an IT company's international activities should contribute to the achievement of certain goals (Fig. 5).

Figure 5. Objectives of optimising IT company business processes
Source: compiled by the authors

To adequately choose a method of optimising business processes, it is necessary to address the factors of the external and internal environment of a particular company. Among the internal factors, the most important are the organisational structure of the company, the way it cooperates with foreign counterparties, the number of international contracts, external sources of financing, the degree of digitalisation of document flow, the company's internal communication system, the duration of business processes, the degree of interdependence of tasks, the cost of existing business processes, etc. In terms of the external environment, the greatest influence is exerted by the requirements of legislation and international standards, as well as the degree of dependence on counterparties, which significantly affects the timeliness of processes. Optimised business processes change the priority of resource allocation, the main functional areas of the company, including marketing, finance, production, personnel, etc.; determine the available capabilities of information systems that support production and organisational activities; focus the decision-making process mainly on the use of an integrated information base formed at lower levels of management, as well as data flows from external structures of the company, obtained through new means of telecommunications and services depending on the Optimisation of business processes in the international activities of an IT company provides certain advantages, as shown in Figure 6.

Figure 6. Advantages of optimising business processes for international operations of IT companies
Source: compiled by the authors based on M.I. Mostafiz *et al*. (2019)

Optimisation of business processes in the context of international operations can be based on the concept of business process improvement, which is based on four approaches aimed at improving the productivity, efficiency and adaptability of business processes: the Fast Analysis of Solutions Technique (FAST); benchmarking; redesign (concentrated improvement); and business process reengineering. The efficiency of an IT company depends on analysing the success of an IT project. Given the high risk involved, analysing the success of IT projects becomes extremely complex and requires a variety of expertise. Different methods of analysis are used to obtain reliable and objective results. As the nature of decision-making in the IT sector is fluid, the process of analysing project performance in this area is complex, time-consuming, and requires the collection of relevant information, which is then subject to various processing and calculations.

One of the most common and effective methods of increasing the competitiveness of an IT company in an unstable and changing internal and external environment is business process reengineering. According to the approach of M. Hammer & J.A. Champy (1993), reengineering was considered a deep rethinking and redesign of business processes to significantly improve their efficiency. Business process reengineering in the course of international activities is a thorough overhaul of business processes aimed at accelerating the company's response to changes in consumer demand in domestic and foreign markets; establishing effective communication and cooperation with foreign contractors; optimising costs through the teamwork of a team of highly qualified and effectively motivated specialists who develop and implement innovative and creative ideas to increase competitiveness, optimise business processes, improve productivity and product quality, service and customer satisfaction.

When implementing business process reengineering in IT companies, typical mistakes are often made that significantly reduce the effectiveness of transformations. One of the key problems is the insufficient level of corporate culture, which hinders the adoption of new management approaches and causes significant resistance to internal changes. In addition, reengineering approaches are characterised by fragmentation, with a focus on superficial or partial redesign of processes rather than a comprehensive rethinking of them. Another significant barrier is limited resources: company management often seeks to achieve efficiency gains without the necessary investments, including the involvement of highly qualified specialists and time spent on strategic planning. In addition, in some cases, there is a complete disregard for the need to change business processes, which leads to delays in adapting to market changes and causes financial losses (Plakhotnik, 2021). The main principles of business process reengineering in the context of an IT company's international activities are presented in Table 1.

Table 1. Principles of reengineering the business processes of international activities of an IT company

Principles	Events
Integration of business processes	creation of working teams responsible for certain groups of processes
Decentralisation of responsibility	vertical compression of business processes, which expands the decisions that performers of certain work can make independently, without recourse to senior management, and which reduces the "time lags" that arise during the execution of business processes
Logic of business process implementation	increasing the efficiency and reducing the time of business processes, implementing parallel work, which mitigates duplication of information and work
Rationalisation of management influence	management influence is recommended when necessary and can affect material results
Flexibility of business processes	changing market conditions and international relations require a rapid response and the ability to make changes to business process models at any time

Source: compiled by the authors

As noted by S. Ito *et al*. (2021), the need to ensure the correctness of business processes in enterprises is widely recognised in terms of reengineering and improving business processes. Formal methods are a promising approach to this issue. The goal of business process validation is to create a formal model that matches reality well. One of the most modern solutions for modelling business processes during reengineering is the ARIS functional modelling method, which is designed to increase the flexibility of business processes in the context of international operations. ARIS is a modelling tool that models functions, organisations and data and then integrates them into a management model. According to P.Y. Chao & Y.M. Su (2023), it can be used to analyse enterprise processes, which is the goal of business process reengineering, BPR. It is also the basis of enterprise resource planning (ERP).

The modelling process in ARIS involves collecting information about the research area, documenting the information obtained, presenting it in the form of a model and improving the model through iterative review. The purpose of using the ARIS model is to create the most realistic model of the company's activities in the changing conditions of the internal and external environment, including the company's international activities. For this purpose, all the most probable scenarios are considered. It is worth noting that the flexibility of the ARIS model means that it can be changed and improved at any time in accordance with the requirements of the environment. Forrester consulting's the total economic impact™ of software AG's ARIS (n.d.) considers the concept of business process architecture, formed based on the ARIS model of integrated information systems, which structures BPM into four levels: development, planning, process and workflow control, and application systems. The presented architecture of ARIS-House of Business Engineering covers the full life cycle of a business process from its modelling to the implementation of digital solutions and forms a new process-oriented software model. The approach, proposed by A.-W. Scheer & M. Nüttgens (2000), provides integration between conceptual business process design and practical applications, facilitating both reengineering and continuous process improvement. The recommended model for optimising an IT company's business processes in the context of international operations using the ARIS functional modelling approach is shown in Figure 7.

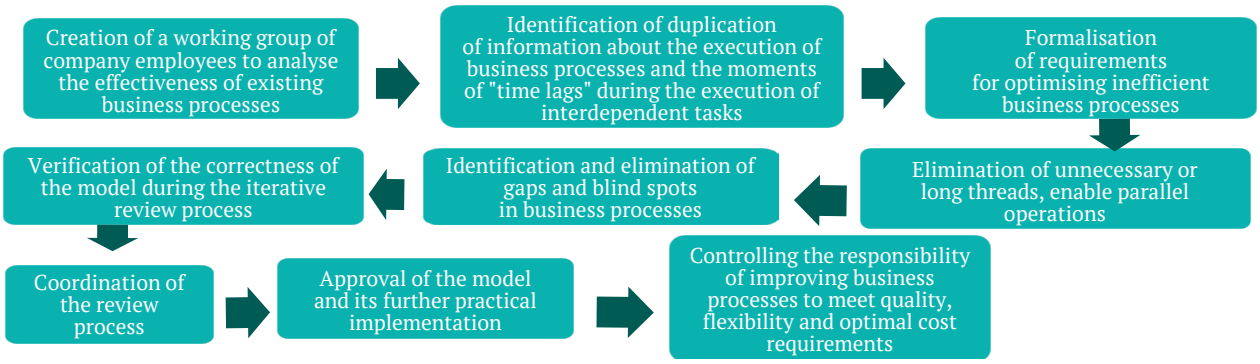

Figure 7. Model for optimising IT company business processes in the context of international activities using the ARIS functional modelling method

Source: compiled by the authors

By applying the ARIS modelling method, companies can gain the following opportunities: real-time process editing; reduction of internal and administrative costs; automation and digitalisation of key decision-making; reduction of maintenance costs; reduction of operating costs; increased productivity; improved forecast accuracy; improved customer service, etc. Forrester consulting's the total economic impact™ of software AG's ARIS (n.d.), which highlights the real possibility that millions of dollars worth of opportunities are hidden in business processes. The economic impact of these benefits is real and significant. The study shows that after three years; ARIS customers can expect to see 301% return on investment (ROI); 7.9 million USD in total payments over three years; and 5.9 million USD in net present value (NPV). Through a series of interviews with ARIS customers, the study found that a consolidated approach is key for organisations to succeed in transformational change, based on a solution that simplifies processes from strategy to operations. ARIS customers can analyse operations and define a strategic framework for business transformation, and effectively implement these strategies to achieve operational excellence while ensuring internal and external compliance. The stages of optimising an IT company's business processes are shown in Figure 8.

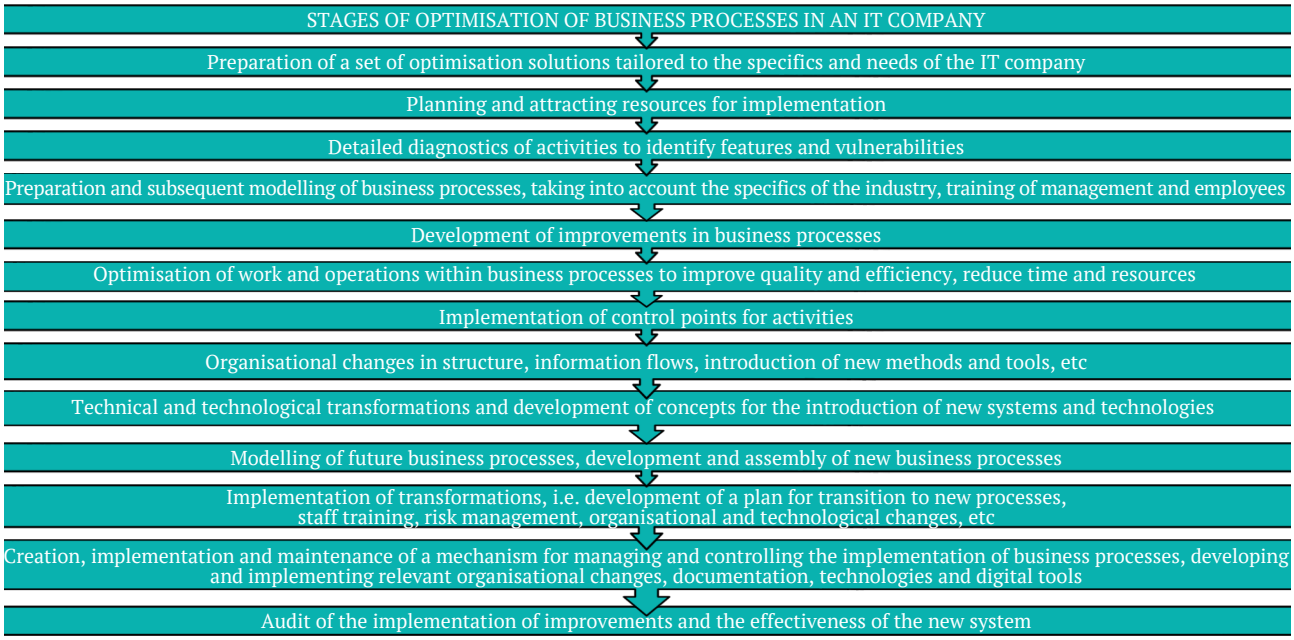

Figure 8. Stages of business process optimisation for an IT company

Source: compiled by the authors

Following the process approach, the ITIL/ITSM model describes a process, which is defined as a series of interdependent operations and changes aimed at achieving the goals declared by IT companies in their development strategy. Service process management has a greater impact than any reorganisation or optimisation. An IT process is a set of actions aimed at achieving a certain result, consisting of several subprocesses, as well as inputs and outputs. Information technology can be used to find solutions to improve business and manifests itself in the quantity and quality of services, the cost and reliability of IT services, the introduction of new services to the market or the creation

of new conditions for the rapid operation of new services. Creation of new business processes based on IT-C requires a clear understanding of the responsibilities of the company's information systems department. IT service management is divided into three areas: aligning IT services with current and future business needs; improving the quality of IT services; and optimising the long-term costs of providing IT services. In the context of business goals, IT companies define technological processes for optimisation following the balanced scorecard in 4 areas (Fig. 9).

Figure 9. Measures to optimise the business processes of an IT company

Source: compiled by the authors

Depending on the company's strategy, the main business goals are determined, which are divided into three categories: primary, secondary and minor. IT processes are a tool for achieving these goals. After defining 5-7 IT goals, the main IT processes of the enterprise are identified, as well as IT processes that do not contribute to the achievement of business goals, since investments in these processes do not yield the expected result and profit. The effectiveness of an IT process is usually assessed by determining its maturity level. In this context, the maturity of key IT processes is diagnosed to gradually improve them to the required target level. It is worth noting that maturity characteristics are constant, while maturity levels are discrete values that can take on values ranging from 0 to 5.

There are six levels of process maturity. At the zero level, the process is virtually absent, which indicates that it has not been implemented or ignored. The initial level implies chaotic activities without organised management, which leads to instability of results. The repetitive level is characterised by the fact that the same tasks are performed by different employees using a similar approach, but the lack of formalised procedures and division of responsibilities leads to dependence on individual specialists. At a defined level, procedures are standardised and documented, although deviations from the established rules occur and are not always controlled; procedures often capture current practice without making improvements. Controllable level means that there are mechanisms for monitoring and measuring the efficiency of the process, which ensures a timely response to its inefficiency, by automating certain stages. The highest level is the optimised level, when processes are systematically improved through the implementation of best practices based on continuous benchmarking with the results of other organisations, as noted in A. Pogorelyy (2017). This tool should be used to address the specifics of the IT company, in particular, the form of ownership (public, private), restrictions (e.g., depending on the type of activity), industry and other components.

Organising analytical work aimed at determining the effectiveness of an IT project involves a series of sequential actions, each of which is important for making informed management decisions. The first stage involves developing general principles and procedures for conducting the analysis, which forms the methodological basis for the entire process. Next, the stages of analytical activities are planned, with a clear definition of the sequence of work and the responsible persons. An important role is also played by the determination of resource provision, which includes material, methodological and scientific components necessary for the full conduct of the research. At the project implementation stage, general management of the analysis process is carried out, followed by the acceptance of the analytical work performed. After the completion of the main stages of analysis, the results are properly documented following reporting and standardisation requirements. The final component, according to H. Kerzner (2013), is monitoring the implementation of measures developed within the IT project to improve the efficiency of the IT enterprise.

Therefore, an IT company should identify critical IT processes that require investment and resources (time, money). The expediency of achieving the highest level of IT process maturity is not universally justified, as excessive investment in all processes without incorporating strategic importance and economic feasibility may not

provide the expected return. At the same time, companies can identify IT processes that do not contribute to the achievement of business goals and stop investing in them, thereby reducing losses from inefficient investments. The maturity level of each key IT process should not fall below a certain level. A "certain level" of IT process maturity should be defined as the minimum acceptable level that ensures consistency, stability and continuity of the process without adversely affecting other interrelated business processes. This means that the process should not be too underdeveloped compared to others and should meet at least the basic requirements of efficiency, controllability and quality assurance adopted by the company. A certain level refers to the limit below which the process no longer provides adequate support for other functions and may pose risks to the stability of the entire organisation. Increasing the maturity level of key IT processes leads to an increase in the maturity level of additional (supporting) business processes, which in turn leads to an increase in business efficiency. The gap between process maturity levels should not be significant, as this can lead to the degradation of more mature processes.

To form effective business processes in modern conditions, it is advisable to introduce several organisational and managerial measures. It is necessary to distinguish between the functions of governance and management in information technology. The concepts of "IT governance" and "IT management" cover different types of activities that have different goals. IT governance ensures that the strategic goals of the enterprise are aligned with the relevant IT priorities. The main functions in this area include assessing the current state of the IT infrastructure, setting priorities in decision-making, and continuously monitoring the compliance of activities with the company's goals. As a rule, the responsibility for this area lies with the company's governing body, headed by the CEO. IT management, in turn, involves the implementation of the defined IT priorities through the organisation and monitoring of tasks, as well as solving problems in the process of their implementation. In the context of DT, this function is mostly assigned to the head of IT or the Chief Information Officer (CIO).

An important prerequisite for achieving the optimal level of IT processes is the involvement of a qualified and experienced CIO. This means a professional with experience, preferably with an MBA degree, and a proven track record of impacting key business indicators such as revenue, EBITDA, or operating expenses. In case of limited resources, an alternative solution may be to use the CIO-as-a-service model, which employs interaction with a specialist on an outsourced basis with cost optimisation. As part of the modern management of an IT company, it is advisable to introduce a penetration test, which may include elements of social engineering. Such a measure is advisable if the company has a comprehensive information security policy, an effective information flow management system, regulated security procedures, and established staff information processes.

The next step is to identify the key business processes, which increases maturity level to at least the optimal level. This, in turn, reduces operating costs, increases the impact on other processes by improving their maturity, and increases the overall efficiency of the company's operations. An important principle in creating an effective IT budget is to adhere to the concept of capital expenditures based on the company's real business needs and priorities. This approach ensures strategic alignment between funding and digital initiatives. In addition, it is advisable to provide for mechanisms for independent assessment of IT functions, through regular (biannual) external IT audits. It is also considered a good practice to involve an independent CIO in the board of directors. Such a specialist, who is not part of the internal management structure, can act as a consultant, interim head (fractional CIO) or strategic advisor on digital issues. They can provide unbiased expertise, help shape DT strategies, and act as a mentor to the full-time CIO to improve their professional maturity. Thus, an IT company can independently form a model for managing internal business processes, based on an integrated approach, a unified methodology, a quantitative assessment of IT's contribution to business results, and a deep understanding of the organisation's future needs.

The results of the study show that optimisation of business processes in the field of international activities can provide several important benefits. In particular, the unification of the description of activities based on a single language helps to ensure that all participants in the process have access to a common and understandable communication format. This approach ensures a better understanding of the essence of business processes implemented within the framework of international cooperation. Additionally, the ability to graphically visualise processes and define functional responsibilities improves efficiency of formulation of requirements for staff. This also simplifies the determination of the control points necessary to achieve the strategic goals of international activities.

Streamlining business processes has a positive impact on the internal organisation of a company, by reducing the number of management levels, eliminating isolation between departments and officials, and establishing more efficient information exchange. This, in turn, increases efficiency and interaction within the organisation. Process optimisation can be used to assess the functional efficiency of operations within the company's overall operations, which contributes to more accurate performance measurement. Consistency of results between individual operations is achieved by minimising duplication of information and actions, which increases the overall rationality of business processes. Such optimisation creates the preconditions for reducing costs and the corresponding reduction in the value of the results and opens the possibility of introducing an effective system of staff motivation. Such a system can be based on the effectiveness of employees' participation in business processes, which, in turn, stimulates the achievement of organisational goals.

Undoubtedly, the issues discussed in this article are not entirely new. A broad scientific discourse has been formed on the necessity, mechanisms and challenges of DT of companies. Modern research by scholars contributes to a deeper understanding of this process and explains the changes in IT companies' business processes caused by the digital environment. Research on DT and BPM management has attracted considerable attention in business and management. Research has classified business processes based on their dynamics, in particular, their predictability

and the intensity of knowledge use during execution, which significantly affects the achievement of the goal.

J.I.C. Goni & A. Van Looy (2022), analysing process innovation capability (PIC) in the context of less structured business processes (LSBP), demonstrated that it is becoming increasingly important in a complex, dynamic and technologically rich business environment. The study conducted a systematic review of both PIC and LSBP, and based on this review, developed a conceptual framework that integrates process innovation with organisational capabilities in the three dimensions of people, processes and technology using the resource-based theory, dynamic capabilities and sociotechnical approach. The study also identified areas for further research and practical approaches to improve the effectiveness of PIC in LSBPs.

S. Monaghan *et al*. (2020) found that greater access to data, information and knowledge, as well as better business analytics methods, has brought unprecedented challenges and opportunities to managers, paving the way for new and effective strategies. K. Rong *et al*. (2022) argued that the specific advantages of firms, at least digital firms that rely on the Internet for their production, operation and delivery processes, are largely based on intangible assets such as technology, business models and knowledge. Despite the proposed changes brought about by the digitalisation of the nature of the firm and the associated advantages of the internationalisation process, there is still a lack of comprehensive insight of how new digital technologies, through the knowledge processes they enable, the new knowledge they help to create, and the new field of knowledge they constitute, new business strategies are emerging on the international stage.

Based on previous research, E. Autio *et al*. (2021) emphasised that digital communication technologies contribute to the dispersion of knowledge-intensive activities of firms, thereby exerting a centrifugal effect that triggers the emergence of new internationalisation strategies, while digital technologies on-site tend to concentrate firms' low-knowledge activities. Furthermore, when digital technologies are part of an offering that includes physical products, they may be location-bound, or when implemented as part of cross-border strategies, they may face institutional and legal constraints from the host country.

Knowledge of the process dimensions is undoubtedly useful for scientists and practitioners analysing the nature of BP. S. Zelt *et al*. (2019) conducted a study that identified numerous features that characterise the nature of business processes. These features include dimensions such as automation, creativity, predictability, and knowledge intensity, as well as aspects such as the codependence of process participants, process value, process analysis capability, process variability, and differentiation of process participants. However, the nature of processes is often unclear, which requires the development of tools to assess the nature of BPs (business processes). BPM Maturity Models (BPM MMs) are conceptual frameworks that can be used to assess how effectively an organisation manages its business processes. They define successive levels of development (maturity), each of which is characterised by certain indicators in the areas of governance, organisational culture, technology, methods and process performance. Unfortunately, BPM maturity assessment methods or BPM maturity models MMs do not fulfil this role. Most of these models cover a wide range of often very detailed or field-specific criteria, which makes their use time-consuming and complex. In addition, the amount of information analysed usually goes beyond the scope of assessing the nature of BP.

Studies that most closely correspond to the topic of this study are those by J. Berniak-Woźny & M. Szelągowski (2022), who presented an approach to the nature of BP that enables proper classification in terms of both the dynamics (predictability) of their performance and the intensity of knowledge. The nature of BP is a multidimensional problem presented in various ways. Researchers have identified its importance in the management process, contributing to better process identification and enabling more detailed analysis. Proper assessment of the nature of BPs performed in an organisation directly affects the success of their implementation (or the implementation of BPM). Therefore, there is a need to develop a diagnostic tool to bridge the theoretical gap and meet business needs (Truong *et al*., 2023).

Despite the acknowledged importance of BP as a research area, a research gap has been identified concerning the field of DT, which involves the introduction of digital technologies into all areas of business, causing fundamental operational and value changes that occur in different contexts where enterprises employ different strategies to enhance their digital presence. On the one hand, BP's research draws on important logics such as modelling, infrastructure and procedural actor logic, but does not confirm how these work in the context of DT. On the other hand, DT research highlights success factors: a sustainable digital strategy, an operational framework that drives operational excellence, and a service platform that enables rapid innovation. Many of BP's themes can contribute to these elements of DT. However, empirical research remains relatively limited. The combination of traditional BP paradigms and the business context of DT has pioneered new areas of process management research, including light-touch processes, infrastructure and agent agility.

In the modern scientific discourse, effective BPM is critical for maintaining the competitiveness and stable functioning of IT companies. The importance of this study is stipulated by the need to identify innovative approaches that contribute to strengthening the sustainability of the IT sector and developing modern management methods that help optimise the activities of international companies, Therefore, the study of BPM problems in IT companies and the development of an algorithm for managing business processes in IT companies under conditions of uncertainty increases their efficiency, adaptability and sustainability. Review of scientific works, consideration of theoretical foundations, including the definition of key concepts: "business process" and "business process management", formulated a general algorithm of BPM. The proposed approach will maintain sustainability, increase efficiency and adaptability in an unstable environment for IT companies, and its implementation will help to increase the competitiveness of the IT sector in the domestic and international markets.

CONCLUSIONS

DT leads to significant changes in the operations of international companies, which radically affect the business environment, open new opportunities and create

significant challenges. The most effective scenario for most of the companies studied in the context of digitalisation is the scenario that focuses on the cost and speed of business processes. Modelling business processes under the scenario of focusing on the cost and speed of business processes has the highest positive effect on their modelling, which contributes to the financial efficiency and productivity of international companies. The study confirmed the need for integrated business process modelling, which addresses various combinations of the resulting indicators and contributes to the efficiency of business process modelling and the financial efficiency and productivity of companies in the context of DT.

The study addressed components of the process of digitalisation of an IT company, presents a structural and logical scheme of organisation of business processes of an IT company, and shows advantages of optimisation of business processes of the international activity of an IT company. The study analysed a model of optimisation of business processes of an IT company in the context of international activity using the ARIS functional modelling method. Thanks to the ARIS modelling method, companies can gain the following opportunities: real-time editing of processes; reduction of internal and administrative costs; automation and digitalisation of key decision-making; reduction of maintenance costs; reduction of operating costs; increased productivity; improved forecast accuracy; improved customer service, etc.

The results of the study demonstrated that optimisation of business processes in the field of international activities can provide several significant benefits. It helps to unify the description of activities using a language that is clear to all participants, which facilitates a clear understanding of business processes. Visualisation of processes and assignment of responsibilities facilitate the formulation of staff requirements, while the definition of control points ensures the effective implementation of strategic indicators. It also simplifies the exchange of information between structural units by reducing the number of levels in the organisational hierarchy and breaking down the isolation between individual functional units. Optimisation can be used for an objective assessment of the efficiency of functions within processes, which helps to improve overall performance. At the same time, it ensures consistency of operations by avoiding duplication of tasks and data, which reduces costs and improves the value of the results. In addition, such optimisation creates the basis for the introduction of incentive systems that reward employees based on the results achieved in the business processes in which they participate.

The results of the study indicate a significant impact of DT on changing approaches to the functioning of international companies on improving the efficiency of business processes. The most effective model was the one that focuses on the cost and speed of processes, which requires further study of the impact of specific digital technologies on the achievement of companies' strategic goals. Further research should be aimed at developing adaptive digital modelling models that address industry specifics, the level of digital maturity of the company, and the dynamics of the external environment. Particular attention should be paid to a comparative analysis of the effectiveness of various modelling methodologies (in particular, ARIS, BPMN, UML) in the context of international activities, as well as to assessing their impact on improving operational efficiency, risk resilience and adaptability to the challenges of the digital age. An empirical study of the relationship between the level of integration of digital business processes and the effectiveness of staff motivation systems is also a promising area. In addition, further research could focus on formalising approaches to assessing the economic impact of DT of business processes, particularly in the field of IT companies operating internationally.

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Оптимізація бізнес-процесів міжнародної IT-компанії в контексті цифровізації

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Анотація. Цифрові технології набувають все більшого значення у всіх сферах діяльності, спричиняючи незворотні зміни в управлінні компаніями в напрямку покращення їхньої фінансово-економічної діяльності, збільшення гнучкості та конкурентоспроможності на ринку. Використання потужного програмного забезпечення, обладнання та цифрових інструментів формує конкурентну перевагу компанії на міжнародному ринку, а загострення конкуренції та широкомасштабне використання інформаційно-комунікаційних технологій створили можливості для вдосконалення бізнес-процесів із метою забезпечення ефективної діяльності компаній. Метою статті було визначити розвиток цифровізації бізнес-процесів у контексті формування сучасного механізму управління бізнес-процесами міжнародних IT-компаній та узагальнення напрямків їх оптимізації в цифровому просторі. Під час написання статті були використані методи загальнонаукових і спеціальних методів наукового дослідження: дедукції та індукції, аналізу та синтезу, абстрагування, узагальнення, методів статистично-економічного аналізу, систематизації, порівняння та аналізу, системно-структурного та функціонального. Досліджено стан цифровізації бізнес-процесів міжнародних IT-компанії через визначення взаємодії між бізнес-процесами на організаційному рівні та врахуванням ієрархії бізнес-процесів суб'єкта господарювання. Виділено складові процесу цифровізації IT-компанії, які дозволяють оптимізувати наявний ресурсний потенціал, витрати робочого часу та підвищення ефективності бізнес-процесів, тим самим підвищуючи ефективність господарської діяльності. Сформовано модель оптимізації бізнес-процесів IT-компанії в контексті здійснення міжнародної діяльності з використанням методу функціонального моделювання архітектури інтегрованих інформаційних систем. Сформовано етапи оптимізації бізнес-процесів IT-компанії, які дозволяють знаходити рішення для покращення ведення бізнесу та проявляються в кількості та якості послуг, вартості та рівні надійності IT-послуг, виведенні на ринок нових послуг або створенні оптимальних умов для швидкої дії нових послуг. Практична цінність полягає у запропонованих рекомендаціях щодо створення оптимальних бізнес-процесів у контексті міжнародної діяльності, які дозволять підвищити ефективність IT-бізнесу

Ключові слова: IT-підприємства; цифровізація бізнес-процесів; переваги оптимізації; реінжиніринг; архітектура інтегрованих інформаційних систем; міжнародна діяльність; інформаційно-комп'ютерні технології