INDUSTRY 4.0 - AS A FACTOR IN INCREASING THE ECONOMIC EFFICIENCY OF INDUSTRY IN UZBEKISTAN

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INDUSTRY 4.0 - AS A FACTOR IN INCREASING THE ECONOMIC EFFICIENCY OF INDUSTRY IN UZBEKISTAN

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Abstract: With the development in industry innovation and applications, numerous concepts have developed in manufacturing. Since the term Industry 4.0 was published to highlight a new industrial revolution, many manufacturing organizations and companies in Europe, North and South America are conducting researches on this topic. Indeed, the Industry 4.0 concept is included on government obligation, supported by national activities and research financing. Notwithstanding, developing nations like Uzbekistan, with high manufacturing potential are encountering a diverse position and the roadmap for the implementation of Industry 4.0 isn't clear yet. Within the last 20 years, Uzbekistan had joined the group of lower-middle income countries; the ultimate improvement objective of the nation within the following arrange is to reach the improvement benchmark comparable to the higher-middle income group by 2030. Therefore, this paper aims to depict the current state of manufacturing systems in Uzbekistan and identify the gaps with the industry 4.0 requirements.

Keywords: Industry 4.0, Manufacturing systems, Developing Countries, Digital policy, Digitalization.

Introduction

Uzbekistan is one the first countries in Central Asia which is enthusiastically moving towards 4th industrial economic revolution. Different ministries are promoting digitalization in the areas of telecommunication, information technology, government and foreign investments. The government has approved "Smart city" concept: implementation of technology solutions in education, medicine, housing and communal services and territorial management. The Cabinet of Ministers of the Republic of Uzbekistan has approved the concept of implementation of "Smart city" technologies with an exclusive decree. The goal of the document is "creation of favorable conditions for improving the standard of living, solutions of citizens'
issues, improving of social infrastructure and regional development". The decree mentions that the country is currently at initial stages of implementation of "Smart city" technologies - pilot projects regarding the systems "Safe city", "Smart enumerators", "Smart transportation" and "Smart medicine" are realized in Tashkent. The main issue preventing implementation of such technologies - poor infrastructure of ICT and obsolescence of city infrastructure, requiring modernization of telecommunication networks and capital investment in reconstruction. The method for resolving such issues, in accordance with world practice is attraction of private sector in resolving socially significant challenges and establishment of PPP. Recent presidential decrees are tackling the issues related to Block chain Mining and regulation of Crypto currency. Moreover, government is enthusiastically supporting IT startups through IT parks and innovation centers. However, there can be challenge for the Ministry of Justice to correlate with the digitalization projects of the government. New Civil Code should spread its tentacles on the all the core areas of private and public laws. In Uzbekistan, the New Civil Code requires market led reforms to meet the demands of 21st century model government as well as to make it relevant with the upcoming wave of digitalization in the country. According to the decree of the President of Uzbekistan “On measures to improve the civil legislation of the Republic of Uzbekistan” which was adopted on April 5, Uzbekistan has begun the preparation of a new version of the Civil Code. The new edition of the Civil Code is expected to be developed before April 1, 2020. The task is to optimize the organizational and legal forms of legal entities, to increase the efficiency of corporate governance and supplement the Code with new types of contracts, etc. The Civil Code is a key regulatory act for economic relations. The current edition was adopted in 1995-1996. The main directions of the upcoming changes are indicated in the “Concept of Improving Civil Legislation”. This document says, “The analysis of economic reforms implementation revealed significant shortcomings and gaps that negatively affect further market reforms, harm favorable investment climate and business environment, hinder improvement the country's position in international ratings,”. These are improvement of existing and introduction of new principles of civil legal relations, revision of the old and introduction of new concepts (terms), improvement of measures and means aimed at ensuring fair and proper implementation of civil rights and discharge of duties, optimization of organizational and legal forms and much more.

Materials and methods
In the quality of the equipment the methods of the analysis of the scientific and information base, the synthesis of the obtained data and the theoretical conclusions and methods of practical analysis are applied.

**Literature review**

Questions of “Importance of developing 4th industrial revolution in Uzbekistan to prosper economic condition” were considered by a number of scientists. The significant contribution to the theory of innovations and a number of other foreign and domestic scientists have introduced. One of popular scientist Ammar Younas in his research on Foreign Policy News [1], states that incorporating modernization and digitalization in new civil code of Uzbekistan, mentions recommendations provided below: The immediate and first step for Uzbekistan is to officially consider the question of drafting an Artificial Intelligence Policy for the country. This should be done by involving stakeholders from all the domains. It should be kept on the highest strategic priority of the political and legal strategy of the country. AI Policy will provide immediate guidelines to industry and other actors directly interacting with the economy. This policy should highlight the important tasks and goals to be achieved in near future. Some of the research including Riedl et al. (2014),[2] Rosas et al. (2017) [3], Schuh et al. (2014b) [4] and Schweer and Sahl (2017) [5] studied Industry 4.0 components and focused especially on CPS and IoT system capabilities. Ong et al. (2008) [6] used Augmented reality applications in manufacturing and their survey analyzed performance for Industry 4.0. Similarly, a lot of researchers studied this concept from various aspects. To mention some; Qin et al. (2016) [7] prepared a fundamental framework for Industry 4.0 system. They analyzed Industry 4.0 process in four layers; factory, business, products and customers. Adeyeri et al. (2015) [8] presented an overview Industry 4.0 focusing the attention on agent-based systems. Filippi and Barattin (2012) [9] classified activities in Industry 4.0 aiming to support respective transition. They intended to provide a road map for the companies to get ready for the future. Sogoti (2014)[10] prepared a report for Machine-to-Machine communication in Industry 4.0 based manufacturing environments.

**Analysis and Results**
Developing countries will be unable to fully benefit from Industry 4.0 for development unless they have the necessary industrial (manufacturing) and digital infrastructure and capabilities. Only a few enterprises in a developing country will use Industry 4.0 if these elements are missing. Even fewer will use Industry 4.0 technology, and even fewer will use Smart Production. While attempting to meet the industry 4.0 prerequisites, developing countries should focus on their own development. The prerequisites for implementing Industry 4.0 in manufacturing (UNIDO, 2020). These include the creation of national plans that guide, in a consistent and coordinated manner; Industry 4.0 development and implementation, as well as the establishment of a multi-stakeholder mechanism. Establishes a participative approach to Industry 4.0 by fostering worldwide collaborations to accelerate the transfer of technology and know-how, and create a conducive intellectual property regime.

According to the forecasts of the Global Institute McKinsey (Mackinsey)[11], it will take about 100 years to fully transition to the digital technology platform of Industry 4.0. By 2025, the contribution of the industrial Internet to the global economy may amount to about 11% of global GDP. The transition of the Republic of Uzbekistan to “Industry 4.0” is considered by a number of factors, which include:

- low level of digitization of the economy;
- lack of business understanding of the economic benefits of digitalization;
- poor development of domestic developments and competencies in automation and digitalization;
- lack of qualified personnel;
- limited financial resources;
- insufficient costs of enterprises for innovative development and research.

In order to accelerate the transition to “Industry 4.0”, the development of the corresponding infrastructure, including:

- creation of legal conditions for the development of the industrial Internet;
- providing enterprises with access to high-speed Internet;
- development of human capital and competencies in line with the concept of Industry 4.0;
- development of proprietary technologies in accordance with the concept of “Industry 4.0”;
- development of digital infrastructure;
- providing financial support for the digitalization of the economy.
Since 2012, the Government of Uzbekistan has made solid stride towards executing computerized advances and has propelled two projects to progress advanced improvement in the nation: the “ICT Infrastructure Development Program 2015-2019” (9 projects) and the “E-Government Development Program 2013–2020” (28 projects).

In the last five years Uzbekistan has managed to improve share of digitalization in economy. Information communication technologies are one of the fast-developing areas amongst job seekers as well. Number of ICT companies has been growing in all regions.

### Table 1.
The share of value added in the information economy and e-commerce in GDP

<table>
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<td>Information Economy and e-commerce sector</td>
<td>1.9</td>
<td>2.1</td>
<td>2.3</td>
<td>2.1</td>
<td>1.8</td>
<td>2.0</td>
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<td></td>
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<td></td>
<td></td>
<td></td>
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<tr>
<td>Information and Communication Technology (ICT) sector</td>
<td>1.8</td>
<td>2.0</td>
<td>2.1</td>
<td>1.9</td>
<td>1.6</td>
<td>1.7</td>
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<tr>
<td>ICT production</td>
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<td>0.1</td>
<td>0.1</td>
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<td>0.1</td>
</tr>
<tr>
<td>ICT trade</td>
<td>0.1</td>
<td>0.1</td>
<td>0.1</td>
<td>0.1</td>
<td>0.1</td>
<td>0.0</td>
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<tr>
<td>ICT services</td>
<td>1.6</td>
<td>1.8</td>
<td>1.9</td>
<td>1.7</td>
<td>1.4</td>
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<tr>
<td>Content sector and mass media</td>
<td>0.1</td>
<td>0.2</td>
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<td>0.2</td>
<td>0.2</td>
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<tr>
<td>E-commerce</td>
<td>0.0</td>
<td>0.0</td>
<td>0.1</td>
<td>0.1</td>
<td></td>
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</tr>
</tbody>
</table>

Source: Digital economy (stat.uz)

### Table 2.
Number of employees in the ICT sector (People)

<table>
<thead>
<tr>
<th></th>
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<td>37731</td>
<td>39896</td>
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<tr>
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<td>1049</td>
<td>1131</td>
<td>1028</td>
<td>1230</td>
<td>1302</td>
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<td></td>
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<td></td>
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<tr>
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<td>1401</td>
<td>1384</td>
<td>1549</td>
<td>1702</td>
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<td>1419</td>
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<td>1770</td>
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<td>553</td>
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<td>731</td>
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<td>750</td>
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<td>913</td>
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<td>1052</td>
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<tr>
<td>Navoi</td>
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<td>1002</td>
<td>1112</td>
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<td>1328</td>
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<tr>
<td>Namangan</td>
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<td>942</td>
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<td>1582</td>
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<tr>
<td>Surkhandarya</td>
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<td>736</td>
<td>850</td>
<td>850</td>
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<td>Syrdarya</td>
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<td>620</td>
<td>623</td>
<td>209</td>
<td>717</td>
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<tr>
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<td>1447</td>
<td>1735</td>
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<tr>
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<td>2638</td>
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<td>2319</td>
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<tr>
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<td>856</td>
<td>1003</td>
<td>1004</td>
<td>1126</td>
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<tr>
<td>Tashkent city</td>
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<td>19818</td>
<td>22597</td>
<td>24163</td>
<td>29400</td>
<td>30142</td>
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</table>
The Ministry for Development of Information Technologies and Communications administers these projects (since 2015). Inside the E-Government program, Uzbekistan has propelled 265 online administrations and 600 government organizations, actualized client criticism on administration quality and e-investment, expanded straightforwardness in open administration conveyance, set-up a call-focus, and set up “One-Stop-Shops” in 194 regions of the nation. Uzbekistan has affirmed its availability to work together with the World Bank and with different nations in the area to build up a focused ICT segment and triple its weight in the national economy.

Digitalization can be contrasted with industrialization in what might be its possible effect on financial and social establishments. As industrialization put machine control at the focal point of the economy, digitalization makes advanced insight its new support. The processing plant as the site of motorized generation was the focal monetary establishment of the modern age. For computerized age, it is sectorial stages that re-compose whole financial exercises in any segment dependent on advanced insight emerging from information. Internet business is a shallow method to assign this wonder. Computerized economy is characterized by advanced insight administrations, particularly as they show in the activity of segment wide stages.

Future exchange gains and the prospects for exchange drove improvement in creating nations will rely upon how great they are at retaining these advances and applying them to existing industry. To be “exchange prepared” in the advanced economy, they will require two arrangements of abilities. The first is standard abilities, know-how, and skills that are basic for the assembling area and to make new items and procedures interfacing assembling and administrations, as in traditional industrialization. Given that a lot of internet business is selling conventional merchandise and enterprises on the web, the absence of capacity to deliver numerous assortments of modern yield will straightforwardly influence the dimension of cooperation and offer of additions. A second arrangement of abilities is the aptitudes, information, and specialized skill of specific centrality to Industry 4.0. This implies information researchers, RPA architects, and individuals represented considerable authority specifically sectoral innovations. After some time, all industrialization will confront transformational weights to wind up computerized industrialization. That is the reason it will be essential to create
interdisciplinary abilities that consolidate specialized mastery with explicit plant the executive’s skill to run half and half generation frameworks. A double spotlight on the two sorts of capacities is expected to adjust and hold occupations while in the meantime advancing nearby modern substance.

A focal pawn in the amusement is information, meriting an uncommon notice. The web creates stunning measures of information each second through web indexes, presentation pages, online stages, and internet-based life. These can help to methodically outline conduct and rivalry inclines and create value correlations (in this way appearing at cut expenses). Be that as it may, access to information alone does not ensure data. Getting significant bits of knowledge from this immense measure of data requires abilities for information examination, and creating other computerized items utilizing information can be overwhelming without high innovation aptitudes.

Computerized mechanical strategies are in this manner critical to fortify the attention on capacities and hold space for nearby man oeuvre. They can enable nations to control and check cross-outskirt information streams, advance purchaser assurance and wellbeing of online exchanges, and secure individual protection. Be that as it may, albeit such strategies are harbingers of expectation, they will likewise confront a few restrictions. A first restriction is the decision of modern arrangement instruments, since a large number of them involve exchange offs and worries of security and improvement might be profoundly interwoven. For instance, information confinement is regularly supported as a modern strategy choice to hold information control and advance neighborhood businesses (by sharing the information), while a few nations likewise consider it to be a critical instrument to guarantee singular protection. In any case, what isn’t clear is the way information power – which depends on a nation’s endeavors to make huge scale computerized foundation to course its web traffic and expecting organizations to store all data produced inside national limits – can truly help make specialized insurance from information abuse.

In useful terms, modern strategies in this field ought to help manufacture abilities as well as guarantee that business sectors for computerized items stay aggressive with the goal that nearby firms can contend and flourish. This is in no way, shape or form a simple errand. It includes administering vast “officeholder” worldwide firms and keeping them from utilizing huge information examination to shape markets and market gains. There are a few manners by which substantial firms can utilize huge information. They can structure their very own extension to
guarantee more prominent benefits and market control; offer new advanced items, for example, the web of things, in light of information created on their online stages, to additionally concrete their monopolistic positions; or even offer their information pools to different firms on a particular premise. Computerized modern approaches will have their restrictions in anticipating and deflecting such enemy of focused practices, since an extensive number of these impacts will unavoidably be cross-outskirt in nature.

In an advanced domain, the Internet’s development and online business starts to make crucial change to government, social orders, and economies with social, monetary and political ramifications. E-trade has effectively improved business esteem by in a general sense changing the manners in which items are imagined, showcased, conveyed, and upheld. The relationship and collaboration of different partners, for example, clients, providers, key accomplices, operators, or wholesalers is recognizably changed. The genuine effect of internet business is its capacity to diminish expenses and costs and make working together progressively proficient. These funds pervade the whole esteem chain and effect fundamentally in business associations with different organizations.

Advanced modern approaches are in this manner critical to strengthen the attention on capacities and hold space for neighborhood man oeuvre. They can enable nations to control and check cross-fringe information streams, advance buyer assurance and wellbeing of online exchanges, and ensure singular protection. Be that as it may, albeit such arrangements are harbingers of expectation, they will likewise confront a few constraints. A first impediment is the decision of modern strategy instruments, since a significant number of them involve exchange offs and worries of protection and improvement might be profoundly interwoven. For instance, information limitation is regularly pushed as a mechanical arrangement alternative to hold information control and advance nearby ventures (by sharing the information), while a few nations likewise consider it to be an imperative instrument to guarantee singular security. In any case, what isn’t clear is the manner by which information sway – which depends on a nation’s endeavors to make extensive scale advanced foundation to course its web traffic and expecting organizations to store all data produced inside national limits – can truly help make specialized insurance from information abuse.

Even though, some important reforms have been made to develop digital industry in Uzbekistan, the government is still suffering from challenges on establishing advanced digital infrastructure the country. Uzbekistan, therefore
should begin shaping digital industrial policies based on mixed, China’s and USA’s digital economy models which are currently dominant and most successful throughout the globe, thanks to their giant commercial internet platforms (Baidu, Alibaba, Tencent, Amazon, Netflix, Uber, Lyft, Youtube.com, Facebook, Google etc.).

The digital economy accounted for 9.6 percent of the U.S. gross domestic product, or $2.1 trillion, in 2019, according to a new batch of statistics released by the Bureau of Economic Analysis. The digital economy supported 7.7 million jobs in 2019, which accounted for 5.0 percent of total U.S. employment of 152.1 million jobs. Employees working in the digital economy earned $131.609 in average annual compensation in 2019.

One important step can be the introduction of new legal personalities such as nonhuman legal personalities or the concept of “digital personhood” in the new Civil Code. This will accommodate not only the demands of 5G Technology and the “Internet of Things” but will help in incorporating the digitalization in overall legal system. The issue is not only related to the AI development, “Internet of Things” or Regulations for Big Data, but the concern of drafting an AI Policy is related to the whole subject matter concerning the technology, innovation and economy in general.

Further steps can include the introduction of more technology-blended laws or to incorporate AI regulations in existing laws. For example, including the regulations for “Autonomous output of Ais” in the Intellectual property laws of the country. It can be a challenge for Uzbek legal scientists to draft an AI policy and to incorporate digitalization in the legislation for making it more relevant to the fourth industrial revolution. Whereas, world in looking towards the upcoming changes in Uzbekistan and question remains open, “Is Uzbekistan ready to take lead in the Central Asian region to introduce an AI Policy or not?” A globalized (by using global methodologies in local context) AI Policy can keep innovative economy sustainable in Uzbekistan. At the initiative of Uztelecom, an Association was created to promote the development and standardization of control systems based on the industrial Internet, the purpose of which is to create and develop a new technological platform, a system of standards, interfaces for creating advanced, universal automation systems. Digitalization is seen by many as an engine of productivity and economic growth. It can increase the efficiency with which things are done and vastly improve the decision-making process by analyzing large amounts of data. It can also spawn the creation of new products and services, markets and industries, thereby boosting consumer demand and
generating new revenue streams. A briefing of European parliament has highlighted that digitalization may also have a highly disruptive effect on the economy and society. Some warn that it could lead to the creation of super firms – hubs of wealth and knowledge – that could have detrimental effects on the wider economy. It may also widen the gap between developed and developing countries, and boost the need for workers with certain digitalization skills while rendering others redundant; this latter trend could have far-reaching consequences for the labor market. Experts also warn of its potential to increase inequality, push down wages and shrink the tax base. While these concerns digitalization valid, there is no consensus on whether and to what extent the related risks will materialize. They are not a given, and carefully designed policy would be able to foster the development of digital economy while keeping the negative effects in check.1 Each country should try to improve its standing in global competition and direct digital economy onto a path that benefits its economy and citizens. In order to achieve this, the country should come up with an 4th industrial revolution Policy.

**Main outcomes and findings**

To establish well-developed digital infrastructure in our country and accomplish a main goal by 2030, innovative start-ups and venture businesses should be encouraged and supported by the government. Devices enabling us to connect to the internet should witness a price reduction. Privacy Policy of the individuals must be protected. National internet browsers and search engines also needed. All territory of the country must be covered by fixed broad bands and high-speed mobile internet. Transparency between citizens and government agencies should be ensured.

According to Parminder Jeet Singh, a sound digital industrial policy will combine at least five elements;
1. providing enabling legal and regulatory frameworks, including for easy and secure e-transactions;
2. supporting a start-up ecology and other domestic digital businesses;
3. building public digital and data infrastructures;
4. shaping regulatory frameworks for digital monopolies that are set to control whole sectors;
5. as required, developing public community digital platforms in some key areas;
Conclusion

Today, the country’s digitalization level determines its economic and social development, as well as competitiveness on the world stage. In recent years, the ongoing reforms in Uzbekistan have been accompanied by the active introduction of modern information and communication technologies into the process, public access to telecommunication services is expanding, government services are being phased into electronic form and provided on a “one-stop-shop” basis. The positions of the Republic of Uzbekistan in the UN ranking on the development of e-government are gradually strengthening.

In order to accelerate the development of digital technologies, increase the efficiency of public administration, improve the quality of public services, create an enabling environment for the development of innovative technologies, increase the competitiveness of the country: Creating a favorable ecosystem for the development and implementation of digital technologies is having an increasing impact on both the country’s economy and society. The phased implementation of appropriate digital solutions entails improving the quality of life of the population, leading to an efficient and transparent construction of public administration mechanisms, in particular, increasing economic efficiency, reducing the level of corruption components, the share of the shadow economy and much more. In this connection, today the digital transformation of all sectors of the economy is one of the priority areas of any developing state.

The stages of the qualitative development of most sectors of the economy, social sphere and public administration are associated with the introduction of digital technologies. In the context of the growing pace of technological and economic changes, the state is faced with increasingly diverse and complex tasks arising from the main problem – the imperfection and lack of competitiveness of the public administration system.

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