

AMURCON 2021
AmurCon 2021: International Scientific Conference**DIGITAL TRANSFORMATION: OPPORTUNITIES AND
THREATS TO BUSINESS MODELS AND ENTERPRISE
MANAGEMENT SYSTEMS**

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ninellss@gmail.com**Abstract**

The article is devoted to the development of theoretical, methodological and applied foundations for the performance of business models and enterprise management systems influenced by digital transformation, as well as the identification of positive effects, challenges and threats of transformation. The novelty of the study is in the development of terminology by enlarging the theoretical foundations of digital transformation through its representation as processes of analysis of the current state, identifying problems, setting goals and objectives, strategy development, management, control, motivation, identifying the effects of the management system model on the principles of digitalization and computerization. From the perspective of the business environment, the trends and areas of digital transformation are focused on. The achieved effects, goals and objectives of digitalization and computerization of businesses are proved. The software of information systems MIS, which is an organizational and functional system, automated information system AIS, providing processing and data transfer to achieve strategic goals, is proposed. The positive effects, challenges and threats of digital transformation for enterprises and organizations are explained. And therein the practical relevance of the research.

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1. Introduction

One of the properties of the third wave of globalization is the digital economy with information and knowledge as the key assets. Adapting and transforming businesses through digital technologies is a major challenge to the effective performance of enterprises. A key trend of the current stage of economic development in all countries of the world is the rapid spread of information and communication, digital technologies and the development of the digital economy. It causes changes in the business environment, the way transactions are made and connections between business entities. These transformations affect the main tasks of enterprises and their further development vectors, as well as in business management processes. In digitalization of all fields and increasing uncertainty in the external environment, ensuring the competitiveness of enterprises predetermines the necessity to transform their work, introduce new information technologies and digital management tools, and ensure digital disruption. Making the right decision in the direction of transformation towards the digitalization of the enterprise and its adaptation to the new conditions of functioning requires comprehensive knowledge of digital economy trends, advantages and opportunities, obstacles to digital technology implementation and emerging threats. The digital economy creates new products, generates new needs, and provides opportunities to create and develop businesses based on new technological solutions or business models that were not previously applied. All of the above shows that the world in which businesses operate is changing, forcing them to adapt to digital transformation to win fresh markets or transform the current ones.

2. Problem Statement

The object of the study is the process of performing business models and management systems of enterprises and organizations influenced by digital transformation. The subject of the study is the theoretical, methodological, scientific and practical foundations of business models and management systems of enterprises and organizations influenced by digital transformation.

3. Research Questions

The objectives of the study are to develop a glossary by deepening the theoretical background of digital transformation through the representation as processes of review of the current state, finding out problems, setting goals and objectives, developing strategy, management, control, motivation, revealing the effects of the management system model on the principles of digitalization and computerization; development a set of MIS information systems with the positive effects proved, challenges and threats of digital transformation for enterprises and organizations.

4. Purpose of the Study

The purpose of the article is to develop theoretical, methodological and applied foundations for performing business models and management systems of enterprises and organizations influenced by digital transformation.

5. Research Methods

The methodological basis of the study consists of a range of principles, techniques, and theoretical, special and interdisciplinary methods of scientific research. The justification of theoretical provisions and argumentation of conclusions and proposals are carried out based on applying a set of theoretical and empirical methods of scientific knowledge. In particular, methods of comparative and situational analysis, synthesis, induction and deduction, idealization and abstraction, formalization, formalization methods, graphical method, system approach, structural, program approaches, monographic, historical, economic analysis techniques, system-dynamic modeling, forecasting.

The information background of the study includes works of national and foreign scientists on the digital economy, digital transformation of the country's economy, regulatory legal acts of the Russian Federation, Internet resources and other reference and information resources.

6. Findings

Digitalization is providing the world with electronic and digital devices, tools, systems and making up electronic communication between them, implementing integral interaction - virtual and physical, i.e. the development of cyber-physical space. The main goal of digitalization is to achieve the digital transformation of current industries and develop new sectors of the economy, as well as transform the areas of living into new, more efficient and modern ones.

Such growth is only possible when ideas, actions, initiatives and programs relating to digitalization are integrated into national, regional and sectoral strategies and programs for the country's development. Digitalization is a mechanism for economic growth due to the ability of technology to influence positively the efficiency, effectiveness, cost and quality of economic, social and personal activities.

The digital transformation of the country's economy will contribute to the digital transformation of business and the involvement in the development of the state's digital economy, while the digital economy and public transformation will contribute to the effective development of business (its digital transformation) and thereby the digital transformation of the state. The expansion of the share of the digital economy and acceleration of GDP growth through digitalization is a priority issue of global scale and is actively studied by the top-level economic scientists in the world. The issues of digitalization, digital transformation of the economy are in the research agenda of many scholars today, such as Lepore and Coacci (2020), Mamychev et al. (2019), Hryhorak et al. (2020), Kuzubov et al. (2021), Gutbrod (2020), Svistunova et al. (2019), Stepnov (2018) and others.

Globally speaking, the term 'digital transformation' should be interpreted as an irreversible process of digital technology inclusion in the development of the digital economy era to improve human, business, society and the state in general (Shashlo et al., 2018).

From the perspective of the business environment, scholars divide 'digital transformation' into the following areas: interaction with customers, optimization of operational processes and changes in business models. The areas of digital transformation are (Bazhenov et al., 2020):

- Functions are marketing, operations, human resources, administration, customer service, etc;

- Business processes are one or more related operations, activities and sets to achieve a specific business goal;
- Business models are the ways the business operates, from the market approach and cost proposals to ways of earning money, transforming its main business with new sources of income and approaches, sometimes even abandoning the traditional main business.
- Business ecosystems are networks of partners and stakeholders, as well as contextual factors affecting the business, such as regulatory or economic priorities and evolution;
- Business assets: the focus is on both financial assets and less tangible assets such as information and customers;
- Organizational culture: there should be a clear customer-oriented, perceived goal, which is achieved by acquiring key competencies in all areas, such as digital maturity, leadership, knowledge database for employees;
- Partnerships or ecosystems include the growth of cooperative, collaborative, co-creative and brand-new business ecosystem approaches;
- Environment involves customers, employees, partners: customer focus, user experience, empowerment of employees, new workplace models, changing channel partner dynamics, etc.

Digital transformation as a process of transition from optimization to the digital economy quite often begins as a response to changing consumer demands. i.e. to optimize interaction with them, to meet their needs faster and more completely, to build a customer database and process it. These changes are often increased by the transformation of business processes and organizational structures. The transformation of business models and management systems of enterprises and organizations in the context of digitalization have been not investigated enough so far. Given the outrun trends in the applied area of digitalization development, it is now much-needed to analyze the developments in theory and practice in this area (Brovko & Petruk, 2016; Korovin, 2020; Masyuk et al., 2019; Razumova & Levina, 2019; Ukolov et al., 2020).

The main goals, objectives and achievable effects of the digitalization of businesses are (Figure 1):

1.Introduction of new technologies and appropriate mechanisms for their implementation, execution of the Government decree on economic development and other requirements according to the regulatory structure.

2.Change of the customer service process to a new quality level through the implementation of supporting information systems.

3.Security improvement.

4.Operational management improved.

5.Provision of new information services to customers and employees.

6.Increased control over key processes.

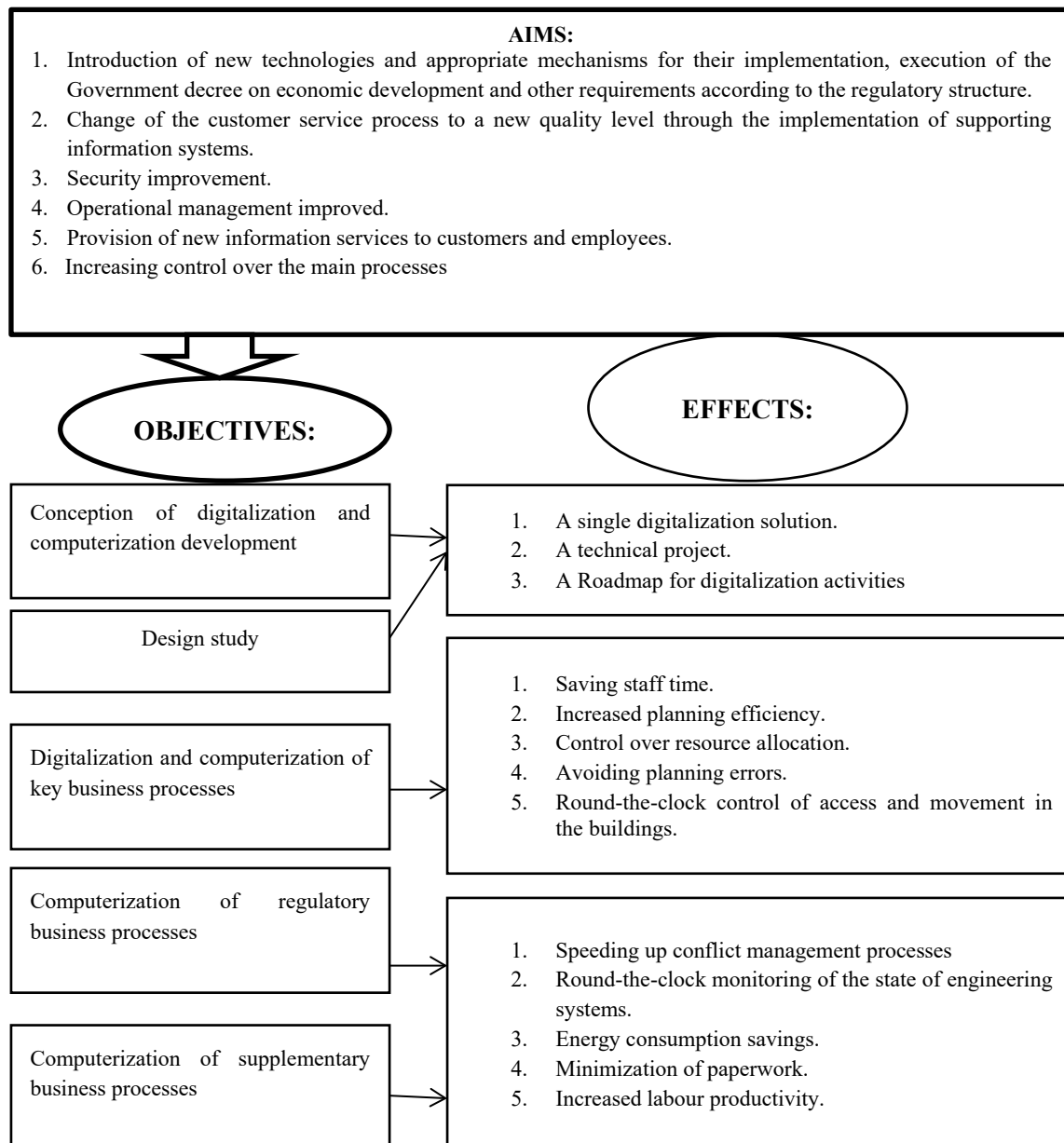


Figure 1. Effects to be achieved, goals and objectives of digitalization and computerization of enterprises

These objectives can be achieved through the development and operationalization of a set of information systems consisting of several linked systems (by process groups). The software of information systems, in turn, is a structural and functional system of an organization that provides information processing and transfer to achieve strategic goals (Petruk et al., 2020). The purpose of the software is to improve the economic and social efficiency of the enterprise.

The key objectives of designing and developing the software of management information systems (MIS) are:

1. Increase of productivity and quality of work of employees due to:
 - Application of tools of shared use of information resources;
 - Application of new methodologies and tools of activity automation in the field of business processes;

- Time cutting for document regulation within the organization.
- 2. Managers provided timely and reliable information for management.
- 3. Centralization of information system resources, including:
 - providing a common technical policy in terms of information technology;
 - ensuring the reliability of information systems through backup the main information resources;
 - reducing operating costs for information technologies.

The management information systems software (MIS) will be understood as an automated information system (hereinafter referred to as AIS), i.e. a set of automated information technologies designed for information services - an organized continuous technological process of preparing and issuing information used for decision-making to consumers, according to the needs for maintaining effective activities.

There are three types of processes used to support the activities of the enterprise:

1. Basic processes.
2. Supporting processes.
3. Management processes.

Computerization of the *Core Process Unit* should aim to simplify procedures for developing training programs and methodologies, communicating with the regions, forming and locating units, improving the quality and control of the production process, and reducing transaction costs and risks in dealing with the contingent. The computerization of the *Auxiliary Process Unit* should be aimed at improving the quality of the provision of basic processes as well as reducing appropriate costs. Computerization of the *Management Process Unit* is aimed at providing management and authorized employees with rapid and reliable information on the financial and economic activities of the organization. In addition, human resources management is an important task.

In perspective, the AIS to be designed must have the following features:

A centralized infrastructure;

Software systems performing various functions;

The need to exchange data between information systems;

Constant changes in information systems (extension of functionality, changes due to changes in business, transition to new hardware, etc.).

In this situation, the following tasks must be solved:

1. To provide the reliable operation of the information systems of the enterprise as a whole.
2. To provide the management of information system modification and operation activities.
3. To provide a unified technical policy in the development of information systems.
4. To provide information security management of information systems.

When implementing the enterprise computerization concept, it is necessary to design a high-quality IT infrastructure, which must meet four key criteria:

1. Accessibility. Provided with the ability to access necessary information resources, technology or software services at any time:
 - Network printing devices;
 - E-mail;

- Remote access to related information systems, etc.

2. Reliability. The resiliency of the information system is supplied through:

- backup system;
- uninterruptible power supply system;
- use of cold and hot equipment spare.

3. Security. This criterion defines the IT infrastructure capacity to provide an appropriate level of differentiation of access to software and hardware and information resources of the system. Information that contains commercial secrets is kept from outsiders and employees of the organization who do not have the appropriate access level. There is a system for authentication (recognition) of users and restriction of their opportunities concerning IT resources (restriction of access to e-mail and the Internet, restriction of the possibility to record information to external media, user authorization in the network, etc.).

4. Adaptability (flexibility and scalability) provided by:

- Possibility of quick and least costly adaptation of IT infrastructure to changes in business requirements;
- Possibility of adding new and/or changing operating functions without failure of the whole system.

5. Efficiency. Provided by application of components for building IT infrastructure, solving problems related to availability, security, long-term data storage and compliance with legal requirements, concurrent minimizing and optimizing capital investments in their acquisition and operation.

Task complexes integrate the functions of the units according to the present organizational structure and provide a link between the individual performer and the automated system that implements the functions of the complex. The basis for dividing tasks into complexes is the principle of microservice architecture. The main advantages of microservice architecture are:

- Simplicity of designing and supporting small services in terms of a code capacity, as opposed to 3D services;
- Opportunity of distributed development of information system components as each service is a separate project;
- Opportunity to choose a programming language and linked libraries suitable for the task to be solved by this service for the development of a separate service;
- Opportunity to use scaling out to build an information system designed on microservice architecture – discovery engine of computing resources for each service, saving costs on computing resources used by the system;
- Simple testing the service, the lower latent error rate in the service because of the small code capacity;
- Modularity of information systems designed on microservice architecture - lower costs for development of a new version of the code service instead of refactoring;
- Simple tracing dependencies between services;
- Minimization of failure risk of the entire information system when using new information technologies in operation;

- High resiliency of the information system as a whole regardless of the operability of a particular subsystem/service.

Let us emphasize the planned effects of introducing AIS into the corporate activities:

- cost savings on expense products;
- saving up to 50% of employees' time;
- reducing operational and administrative expenses by 10-25%;
- more rapid receipt of management reports by 2-5 times;
- optimization of business processes related to document management;
- dynamic monitoring of planning conflicts, elimination of planning errors by 100%;
- eliminating the probability of downtime when disposing of offices and workforce;
- elimination of budget overruns in planning expenditure;
- more than 10 times time reduction for appointment, escalation and resolution of incidents;
- getting a real and complete picture of the status of all engineering systems at any given time;
- constant monitoring of heat, water and energy consumption;
- increased comfort and safety;
- an opportunity of gathering statistical information;
- speeding up the application approval procedure by 60-80%;
- dynamic tracking of KPI (key performance indicators) fulfilment by the company administration;
- providing integration between all systems.

Based on the findings obtained and the anticipation of future results, the priority tasks of digital transformation can be distinguished:

- development management based on strategic management;
- a new approach to the development of professional skills of employees, taking into account the dynamic changes in the economy, new information technologies;
- innovations and strategies in the management development;
- information and communication support, taking into account the constant dynamic changes and updates in the digitalization of all career fields;
- maintaining, strengthening and developing close interaction: the enterprise team;
- close ongoing interaction with the public;
- delegation of authority as a means of involving all participants in the production process in joint active teamwork aimed at promoting daily living and development;
- improvement and renewal of logistical and informational support, taking into account modern technology and science development.

The digitalization of business processes and the economy as a whole not only presents opportunities and influences positively on businesses but is also a challenge and includes some threats (Table 1).

Table 1. Positive effects, challenges and threats of digital transformation for enterprises and organisations

Positive effects	<ul style="list-style-type: none"> - Rapid automation of production processes; - Shortening of the production cycle; - A new kind of cost chain; - Product quality improved and increased product variety and individuality; - Broadening of product market outlets; - Opportunity for access to world markets, development of new leading and breakthrough markets for goods and services; - Reducing risk in management and eliminating incomplete information in decision-making; - Reduction in paperwork, fewer errors in dealing with documents; - decentralization of decision-making; - increased management efficiency; - job cuts and closure; - improving labour efficiency; - reduction of production costs; - increased profitability; - opportunities to closer cooperation between enterprises and research institutions for innovations included; - transparency, simplicity and timeliness in dealing with the authorities.
Challenges and threats	<ul style="list-style-type: none"> - possibility of concentration of market influence and strengthening of monopolies; - increased competition, reduced entry barriers; - occupation of new markets by multinational industrial corporations; - increasing dependence on champion digital technology companies; - shortage of software developers and IT specialists may cause higher labour costs; - the threat of weakening economic security of enterprises; - insufficient development of relevant institutions; - lack of financial resources, high-interest rates on loans; - more substitute products, an increase in consumers' opportunities; - the cumulative effect of digitalization may be weaker than expected.

One of the key challenges for businesses at present is securing their operations. After all, the digitization of information has made business operations much more vulnerable. It is becoming urgent to address the issue of information security and protection as one of the key strategic resources of an enterprise.

7. Conclusion

Digital transformation in the world and Russia, in particular, is very quick. The digital age has already arrived, and business is changing faster than ever before, so businesses cannot ignore the current trends that are now developing and picking up steam: big data, machine learning, neural networks, the Internet of Things, and other modern tools based on the use of digital technologies.

In such an environment, supporting the competitiveness of enterprises requires constant modernization, adaptation and development based on the principles of digital transformation. The effectiveness of these processes is promoted by a proper system of strategic management. The components should include a system of strategic analysis and assessment of the impact of digitalization factors, the development of digital options for product and service development, the identification and setting of strategic objectives for the digital transformation of the enterprise and the selection of tools, taking into account the key trends of computerization. Understanding the modern terminology of digital

development can contribute to the comprehension of economic transformation processes by all stakeholders and effective changes in general.

To sum up, the rapid development of the digital economy in the world is changing the operating conditions of all enterprises in the market, adjusting the strategic priorities and objectives of their further development, causing changes in arranging internal business processes, enterprise management systems, and in the format of the enterprise's interaction with other business entities, consumers and public authorities. Digitalization transforms the business models of enterprises and provides new opportunities for providing competitive advantages, generating income and cost, improving the efficiency of business processes, and, thus, changing to digital business. The positive effects of digitalization are strengthening the competitive position of the enterprise in the market by automating production processes, reducing costs, increasing productivity and management efficiency.

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