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Article

Analysis of The Digitalization Potential of Business Process Management in Joint-Stock Companies and The Factors Influencing it

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Abstract: This article assesses the readiness of joint-stock companies in Uzbekistan for the adoption of digital technologies in the digitization of business processes. The study examines the levels of digital technology infrastructure, internal process automation, business digitization, human capital development, and information security. Additionally, it explores the creation of favorable conditions for the implementation of artificial intelligence technologies in joint-stock companies. The article evaluates the penetration levels of various digital technologies, as well as the volume of software products and services developed based on artificial intelligence.

Keywords: Business Process Digitization, Digital Technology, Automation, Artificial Intelligence, Software

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1. Introduction

In recent years, the acceleration of the global transition to digital technologies and the ongoing transformation have been fundamentally reshaping economies worldwide. In this context, the digitalization of business process management in joint-stock companies is increasingly drawing the attention of both theorists and practitioners. Naturally, this process also affects corporate governance, requiring a thorough analysis of numerous factors and conditions that influence its quality and efficiency.

In Uzbekistan, the legal foundations for digitalizing business process management in joint-stock companies are being established. The Strategy for the Development of Artificial Intelligence Technologies in Uzbekistan until 2030 sets out objectives to create favorable conditions for the introduction of AI technologies in both the social and economic sectors [1]. The strategy also aims to increase the volume of AI-based software products and services to USD 1.5 billion, and to position Uzbekistan among the world's leading countries in the use of artificial intelligence technologies [2]. To achieve these goals, a wide range of measures have been outlined to promote and support the broad implementation of the digital economy [3].

Alongside the integration of digital technologies into management processes, new demands are emerging regarding the competitiveness of local enterprises, their operational efficiency, and their adherence to modern management principles. In the transition to a digital economy, it is essential to consider the specific characteristics of the national economy, anticipate potential challenges in advance, and develop proposals and

solutions to mitigate negative consequences. In Uzbekistan, one of the key strategic directions is enhancing competitiveness in joint-stock companies through the efficient management of available resources and business processes, the application of digital technologies, and process optimization.

2. Materials and Methods

Numerous local and international scholars have conducted research on the digitalization of business processes. For example, Dilmurod Suyunov is the author of several scholarly works focusing on the effective management of business processes in joint-stock companies. His research emphasizes improving corporate governance efficiency, optimizing business processes, and implementing digital transformation strategies.

In his monograph titled "Corporate Governance Mechanism: Problems and Solutions," Suyunov analyzes pressing issues in corporate governance within joint-stock companies and provides scientifically grounded recommendations for their resolution [4]. Additionally, in his article "The Main Problems of Corporate Governance and Ways to Solve Them," he examines various methods to enhance the effectiveness of corporate governance systems [5].

Currently, Uzbek scholars have been carrying out a number of scientific studies in the field of artificial intelligence. In his 2023 publication "Legal Liability within the Scope of Artificial Intelligence", Bozarov Sardor explores the legal issues surrounding artificial intelligence technologies [6]. The book examines the legal status of artificial intelligence, the issues of legal liability that arise from its use, as well as international practices in regulating AI technologies. The author analyzes the autonomy of artificial intelligence and the legal consequences resulting from its activities, emphasizing the importance of clarifying aspects of legal responsibility in this field.

In addition, Akhrorjon Yuldashev's article titled "Opportunities of Artificial Intelligence in Education" analyzes the potential applications of AI technologies in the education sector [7]. Moreover, the "Artificial Intelligence" department under the National University of Uzbekistan named after Mirzo Ulugbek is conducting scientific research on topics such as modeling intuitive decision-making processes, non-parametric methods for solving pattern recognition problems, and the design of artificial neural networks [8]. These scientific endeavors represent significant steps toward the development of the artificial intelligence sector in Uzbekistan.

Among foreign scholars, Herbert A. Simon's seminal work The Sciences of the Artificial is dedicated to understanding artificial systems and complex environments created by humans. This book is widely regarded as a foundational academic contribution in the fields of technology, artificial intelligence, design, and management systems [9]. One of the founding figures of artificial intelligence, John McCarthy, introduced the LISP programming language in 1958, emphasizing its significance as one of the most important programming languages for AI. He highlighted the flexibility and capabilities of LISP, which have served as the foundation for numerous AI systems [10]. Scholars such as Andrew Ng and Michael Porter have also made significant contributions by promoting the widespread application of artificial intelligence through innovations in education and research. Their work explores the integration of AI in competitive strategy and business models, as well as the broader impact of digital transformation on business [11], [12].

Erik Brynjolfsson and Andrew McAfee have conducted in-depth analyses of the digital revolution's impact on the economy and society [13]. They emphasize that effective management of emerging technologies can lead to positive societal transformations. In their research, they advocate for the view that the digital economy and artificial intelligence are critical to shaping the future [14]. Among Uzbek scholars, D. Suyunov emphasizes the relevance of using digital technologies and artificial intelligence in

strategic planning within joint-stock companies [15], [16], [17], [18], [20], [22]. Meanwhile, D. Suyunova asserts that the use of digital technologies and AI in evaluating corporate governance efficiency facilitates more precise, risk-reducing decisions, thereby contributing to better management outcomes [23], [24], [25], [28], [29], [30], [31].

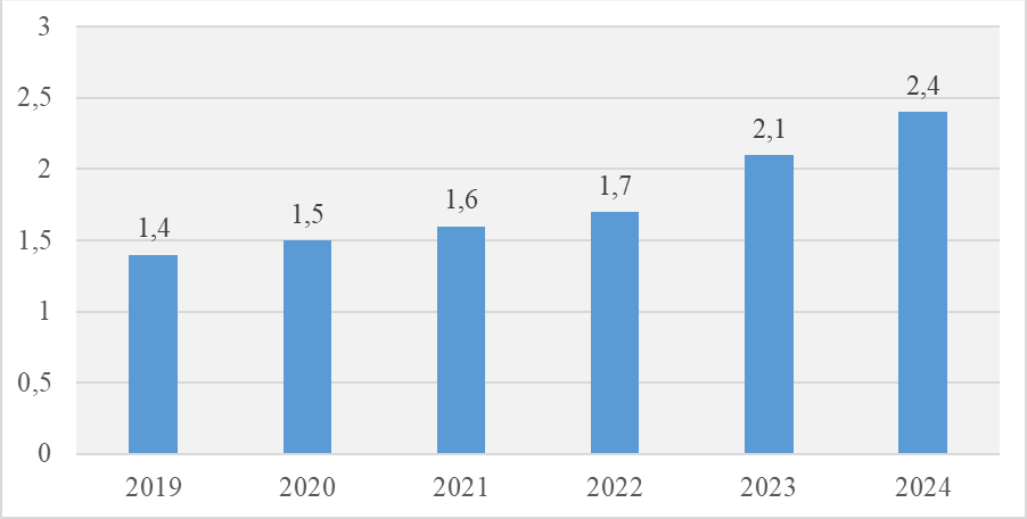
3. Results and Discussion

In accordance with the Presidential Decree of the Republic of Uzbekistan dated October 5, 2020, the "Digital Uzbekistan – 2030" strategy was adopted, along with a corresponding implementation roadmap. This strategy consists of two core programs focused on the digitalization of regions and sectors. Key directions outlined include the development of digital infrastructure, improvement of e-government systems, formation of a national digital technology market, and the advancement of education and professional training in the field of information technology. The successful implementation of this strategy largely depends on financial support for the sector and the enhancement of digital literacy among the population.

With the rapid development of modern technologies and the increasing need to digitalize all sectors, it has become essential for joint-stock companies to adapt their management processes to dynamic conditions. Many enterprises in Uzbekistan, including joint-stock companies, are at the early stages of digital transformation. One of the main limiting factors is the lack of material and technical resources required for transformation. Nevertheless, it is evident from the actions of company leadership that digital transformation is being increasingly prioritized as a strategic objective.

An increase in the level of digitalization has a direct positive impact on the share of information and communication technology (ICT) services in gross domestic product (GDP). Through digitalization, all sectors of the economy can benefit from greater automation, remote services, e-commerce, online education, and e-government services—leading to a rise in ICT demand and the creation of new technological jobs.

Furthermore, digitalization enhances efficiency by automating business processes, accelerating data exchange, and reducing human error. It also expands the capacity for real-time decision-making and improves the quality of customer service through advanced digital technologies.



Source: Compiled by the author based on https://www.stat.uz data.

Figure 1. Change in the Share of Information and Communication Technology (ICT) Services in the Country's GDP, %.

In September 2024, the digitalization potential of business processes in 15 major joint-stock companies in Uzbekistan was studied and analyzed. The results revealed the current

state of digital technologies within these companies, the departments where they are most widely used, and the key areas of digital transformation. Additionally, the study identified the challenges and barriers to digital transformation, proposed solutions to overcome them, and assessed both the current implementation status and future plans regarding the adoption of artificial intelligence (AI) technologies within these companies. Based on these analytical findings, Table 1 illustrates the current state of digital business process management implementation across the surveyed joint-stock companies.

From the data in the table, it is evident that although still at an early stage, joint-stock companies have initiated the digitalization process and have begun implementing Big Data and Data Analytics technologies. While many companies are still in the exploratory phase, discussions are already underway regarding their practical application.

According to the analysis, Table 1 reflects the types of digital technologies that are currently being widely used in joint-stock companies, highlighting their innovation strategies and the progress of their digital transformation journeys.

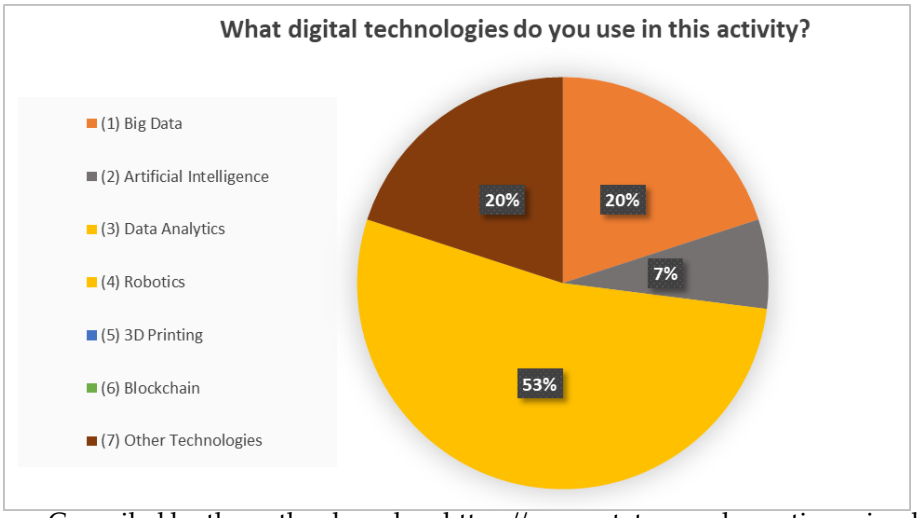
Table 1. Digitalization Potential of Joint-Stock Companies.

No	Joint-Stock Company	Digitized Departments (Divisions, Units)	Implemented Digital Technologies
1	Uzbekistan National Electric Networks JSC	- Accounting Department - Procurement Department	- Big Data -Data Analytics	- Limited financial resources - Low staff qualification
2	Andijan Biochemical Plant JSC	- Accounting Department - Procurement Department - Production Process	-	- Limited financial resources - Low staff qualification - Lack of competition
3	Takhiatash TPP JSC	- Accounting Department - HR Department	-Data Analytics	- Limited financial resources - Distrust in technology
4	New Angren TPP JSC	-Accounting Department - Energy Block No. 4	-	- Limited financial resources - Low staff qualification
5	Microcreditbank JSCB	- Accounting Department - Executive Office - Call Center - Retail and Small Business Departments - Social Programs	- Big Data - Data Analytics	- Limited financial resources
6	Uzbekexpertiza JSC	- Accounting Department - Procurement Department	-Big Data	- Limited financial resources - Low staff qualification
7	Uzbektelecom JSC	All company departments digitized	- Big Data - Artificial Intelligence -Data Analytics	No significant barriers
8	Uzagroleasing JSC	- Accounting Department - Procurement Department	-	- Limited financial resources - Low staff qualification - Lack of competition
9	Buyuk-Qurilish Loyiha LLC	-Accounting Department - Procurement Department - Marketing Department	-	- Limited financial resources - Absence of digital strategy - Low staff qualification

10	Business Development Bank JSCB	- Accounting Department - Card Issuance Department - Lending Department	-	- Limited financial resources - Lack of infrastructure - Low staff qualification
11	Chorsu Commodity Trading Complex JSC	-Accounting Department - Security Service	-Data Analytics	- Limited financial resources
12	Navruz Farmers' Market JSC	- Security Service		- Limited financial resources - Low staff qualification - Lack of competition
13	Mirobod Farmers' Market JSC	- Accounting Department	-	- Limited financial resources - Low staff qualification - Lack of competition
14	Chilonzor Commodity Trading Complex JSC	-Accounting Department - Marketing Department	-	- Limited financial resources - Low staff qualification - Lack of competition
15	Uzsanoateksport JSC	- Accounting Department	-	- Limited financial resources - Investment attraction issues - Low staff qualification

Source: Compiled by the author based on https://www.stat.uz and questionnaire data.

The Figure 2 indicates that companies are actively utilizing technologies needed for big data processing and data analytics, which significantly contribute to more effective decision-making and enable faster adaptation to market changes.

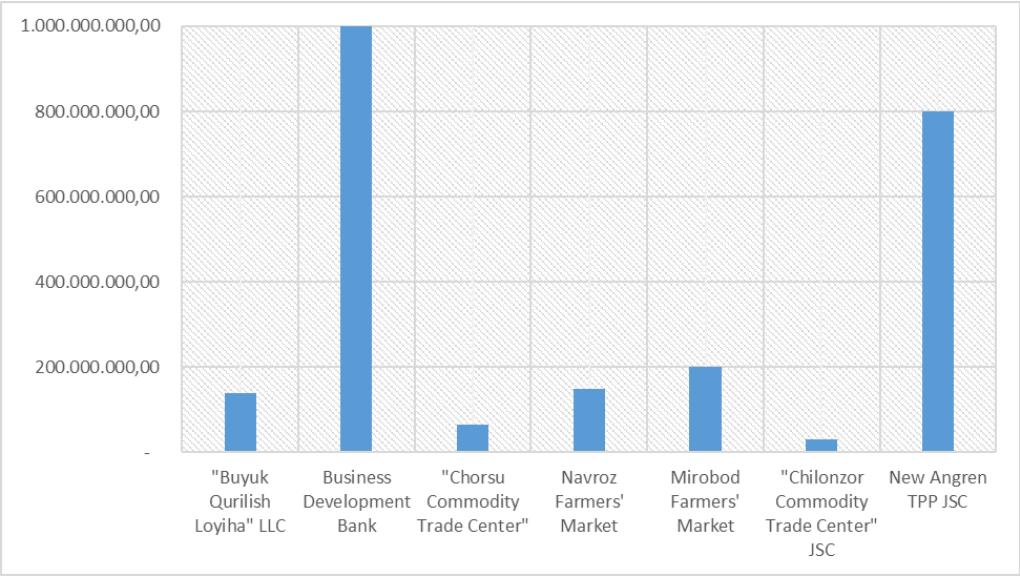


Source: Compiled by the author based on https://www.stat.uz and questionnaire data.

Figure 2. The Degree of Utilization of Digital Technologies by Joint-Stock Companies (in Percentage).

The results of this analysis show that the use of artificial intelligence technologies has not yet been implemented in almost all companies. The reason for this is that many organizations still do not have the necessary resources and knowledge to implement these technologies, or they are taking a cautious approach towards technological innovations.

One of the key aspects is investment in digital technologies, as this allows joint-stock companies to implement innovations and maintain their competitiveness in the market. Figure 3 analyzes how much joint-stock companies have invested in digital technologies and the distribution of this investment."



Source: Compiled by the author based on https://www.stat.uz and questionnaire data.

Figure 3. Investments in digital technologies by joint-stock companies, thousand soums.

"The results of this analysis show that the amount of investment in digital transformation by joint-stock companies currently varies significantly, with some companies investing large amounts (for example, billions of soums), while others are still determining their financial obligations. This disparity indicates that while some are strongly pursuing digital transformation, others may be constrained by budgetary limitations.

Currently, the factors (barriers) hindering the implementation of digital technologies are often related to both internal and external causes. Table 2 presents an analysis of barriers to implementing digital technologies and develops several proposals to overcome them.

To overcome these barriers, enterprises and the government need to work together. This requires not only preparing companies themselves for digital transformation but also developing the entire economic environment. Effective implementation of technologies requires a strategic plan, infrastructure development, personnel training, and financial support."

The analysis of current challenges shows that although joint-stock companies express a desire to implement digital transformation and artificial intelligence, practical barriers continue to significantly hinder progress. Despite these obstacles, several scientific studies and practical projects in the field of artificial intelligence are being carried out in Uzbekistan. In 2021, the Scientific Research Institute for the Development of Digital Technologies and Artificial Intelligence was established under the Ministry of Information Technologies and CommunicationsDevelopment. Among the main tasks of the institute are:

Table 2. Barriers to Implementing Digital Technologies in Joint-Stock Companies and Proposed Solutions.

No	Barriers to Implementing Digital Technologies	Proposals for Overcoming Them
1	Lack of Funding and Resources	• Increase government subsidies and concessional loans for the implementation of digital technologies; • Encourage investments in digital technologies through local and international donors;

2	Insufficiently Skilled Personnel	• Develop a phased implementation strategy to avoid large-scale investments at once. • Organize training courses, seminars, and workshops for employees; • Expand cooperation between joint-stock companies and universities, IT companies, and other institutions for staff development; • Attract specialized experts in digital technology management to train in-house personnel.
3	Distrust in Technology	• Showcase the experiences of companies that have successfully undergone digital transformation; • Provide reliable tools and solutions for cybersecurity; • Demonstrate the effectiveness of technology through small pilot projects.
4	Cultural and Psychological Barriers	• Inform organizational leadership about the benefits of digital transformation and generate interest in its implementation; • Establish special change management teams within companies; • Foster a corporate culture that encourages the adoption of technology.
5	Competition	• Prepare the local market for globalization and promote the production of competitive products; • Promote the convenience of digital services to customers.
6	Underdeveloped Existing Infrastructure	• Expand access to quality internet networks in remote areas; • Establish specialized centers to provide technical support for digital technologies.
7	Lack of a Digital Strategy	• Engage specialists in digital transformation; • Develop flexible digital strategies tailored to each enterprise; • Continuously evaluate the outcomes of implemented technologies.

Source: Compiled by the author based on analytical and survey data.

a. the implementation of artificial intelligence technologies in economic sectors, social spheres, and public administration systems;
b. conducting both fundamental and applied scientific research;
c. and developing innovative products.

These initiatives represent important steps toward the development of the artificial intelligence sector in Uzbekistan.

4. Conclusion

This article analyzes the current state, opportunities, and challenges of business process digitalization in joint-stock companies in Uzbekistan. The level of readiness of these companies for digital technologies has been assessed based on indicators such as existing infrastructure, the degree of internal process automation, human capital development, and information security.

The article also addresses the challenges in implementing artificial intelligence technologies, including financial constraints, a lack of qualified personnel, and distrust toward technology. Recommendations have been proposed to overcome these barriers, such as government support measures, upskilling the workforce, and developing phased digitalization strategies. Although the process of digitalization and the application of artificial intelligence technologies in joint-stock companies is still in its early stages, significant positive developments are already underway. However, to ensure the full effectiveness of this process, collaboration between the public and private sectors, strategic planning, and efficient allocation of resources are of vital importance.

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