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THE RAPID DEVELOPMENT OF DIGITAL TECHNOLOGIES AND THEIR WIDESPREAD PENETRATION INTO REAL BUSINESS

Abstract. The article analyzes the impact of the rapid development of digital technologies on the transformation of modern business processes. Key digital tools, including big data, artificial intelligence, cloud computing and the Internet of Things, as well as their integration into the operational activities of companies in various industries are considered. The author emphasizes that digitalization not only increases the efficiency and competitiveness of enterprises, but also requires a revision of organizational models, corporate culture and approaches to personnel management. The article also touches on challenges related to cybersecurity, the need for digital literacy and adaptation to constantly changing technological conditions. Examples of successful digital business transformation are presented and recommendations are offered for companies seeking to adapt to the new realities of the digital economy.

Keywords: digital tools, ecosystem model, transformations, business process, digitalization.

Introduction.

The rapid development of digital technologies and their widespread penetration into real business processes of companies and industries in various industries has formed a new trend that can be called the structural transformation of the global economy. As global development of world economies, the main essence of the digital transformation of business processes of the economy is the transition from traditional platform models to more complex ecosystem models. It is known that the digital transformation significantly changes a company's business model, making it more flexible, efficient and competitive. As a result of digital transformation, a company can revise its strategies, processes and products to adapt to a rapidly changing market environment. At the same time, the company's business processes change. All this happens due to the fact that digital transformation allows the company to automate many processes, which improves efficiency and reduces costs. Also, digital transformation opens up new opportunities for business development through the creation and development of digital products such as mobile applications, online platforms or cloud services that will allow them to attract new customers and increase profits.

Companies that implement digital technologies develop new digital business models, which entails changes and redesign of the company's business processes.

Technologies such as artificial intelligence, machine learning, big data, IoT and digital transformation are changing digital business models. All this has led to the emergence of new business models called destructive business models based on technology and the power of networks.

The special feature of these models is their direct access to the customer and to the data. To achieve this, digital business models mainly use various digital technologies to create and deliver their products and services digitally. There are many different dynamics in digital businesses because the products offered usually have no marginal costs, which has different implications for price and supply and clearly distinguishes them from classic business models. Digital business models can be combined, but the following three main categories can be distinguished: product-centric, service-centric and process-centric. Product-oriented companies sell physical or digital products, service-oriented companies provide services, and process-oriented companies provide a process or platform that enables other companies to create and offer digital products or services.

Digital business models have the following characteristics:

- value is created through digital technologies;
- digital business models are new to the market;
- Digital customer acquisition and distribution;
- Unique selling proposition is created digitally.

One of the developing business models is the digital ecosystem model. This is one of the most complex digital business models of the modern economy. Examples of ecosystems are companies such as Amazon, Alibaba, Google, Apple, Tesla and many others that attract customers through various services on different platforms.

The ecosystem model, where interaction and cooperation of different participants create value for all, has replaced the platform model based on centralization and unification of market parties. Digital technologies allow for efficient coordination of work, exchange of data and innovations. The ecosystem model increases productivity, stimulates innovation and opens up new opportunities for growth. The transition to such a model requires changing business processes, cooperation and creating new business models to be successful in the digital economy. If we follow the path of development of information systems from local to distributed systems, we can determine the correlation of changes between the business models of companies and industries and the business processes of these companies.

Analysis of previous studies.

The main elements of ecosystem management are projects, IT service costs and personnel. The mandatory technical components are:

- BPM engine, with tools for analysis, finding weak points and optimization, convenient for automating complex-structured and unstructured processes;
- LCAP for quickly creating your own IT solutions: low code does not require writing code and programming skills to set up such a platform, which makes such platforms available to a wide range of users;
- open API for integration of various services;
- AI technologies to speed up decision-making and improve their accuracy.

Important additional features include Open-Source technologies, compatibility with different DBMS, visual interface editor, seamless installation of updates, advanced tools for working with data and analytics.

How do all these changes in business models affect business processes, their design, semantics and execution tools?

To do this, let us dwell on the main issues of defining and describing business processes. There are many definitions of business processes. One of the definitions of business processes describing the essence of such a process is the following. Business process - a logical sequence of regularly repeated actions that enables one to obtain a final product from input resources.

The task of describing and automating business processes is complex, consider it in relation to the concept, approaches, models and methods, programming, i.e.:

- conceptual representation of complex business processes;
- formalization or construction of a business process model: formal and information models from the point of view of constructing (designing) an optimal business process;

- automation of business processes;
- verification and assessment of the quality of the business process;

Methods for solving various applied problems on the business process platform:

- mass processing of applications (defining a strategy for processing mass applications at the organizational level);

- combining the process of servicing several applications;

- individual service for unique requests;

- drawing up a plan and schedule for servicing applications;

- making decisions on processing and servicing incoming requests;

- integration and separation of business processes taking into account the interests of the owners;

- management and allocation of resources across work/business operations.

The purpose and objectives of the study.

For effective automation of business processes or for building a business process support system with broad functional capabilities, the full cycle of business activity should be taken as the automation object and, accordingly, a business activity support system should be built as a whole, which includes: organizational processes, management processes and business process execution processes.

The problem is the low information content of business process models in the form of diagrams of automated business processes as an object of automation.

Materials and Methods.

Automation of business processes is carried out on the basis of BPMN diagrams. From the analysis it is clear that the BPMN diagram shows only the sequence of the operation. Therefore, for programming based on these diagrams there is insufficient data on business operations and the business process. In this regard, BPMS software - a system that is programmed based on the business process model BPMN diagrams have low functionality and efficiency due to insufficient information and data on the features of the business process.

Hence, due to the minimal awareness of the business process, there is no need for deep semantic analysis of data on operations and business processes and decision making.

Other types of known business process diagram models also do not provide complete information about work operations and the business process as a whole.

To create a multifunctional business process support system, we will present the business process model in a hierarchical form.

A multi-level hierarchical model that specifies the description of a business process by levels and its work operations can be represented as follows:[5][6]:

$$BP = (BO, E);$$
$$BD = \langle OPP, YPP, IPP \rangle;$$
$$BO = \langle IP/OPI, YP, OPR, RC \rangle;$$
$$RC = \langle Ins, MP\&MP, MC, Inf\&Dt \rangle;$$
$$BD(S)_n = \langle \mathcal{N}, S^K, Z(t_{n-1}), S(t_{n-1}), OP(S), YP(S), IP(S) \rangle,$$

Where,

BO – business operations and a local business process that is distinguished by time, place and compactness of execution from the rest of the business process;

(1)

E – relationships between business operations. In particular, BP is represented as a linear chain.

BD – business activity;

OPP - organizational processes;

YPP - control processes;

IPP - executive processes (business process).

IP/OPI – input and output interfaces;

YP – management, governing bodies, institutional support, governing impact;

OPR – operations: execution conditions, quality criterion from the business process and/or actor side

RC – resources: execution procedures, data for execution, execution criterion from the execution side;

Ins – tools;

MP&MP – models and methods of business process operation procedure;

MS - models of the external environment of a business process in general have the property BDI are both temporal and deductive;

Inf&Dt – information and data required to perform a procedure. The data are: numeric and symbolic variables (data), information and knowledge.

BD(S)_n – business activity at time n; N- motive/mission of the activity;

S^K – class of current situations to which the current business situation S(t) belongs: S(t) ∈ S^K; Z(t, S(t)) - current goal of activity in the current business situation; OP(S^K) - organizational processes;

YP(S^K) - control processes;

IP(S^K) - executive processes (business process).

Results and Discussion.

The theoretical and practical development of methods for increasing efficiency will be carried out on the basis of such a representation of the business process. The problem is the representation of business process workflows in a limited version of execution. One of the reasons for the low efficiency of a business process is the inability to present operations for optimal execution in various production situations. To achieve this, work operations should be divided into coordinating and executing parts.

The operation is responsible for integrating the local process with the rest of the business process. To solve this issue, the local processes being executed should be represented in two parts: operations and procedures. The procedure is responsible for executing a local process. The problem is the non-optimality and/or inefficiency of the identified or formulated business processes and individual work operations.

This problem is solved in two stages:

- the allocation of individual business processes from the world or space of activity, or the space of functioning of the company;

- selection or formation of individual work operations from business processes and then selection of services from work operations.

Thus, the target space of the company's activity should be divided into the space of business activity. Further, the space of business activity consists of the unification of the space of business processes.

The problem is the low orientation of the business process representation for machine execution of business process work operations.

During the execution of complex business processes, not only work or actions are performed, but also data appears. This data must be drawn up in the form of documents for further execution of the business process based on them.

Thus, documentation support occurs, i.e., documentary registration of the results of each work operation. In addition, in the conditions of work operations by several owners (legal entities), the cost of the completed work operations (financial settlements) is recorded and the rules for payment for the completed work operations are drawn up. Therefore, the business process should be presented as a flow of three types: Workflow, Docflow, Cashflow.

Conclusion.

Digital transformation is fundamentally changing approaches to doing business, facilitating the transition from traditional platform models to ecosystem models that increase the flexibility, efficiency and competitiveness of companies. The introduction of technologies such as AI, big data, IoT and cloud solutions requires a review of not only business processes, but also organizational structures, personnel management and corporate culture. At the same time, modern enterprises need to overcome challenges related to cybersecurity, a lack of digital competencies and the difficulty of adapting to rapidly changing conditions. For effective digitalization, it is important to consider both the strategic and operational levels, introducing hierarchical business process models based on the integration of data, document flow and financial flows. Successful digital transformation requires an integrated approach and continuous improvement of the technological infrastructure.

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САНДЫҚ ТЕХНОЛОГИЯЛАРДЫҢ ҚАРҚЫНДЫ ДАМУЫ ЖӘНЕ ОЛАРДЫҢ НАҚТЫ БИЗНЕСКЕ КЕҢІНЕН ЕНУІ

Андатпа. Бұл мақалада цифрлық технологиялардың қарқынды дамуының заманауи бизнес-процестердің трансформациясына әсері талданады. Үлкен деректер, жасанды интеллект, бұлтты есептеулер және Заттар интернеті сияқты негізгі цифрлық құралдар, сондай-ақ олардың әртүрлі салалардағы компаниялардың операциялық қызметіне интеграциялануы қарастырылады. Автор цифрландыру кәсіпорындардың тиімділігі мен бәсекеге қабілеттілігін арттырып қана қоймай, сонымен қатар ұйымдастырушылық модельдерді, корпоративтік мәдениетті және HR басқару тәсілдерін қайта қарауды қажет ететінін атап өтеді. Мақалада киберқауіпсіздікке, цифрлық сауаттылыққа деген қажеттілікке және үнемі өзгеріп отыратын технологиялық ортаға бейімделуге байланысты мәселелер де қарастырылады. Сандық бизнестің сәтті трансформациясының мысалдары келтірілген және цифрлық экономиканың жаңа шындығына бейімделуге тырысатын компанияларға ұсыныстар берілген.

Түйінді сөздер: сандық құралдар, экожүйе моделі, трансформация, бизнес-процесс, цифрландыру.

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БЫСТРОЕ РАЗВИТИЕ ЦИФРОВЫХ ТЕХНОЛОГИЙ И ИХ ПОВСЕМЕСТНОЕ ПРОНИКНОВЕНИЕ В РЕАЛЬНЫЕ БИЗНЕС

Аннотация. Статья посвящена анализу влияния стремительного развития цифровых технологий на трансформацию современных бизнес-процессов. Рассматриваются ключевые цифровые инструменты, включая большие данные, искусственный интеллект, облачные вычисления и Интернет вещей, а также их интеграция в операционную деятельность компаний различных отраслей. Автор подчеркивает, что цифровизация не только повышает эффективность и конкурентоспособность предприятий, но и требует пересмотра организационных моделей, корпоративной культуры и подходов к управлению персоналом. В статье также затрагиваются вызовы, связанные с кибербезопасностью, необходимостью цифровой грамотности и адаптацией к постоянно меняющимся технологическим условиям. Представлены примеры успешной цифровой трансформации бизнеса и предложены рекомендации для компаний, стремящихся адаптироваться к новым реалиям цифровой экономики.

Ключевые слова: цифровые инструменты, экосистемная модель, трансформации, бизнес процесс, цифровизации.

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