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UNLOCKING THE POTENTIAL OF THE DIGITAL ECONOMY IN THE EAEU COUNTRIES: IDENTIFYING AND OVERCOMING OBSTACLES

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Abstract. In this research work, the conditions of digitalization in the countries of the Eurasian Economic Union are considered. The essence and trends of the digital strategy of the EAEU are revealed, in particular, the emphasis is placed on its structural composition. We analyzed digital indicators by comparative analysis. The foreign experience in the field of problem solving in the process of digital transformation of the economy was studied as well. The features and constraining factors for the development of digital transformation of economic sectors are determined, and on their basis scientific conclusions are drawn on the formation of a single digital space of the EAEU. Scientific conclusions are made for the further development of the digital economy by studying the features and constraints of the development of digital transformation in various sectors of the economy of the EAEU. Digitalization is one of the dominant processes of modern economic development both at the national level and globally. Because of this, digital transformation is seen as the main agenda for the Eurasian Economic Union, facilitating the free movement of goods, services, labor and capital between member states. The EAEU creates the appropriate conditions for the member countries to fulfill the key statutory tasks in all areas of the country's foreign and domestic economic activities. This is confirmed by the significant growth of macroeconomic indicators following the results of the first five-year period. The EAEU gross domestic product at purchasing power parity (GDP at PPP) increased by 13%, GDP per capita by 12%, the unemployment rate decreased by 12%, investment in fixed assets increased by 19%. The volume of mutual trade of the EAEU in November 2019 amounted to 5,628.8 million US dollars. By November 2018, its value increased by 11.3% or $572.3 million, or by 5.9% or $315.6 million compared to the previous month. For Kazakhstan, the growth rate compared to 2018 was 123.7% (USD 598.2 million) Purpose of the study. The purpose of the study is to study the regional challenges and opportunities of the member countries of the EAEU in the sector of digital economy. Furthermore, we aimed to investigate the barriers, problems in the field of digitalization and to provide scientific and practical conclusions on their solutions. Research methods. In the process of research, structural-system approaches, classification, logical method, scientific abstraction, generalization method were used. Using these methods together made it possible to carry out a comprehensive and complex analysis of the studied area, to make theoretical generalizations, to formulate practical recommendations and conclusions.

Keywords: digital economy, digitalization, digital transformation, digital strategy, EAEU countries, digitalization indicators, threats

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РАСКРЫТИЕ ПОТЕНЦИАЛА ЦИФРОВОЙ ЭКОНОМИКИ В СТРАНАХ ЕАЭС: ВЫЯВЛЕНИЕ И ПРЕОДОЛЕНИЕ ПРЕПЯТСТВИЙ

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Аннотация. В данной исследовательской работе рассмотрены условия цифровизации в странах Евроазиатского экономического союза. Также, раскрываются сущность и тенденции цифровой стратегии Евроазиатского экономического союза, в частности, сделан акцент на её структурный состав. Проанализирована цифровые индикаторы методом сравнительного и сопостовительного анализа. Также, изучен зарубежный опыт в сфере решения проблем в процессе цифровой трансформации экономики. Определены особенности и сдерживающие факторы развития цифровой трансформации отраслей экономики, и на их основе сделаны научные выводы по формированию единого цифрового пространства Евроазиатского экономического союза. Сделаны научные выводы для дальнейшего развития цифровой экономики путем изучения особенностей и сдерживающих факторов развития цифровой трансформации в различных отраслях экономики Евроазиатского экономического союза. Цифровизация является одним из доминирующих процессов современного экономического развития как на национальном уровне, так и в глобальном масштабе. В силу этого, цифровая трансформация видится главной повесткой для Евразийского экономического союза, содействующей свободному движению товаров, услуг, рабочей силы и капитала между государствами-членам. ЕАЭС создает надлежащие условия для выполнения странами-участницами ключевых уставных задач во всех сферах внешней и внутренней экономической деятельности страны. Это подтверждается значительным ростом макроэкономических показателей по итогам первой пятилетки. Валовой внутренний продукт ЕАЭС по паритету покупательной способности (ВВП по ППС) увеличился на 13%, ВВП на душу населения — на 12%, уровень безработицы снизился на 12%, инвестиции в основной капитал выросли на 19%. Объем взаимной торговли ЕАЭС в ноябре 2019 года составил 5 628,8 млн долл. США. К ноябрю 2018 года его стоимость увеличилась на 11,3% или 572,3 млн долл. США, по сравнению с предыдущим месяцем — на 5,9% или 315,6 млн долл. США. Для Казахстана темп роста по сравнению с 2018 годом составил 123,7% (598,2 млн долл. США) Цель исследования. Цель исследования – изучить региональные вызовы и возможности стран входящие в ЕАЭС при цифровизации экономики. Также, рассмотреть преграды, проблемы в области цифровизации и изложить научно-практические выводы по их решениям. Методы исследования. В процессе исследования использованы структурно-системные подходы, классификация, логический метод, научное абстрагирование, метод обобщения. Применение этих методов в совокупности позволило осуществить всесторонний, комплексный анализ изучаемой сферы, сделать теоретические обобщения, сформулировать практические рекомендации и выводы.

Ключевые слова: цифровая экономика, цифровизация, цифровая трансформация, цифровая стратегия, страны ЕАЭС, индикаторы цифровизации, угрозы

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Introduction

Digitalization is one of the dominant processes of modern economic development both at the national level and globally. Because of this, digital transformation is seen as the main agenda for the Eurasian Economic Union, facilitating the free movement of goods, services, labor and capital between member states [1]. The EAEU creates the appropriate conditions for the member countries to fulfill the key statutory tasks in all areas of the country's foreign and domestic economic activities. This is confirmed by the significant growth of macroeconomic indicators following the results of the first five-year period. The EAEU gross domestic product at purchasing power parity (GDP at PPP) increased by 13%, GDP per capita – by 12%, the unemployment rate decreased by 12%, investment in fixed assets increased by 19%. The volume of mutual trade of the EAEU in November 2019 amounted to 5,628.8 million US dollars [2]. By November 2018, its value increased by 11.3% or $572.3 million, compared to the previous month – by 5.9% or $315.6 million. For Kazakhstan, the growth rate compared to 2018 was 123.7% (USD 598.2 million) [3].

The share of the digital economy in the EAEU is 2.8% of the total GDP of all member states. It is expected that the potential economic effect from the implementation of the digital agenda will increase the total GDP of the EAEU by 2025 by about 11% of the total expected growth. This is about twice as much as without a joint digital agenda. The implementation of a joint digital agenda can increase employment in the ICT sector by 66.4% and overall employment by 2.46%, and lead to an additional increase in exports of ICT services by 74%. It is expected that by 2025 the share of the digital economy will be at least 20%, the share of people employed in the high-tech segment will be at least 20%, the share of exports of digital goods and services and traditional goods through digital channels will be at least 20% [4].

Purpose of the study. The purpose of the research is to study the regional challenges and opportunities of the EAEU member countries in the digital economy. Also, it aims to study the barriers, problems in the field of digitalization and to provide scientific and practical conclusions on their solutions.

The object of the research work is the ongoing process of digitalization of the economy in the EAEU countries.

The subject of the study is a set of economic relations that arise in the process of developing and applying a program for the digitalization of the national economy.

Literature review. The theoretical foundation for studying the features of the digital economy developments within the EAEU and digital transformation of the world economy is built upon the contributions of foreign and CIS countries' economists as M.Yu. Ilyina [5], B.D. Khusainov, A.A. Shirov, N.A. Baizakov [6], Anna V. Abramova, Elina Thorne [7] and many others. The challenges and opportunities surrounding digital relations within the EAEU are examined by M. Yu. Eremenko [8], Nadezhda V. Muravyeva, Vera U. Rudakova [9], Olga Filatova, Vadim Golubev and Elena Stetsko [10] with a focus on identifying issues in the digital economy's development at the level of this regional integration.

Works of P.A. Lis, V.I. Slizh, V.A. Bogush [11], Elena I. Inshakova, Agnessa O. Inshakova and Larisa A. Kochetova [12] are devoted to certain issues of transformation of the financial, transport and agro industries under the influence of the process of digitalization of the economy.

Despite the large number of publications on the digital transformation of the global economy, a number of aspects require more thorough analysis in unlocking the potential of the digital economy in the EAEU countries. Presently, the EAEU plays a crucial role in fostering economic ties among its member countries, aiming to provide legal entities with enhanced opportunities to fulfill their requirements and align economic relationships with contemporary digital processes.

Research methods. In the process of research, structural-system approaches, classification, logical method, scientific abstraction, generalization method were used.

The use of these methods together made it possible to carry out a comprehensive and complex analysis of the studied area, to make theoretical generalizations, to formulate practical recommendations and conclusions.

Results

A special role in the development of the digital strategy of the EAEU is assigned to the international aspect. It is necessary to use international experience and best world practices, borrow successful projects from digital transformation programs of other countries and integration associations. The study also acknowledges the significance of projects that facilitate consistent digital interaction with other integration associations.

At the same time, global risks are also taken into account: loss of digital sovereignty, control by global players, loss of competitiveness[24], suppression and absorption, cyber threats. The main challenges are related to the insufficient involvement of the EAEU countries in global, macro-regional and regional processes of change associated with digital transformation, the formation of new industries and markets, as well as the lack of a strategically adjusted and coordinated position on transformation. Another potential threat is global digital platforms, which, using accumulated data on various areas of human life, human needs, interests, requests and preferences, business processes, as well as up-to-date retrospective statistics, were able to more accurately make forecasts and scenarios in many areas of the economy and public life than those of the countries and governments of individual member states of the Union. The Eurasian Economic Commission has come up with a number of initiatives that provide a favorable environment for the digital transformation of trade in the EAEU.

It is important to start with an analysis of the level of digitalization in the EAEU countries with the EU countries and China based on international indices (Table 1).

Table 1. Level of digitalization of EAEU, EU and China according to international ratings [4]

Indicator (last available)	Organization	Countries/Unions	Value
B2C E-Commerce Index (Score) 2017	International Telecommunication Union	China	61,70
		EAEU	73,56
		EU	86,56
World Digital Competitiveness Ranking (Ranking) 2018	International Institute for Management Development	China	30
		EAEU	38
		EU	23
Network Readiness Index (Score) 2016	World Economic Forum	China	4,20
		EAEU	4,51
		EU	5,26
ICT development index (score) 2017	International Telecommunication Union	China	5,60
		EAEU	7,04
		EU	8,05
Blockchain and Cryptocurrency Regulation Index (estimate) 2018	Flight University (Belarus)	China	5,08
		EAEU	5,59
		EU	7,09
International Index of Digital Economy and Society (score) 2016	European Commission	China	0,45
		EAEU	0,48
		EU	0,59

End of Table 1

Global Cybersecurity Index (Score) 2018	International Telecommunication Union	China	0,83
		EAEU	0,82
		EU	0,86
E-government development index (score) 2018	United Nations Department of Economic and Social Affairs	China	0,68
		EAEU	0,79
		EU	0,85
Gross domestic expenditure on R&D (% of GDP) 2017	Organization for Economic Cooperation and Development	China	2,129
		EAEU	1,109
		EU	1,963
Number of patent applications (residents + abroad, including regional) 2017	World Intellectual Property Organization	China	1306019
		EAEU	33452
		EU	481801
Global Innovation Index (Score) 2019	World Intellectual Property Organization	China	0,55
		EAEU	0,37
			0,54

In order to get an overview of the situation with digital development in the EAEU, Table 1 shows the indicators in the digital sphere in terms of connectivity, human capital, patent applications, use of Internet services, digital integration, etc. For comparison, data are given for the European Union, the EAEU and China, which also differ from each other. The key indicators of the digital economy still lag behind the leading digital countries, in particular the European Union and China.

Considering the fact that the five member states that make up the EAEU differ significantly in terms of territory, population and the size of their economy, it is advisable to analyze the positions of the EAEU member countries in separate international rankings that characterize the development of the digital economy separately. By analyzing these indicators, it is possible to identify discrepancies in the global digital development landscape.

Table 2. Position of EAEU in certain international rankings characterizing the development of the digital economy [13]

Type of international rankings	Armenia	Belarus	Kazakhstan	Kyrgyzstan	Russia	Position of EAEU (1)	Position of EAEU (2)
E-government development index, 2020	68	40	29	83	36	36	51
E-participation index, 2020	57	57	26	66	27	28	47
ICT development index, 2017	75	32	52	109	45	46	63
Network Readiness Index, 2020	55	65	56	94	48	50	64
Global Cybersecurity Index, 2018	79	69	40	11	26	29	65

According to Table 2, Russia is the leader among the EAEU countries in three indicators such as the Index of e-participation, network readiness and cybersecurity. However, in terms of the ICT development index and the development of e-government, Belarus and Kazakhstan are ahead of other EAEU countries. It is important to note that the gap between countries can be considered comparable and not too large for the development of cooperation in this area.

The statistical data presented below pertains to trade relations among the EAEU countries in 2017, allowing for a comparative analysis.

According to UN Comtrade, in 2017, 60.0% of exports and 31.4% of imports within the Union accounted for Russia, the only net exporter of the Union, 27.4 and 38.4%, respectively, for Belarus (Table 3).

Table 3. Matrix of foreign trade between the EAEU countries in 2017, USD million

	World	Armenia	Belarus	Kazakhstan	Kyrgyzstan	Russia	Within the EAEU, %
from **in**	**Export**						
Armenia	2145,0	-	6,9	4,9	1,8	540,5	25,8
Belarus	29267,1	34,5	-	587,9	123,4	12835,3	46,4
Kazakhstan	48342,1	4,4	95,5	-	503,2	4515,2	10,6
Kyrgyzstan	1790,8	0,0	8,6	297,2	-	262,2	31,7
Russia	359152,0	868,8	15537,4	11924,2	1388,7	-	8,3
	World	**Armenia**	**Belarus**	**Kazakhstan**	**Kyrgyzstan**	**Russia**	**Within the EAEU, %**
in **from**	**Import**						
Armenia	3893,5	-	37,5	4,0	0,1	1165,7	31,0
Belarus	34230,7	7,1	-	96,8	6,6	19359,5	56,9
Kazakhstan	29345,9	4,6	508,6	-	255,2	11472,9	41,7
Kyrgyzstan	4481,3	0,6	83,1	586,0	-	1180,5	41,3
Russia	228212,8	427,6	10691,6	4599,7	169,2	-	7,0

Based on the findings from Table 3, it can be inferred that within the EAEU countries, Russia and Belarus emerge as the prominent leaders. Their significant bilateral trade highlights a substantial level of integration within the "Union." Notably, despite Belarus's geographical proximity to European markets, a substantial portion of its exports, amounting to 46.4% of the export value, is directed towards other EAEU countries. Additionally, Belarus imports 56.9% of its total imports from other member countries of the Union [13].

An equally intriguing aspect lies in comparing the data regarding the proportion of digital services in the overall volume of services exports and imports among EAEU member states in 2017 (Fig. 1). Notably, Kazakhstan and Russia emerge as frontrunners in this regard. Digital services encompass a wide range of sectors, including insurance, pension and financial services, intellectual property royalties, telecommunications, computer and information services, audiovisual services, and other related services. The success of private companies, coupled with transformative changes in the labor market, alongside direct government support, has facilitated the implementation of unprecedented infrastructure projects [28]. These initiatives have significantly enhanced citizens' and businesses' (including small and medium-sized enterprises) access to various digital services, such as the Internet, mobile communication, and broadband connectivity.

Sustaining economic growth and ICT development in the modern economy primarily relies on the level of development and economic activity within its carriers. To assess overall achievements in the digital economy, let us examine similar indicators for the EAEU countries, which serve as socio-demographic measures. Analysis of data on population's Internet access in EAEU member states reveals the presence of a digital divide even within the region. Furthermore, due to varying levels of economic and infrastructural development among the countries themselves, disparities exist between different regions within each country. Notably, significant differences in interconnectivity are observed between urban and rural environments. Based on the index of population with Internet access (Fig. 2), the EAEU member countries can be categorized into two groups. The first group comprises four countries, namely Russia, Kazakhstan, Belarus, and Armenia, which exhibit the broadest access to the Internet. The second group primarily consists of Kyrgyzstan.

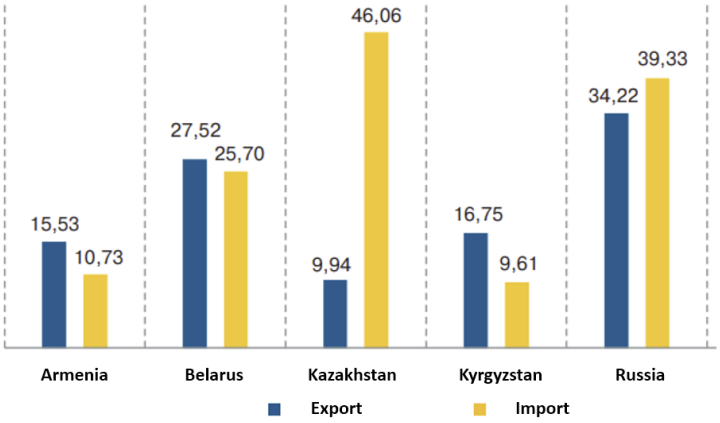

Fig. 1. Share of digitally provided services in the total exports and imports of services of the EAEU member countries in 2017 (%)

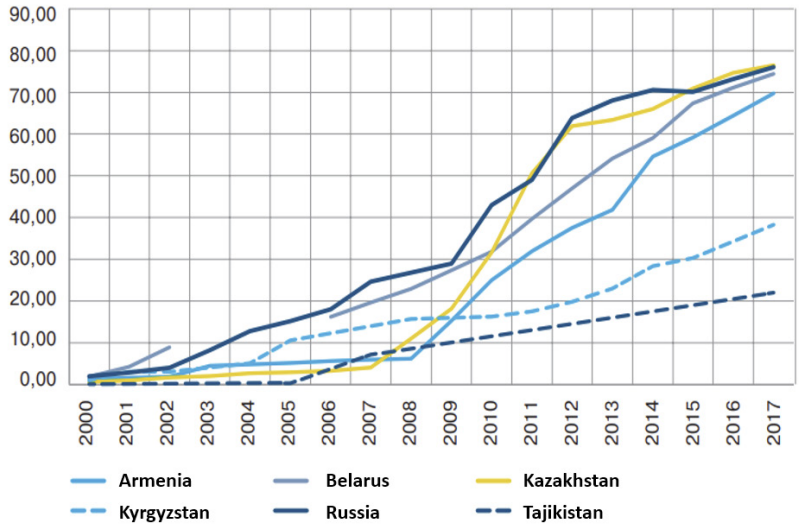

Fig. 2. Share of population with access to the Internet for 2000–2017 [15]

This indicator of population access to the global network is evident from the fact that the Internet plays a fundamental role in the digital economy and its transition. As part of the process of formation and development of the digital economy, the Internet creates an economic ecosystem and completely changes the nature and competitiveness of territories.

For the period 2010–2021 In almost all EAEU countries, there is a positive trend in providing the population with access to the Internet. However, the figures reveal a considerable disparity in internet usage among EAEU countries. The range stretches from a low of 4.43 users per 100 people in Kyrgyzstan to a high of 33.82 users in Belarus. Belarus leads the EAEU member states with a global rank of 38, while Kyrgyzstan lags considerably at rank 127. Russia, the most populous country in the union, has 23.73 internet users per 100 people, ranking it 64th globally. Its internet penetration is above the EAEU average, yet below that of Belarus. Armenia and Kazakhstan lie in the middle ground with 16.72 and 14.34 users per 100 people, respectively, and global ranks of 86 and 91. Their internet usage figures show that there's room for growth and improvement, especially when juxtaposed against global figures.

Table 4. Fixed broadband internet subscribers per 100 people, 2021 – Country rankings

EAEU countries	Internet users per 100 people	Global rank
	2021	2021
Armenia	16.72	86
Belarus	33.82	38
Kazakhstan	14.34	91
Kyrgyzstan	4.43	127
Russia	23.73	64

Structural changes within the institutional environment are significantly influenced by integration processes, which are evident through various indicators.

Table 5. EAEU countries in the Doing Business rating and its sub-ratings in 2007–2020

Year	Index	Armenia	Belarus	Kazakhstan	Kyrgyzstan	Russia
2007	Doing business	34	129	63	90	96
	Starting a business	46	148	40	41	33
	Property registration	2	96	76	31	44
	Enforcement of contracts	18	36	27	38	25
	Trade across borders	119	113	172	173	143
2015	Doing business	45	57	77	102	62
	Starting a business	4	40	55	9	34
	Property registration	7	3	14	6	12
	Enforcement of contracts	119	7	30	56	14
	Trade across borders	110	145	185	183	155
2018	Doing business	47	38	36	77	35
	Starting a business	15	30	41	29	28
	Property registration	13	5	17	8	12
	Enforcement of contracts	47	24	6	139	18
	Trade across borders	52	30	123	84	100
2020	Doing business	47	49	25	80	28
	Starting a business	10	30	22	42	40
	Property registration	13	14	24	7	12
	Enforcement of contracts	30	40	4	134	21
	Trade across borders	43	24	105	89	99

The overall business climate index in the EAEU is starting to outpace its neighbors (with the exception of Georgia). Thus, especially over the last decade, the EAEU countries have made notable progress in the Doing Business Index, increasing their rankings. From 2017 to 2018, Russia rose from 96th position to 35th, Belarus from 129th to 38th, Kazakhstan from 77th to 36th, respectively, and Kyrgyzstan from 102th to 77th in 2015–2018, so they achieved a breakthrough precisely in time of their stay in the EAEU (Table 5). The EAEU countries score high on key indicators such as starting a business and registering property.

As can be seen from the table, the performance of the elements of digital commerce in the Member States differ from each other and are at different stages of maturity. Joint actions to develop the Eurasian digital trade ecosystem will ensure its competitiveness with global players and interest in further integration.

In accordance with the Main Directions for the Implementation of the EAEU Digital Agenda until 2025, digital trade is one of the priorities for the development and implementation of digital initiatives and projects of the Eurasian Economic Union. In the EAEU, digital trade is growing at an average of 30% per year. The percentage of buyers leaving offline marketplaces reaches 10% per year, mainly due to a wider range and lower prices. The rate of rapid growth of digital trade than the global average is explained by the too rapid growth of digital trade in the EAEU countries due to the weak platform and level of participation of the population in the highly digital space, as well as the high proportion of the population. Market openness allows global players to enter the market through new digital channels.

The growth rate of digital trade in the EAEU space relative to the global average growth rates is explained by the high degree of integration of the population into the digital space and the openness of the market. According to Rosstat, the share of Internet sales in the total volume of retail operations in the Russian Federation in 2019 is 2%, in 2020 and 2021 – 3.9% and 4.8%, respectively. According to the Association of Electronic Commerce Enterprises, the Russian e-commerce market grew by 2032 billion rubles. up to 4096 billion rubles. in the period 2019–2021 According to Markets Deal.by, in 2020 the growth rate of online sales in Belarusian online stores is 42% (2.3 billion Belarusian rubles), and the share of Belarusian retail sales is 4.5%. In 2021, online sales in Belarusian online stores grew by 25% to 3.4 billion rubles. The share of online sales in retail sales in Belarus is 5.8%. Let's move on to the comparative dynamics of the e-commerce index (Table 6).

Table 6. Assessment of EAEU Member States in the Electronic Commerce Index (UNCTAD B2C E-Commerce Index, 0-100) [13]

	2018	2019	2020
Armenia	60,10	53,70	49,90
Belarus	77	79,30	78,80
Kazakhstan	68,10	68,50	68,20
Kyrgyzstan	33,80	36,40	44,30
Russia	74,30	77,90	76,60

Now, let us examine the B2C e-commerce index, which serves as an indicator of the level of e-commerce development. This index was introduced by the United Nations Conference on Trade and Development (UNCTAD) in 2014. According to the UNCTAD B2C E-commerce Index for 2015, Russia secured the 50th position, Belarus ranked 62nd, Armenia placed 87th, Kazakhstan stood at 88th, and Kyrgyzstan ranked 109th. These rankings reflect the varying degrees of e-commerce development within the EAEU countries. Notably, there exists a significant disparity in e-commerce development, with Russia scoring 76.6 compared to Armenia's 49.9. It is worth mentioning that the penetration of the global Internet is increasing annually across all analyzed countries. However, residents of Russia and Belarus demonstrate the highest level of online purchasing activity, regardless of this growth trend.

If we consider such a direction as digital trade, then such an aspect as foreign trade is especially in need of digital transformation today. First of all, this concerns the integration of customs information systems based on a single digital platform. Today, the digital customs platform may include, for example, electronic declaration and advance information systems, various customs databases and registers, electronic document management systems and other systems, as well as data exchange systems between customs and other government agencies, and also how those who work in the customs sphere and foreign trade. Customs and digital trade solutions include online import/export processes to facilitate cross-border trade in goods and services, as well as related services including logistics, clearance and licensing/certification. In particular, the “single window” system unites all government agencies involved in import/export procedures, which allows companies to submit documents electronically once from anywhere in the world [15].

An important place in the internal border trade of the EAEU member states began to be occupied by the leaders of Russian e-commerce Wildberries, Ozon, as a rule, using their own distribution system. However, the main volume of cross-border retail trade in the EAEU is directed to China in the form of imports of Chinese goods by the population of the EAEU member states through the Alibaba platform (China accounts for more than 50% of global cross-border trade). Logistics is carried out mainly by courier service from the member countries of the EAEU [16].

The Eurasian Intergovernmental Council in the Decision of 2019 "On creating conditions for the development of the digital ecosystem of trade in the EAEU" and other documents paid considerable attention to digital transport corridors. As a result, in December 2020, a long-term cooperation agreement was signed between Belpochta, Russian Post and Kazpost, the purpose of which is to develop integrated transport and logistics food chains for international postal transportation between the participating countries, and in the direction of Asia – Europe, USA – EAEU, Europe – EAEU. The elements of the digital transport corridor are electronic waybills, state control bodies (customs, tax, etc.), digital platforms of the EAEU member states, cargo tracking systems (electronic sealing, satellite tracking), the Single Window system.

The digitalization of industry and the agricultural sector is crucial for the overall digitalization of the EAEU, considering the specific economic structure of these sectors. The EAEU is characterized by a substantial presence of the agricultural sector, which employs a significant portion of the workforce. Consequently, within the framework of industrial digital transformation, projects are envisioned to incorporate new production technologies, robotics, sensors, virtual and augmented reality technologies, among others. In the agricultural sector, as well as in the areas of ecology and nature management, the utilization of unmanned aerial vehicles and remote sensing of the Earth are planned. Furthermore, digital development in the construction sector will be underpinned by technologies such as information modeling, spatial analysis, telemetry, and more.

Examples of projects from digital transformation strategies for industries:

- Industry: Digital Engineering project.
- National system of standardization and certification based on virtual testing technologies.
- Universal marketplaces for creating and selling products (from idea to market).
- Common data formats (libraries).
- Implementation of digital twins at enterprises.
- Energy: digital assistant "My Energy".
- A single information and settlement center (single window) for communication with clients and access to all providers of resources and housing and communal services.
- Development and approval of customer service quality standards.
- Creation of new markets for demand management and microgeneration [17].

The following is a comparative analysis of the level of digital development and identification of the comparative advantages of the EAEU countries.

Armenia. At present, the Armenian economy is demonstrating outstripping dynamics in such areas as: infrastructure development (customs infrastructure, transport and communications); improving the quality of border management. The Soviet Silicon Valley is the leader (in the EAEU) in the transfer of customs administration to electronic format. The Armenian tax service and customs have completely switched over to the electronic document processing system. In addition, in order to digitize trade processes and digital data exchange between customs authorities, an agreement was signed in 2019 on the digitalization of border control with Iran, Georgia and Armenia. Armenia is also a member of EU4Digital: Supporting the Digital Economy and Society in the Eastern Partnership (also Belarus). EU4Digital builds on the EU's long history of cooperation with Armenia in the areas of e-government and digitization. The EU4Armenia project: e-government actions (2017–2020) aims to create a government interoperability platform that provides simplified and standardized secure communication between all organizations of the Armenian public administration, and also implements a "single window" solution for border crossings. To date, the

number of IT companies has reached almost 800, and the number of employees in the ICT sector has exceeded 15,000 people.

Belarus. The country is considered the Silicon Valley of Eastern Europe (The Wall Street Journal). Since 2005, the High Technology Park (HTP) has been operating in Belarus. As a special economic zone with a special tax and legal regime for the development of IT activities. Companies and individual entrepreneurs registered in the park can take advantage of the preferences offered to them,[25] regardless of the location of their Belarusian office. Currently, 751 companies (IBA Group, EPAM Systems, Game Stream, Itransition, Viber Media, etc.) are based in the HTP (known as Wargaming.net). In general, 1573 IT companies successfully operate in Belarus; 7 companies with Belarusian development offices were included in the rating of the best outsourcers in the world "Best of The Global Outsourcing 100" (according to IAOP); 1 billion people in 193 countries around the world use mobile applications developed by Park residents; the annual release of IT specialists with higher education in Belarus is about 7 thousand. They are trained by 21 universities of the country; 5 of the 10 largest global corporations (according to Forbes ratings) are customers of the Hi-Tech Park; more than 50% of IT-specialists in Belarus are young boys and girls under 28 years old. Residents of the Hi-Tech Park are exempt from most taxes, including value added tax and income tax. SayGames is one of the world's top 5 mobile publishers (by number of downloads) according to App Annie (2021), SayGames is ranked third in terms of number of downloads after Facebook and Google (2019), in the top ten according to Sensor Tower (2020). This studio was founded in 2017, and has been operating in the high-tech park since 2018 [14].

Bitcoin-friendly country (first in the world to legalize blockchain, cryptocurrencies, smart contracts and ICOs). Has a high level of exports of software and computer services per capita ($162 vs. $74, $72 in Ukraine, $66 in Armenia, $50 in Korea, $41 in India, US$31 in China, US$28 in Russia, and US$24 in Japan).

Kazakhstan. In May 2017, the Digital Silk Road project was put forward, which was announced at the Belt and Road Forum for International Cooperation. The Chinese President noted that the initiative should become a "road of innovation", namely the "Digital Silk Road of the 21st century." As part of this project, Kazakhstan has made significant investments to strengthen its position as a transit corridor. Including over $3.5 billion for Khorgos East Gate, a dry port on the eastern border with China. COSCO Shipping and Lianyungang Port Holdings Group, one of the world's largest logistics service providers, joined the project, which made the project multinational and enabled the Kazakh side to benefit from the great experience of its partners. In 2019, China demonstrated the possibility of using blockchain technologies to develop trade and economic cooperation with Russia and Kazakhstan. TransCaspian Fiber Optic (TCFO) is a large-scale project to lay a fiber-optic communication line under the Caspian Sea between Kazakhstan and Azerbaijan. This is one of the global initiatives to develop the potential of both countries, whose close trade and economic relations are rooted in the historical past.

At the end of 2018, the volume of the online trading market in Kazakhstan increased by 1.5 times and amounted to 269 billion tenge. The structure of the e-commerce market in Kazakhstan consists of 68% trade in goods and 32% in services. Today, Kazakhstan is a leader in the field of new technologies in Central Asia. According to the National Bank of the Republic of Kazakhstan, about 11 million users use mobile and Internet banking systems, of which 26% make regular payment transactions. Every day, the population makes about 400,000 payment card transactions through digital channels. In 2017, payments by the population via digital channels tripled compared to 2016, and in the first half of 2018, the population made more than 80 million transactions. This is twice as much as in the same period in 2017. The National Bank is currently testing its fast payment system platform with several subsidiary banks, and such pilot projects have already started in the third quarter of 2018. In addition to banks and payment systems, 40 payment organizations registered in the relevant registers are active market participants.

Russia. The volume of the Internet commerce market in Russia in 2021 grew by 52% and amounted to 4.1 trillion rubles, follows from the Data Insight report. The UN has put Moscow in first place in terms

of e-government services. As for the introduction of electronic declaration in Russia, a new base has been built in the period from 2018 to 2020. The number of customs clearance points has been significantly reduced to 16 electronic declaration centers instead of more than 600 customs posts that previously processed declarations. As a consequence of the reform, the Federal Customs Service has established electronic customs, with electronic declaration centers (EDCs) operating under their jurisdiction across all federal districts. Additionally, there are four specialized Regional Customs Electronic Centers (RCEs) categorized by modes of transport (Aviation, Baltic, Novorossiysk, and Vladivostok). Furthermore, two specialized RCEs have been established based on types of goods (excise and energy), along with two territorial RCEs in the Kaliningrad and Moscow regions [18].

Based on the contribution of the Information and Communication Technology (ICT) sector to the Gross Domestic Product (GDP), Russia ranks within the third to fourth decile globally [23]. A higher share of the ICT sector, ranging from 4% to 7%, is commonly observed in large developed countries such as the USA, UK, Germany, France, and Japan, which possess significant domestic markets. Similarly, smaller economies or developing countries specializing in ICT goods or software export, such as Estonia, Ireland, India (software export), and the Republic of Korea (electronics export), exhibit a comparable proportion of their economies attributed to the ICT sector. In Russia, the Bank of Russia has identified 92 electronic money operators and 34 payment systems included in the relevant register. Additionally, the MIR payment system operates within the country. According to the Market Adjustment Research Center (MARC), Russian websites avail the services of approximately 100 payment aggregators and gateways.

Kyrgyzstan. According to the Association of Payment Systems of Kyrgyzstan, there are about 200 online stores operating in the country, the total user base of Internet acquiring is about 800 thousand people, although so far active users are about 8%. It is also possible to pay for purchases online using 9 mobile wallets ("ELSOM", "Mobile.Money", etc.).

Kyrgyzstan, the least economically developed country in the EAEU, faces severe domestic unemployment and is therefore highly dependent on labor migration. According to World Bank data for 2017, personal remittances account for 32.9% of GDP, second only to Tonga (34.2%) and neighboring Tajikistan (31.6%) in the world.

Along with the achievements of the EAEU countries, there are also shortcomings and problems in the development of the digital economy.

Recently, fast payment systems have become increasingly widespread, in which funds are transferred directly in real time, including without opening bank accounts. Currently, the creation of such systems is underway in Russia and Kazakhstan. One of the factors hindering the development of B2B digital trade, primarily cross-border trade, is the inability to make settlements between legal entities in electronic form without recourse to the system of bank accounts. Meanwhile, in international practice, alternative systems of settlements between legal entities in electronic form are widely used. This allows businesses to use payment cards with preferential rates and payment types to choose from, providing electronic primary documentation for commercial invoicing. Non-bank account systems are also used to enable invoicing, reduce the cost of processing payment transactions and ensure the solvency of customers. Currently, electronic money (Webmoney, Yandex.Money, etc.) can only be used for payments from individuals to legal entities. However, export e-commerce also requires the ability to use B2B e-money payments. The underdevelopment of special regulations for new payment methods hinders their development.

B2B trading relationships are starting to use smart contracts. Today, the practice of using smart contracts is largely reduced to the partial automation of certain aspects of contracts. However, with the development of infrastructure and platforms based on distributed ledger technology, smart contracts are becoming the main guarantor of the fulfillment of contracts, the obligations of the parties when concluding, and it is necessary to ensure the transition to digital contracts without confirmation on paper documents.

The lack of a unified international legal framework for the functionality of smart contracts limits the use of this tool. For example, the absence of paper contracts can lead to conflicts with legislation in the areas of

taxation, accounting and reporting. Distributed Registry technical consultants recommend copying smart contracts using printed contracts or electronic documents certified by electronic signatures.

In addition, there is no agreed approach to the classification and taxation of digital services. In Russia and Belarus, the concept of digital services stands out, but this is not the case in other Member States. The concept of digital services is based on the EU approach, according to which digital taxable services are provided automatically without human intervention. Thus, digital services do not include manual consulting, education, legal services, or software development.

The next problem is an insufficient mechanism to support access to global digital markets, so according to the Russian Export Center for 2017, more than 80 documents issued by exporters, 1 out of 4 applications for clearance in the customs territory was rejected. More than 50% of goods go through intermediaries, 45% of exporting companies face administrative difficulties when exporting, more than 15% of companies do not know where and how to export. On average, exporters conduct 10 cases and 5 personal accounts when conducting foreign economic activity.

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Thus, the rapid digital globalization and regional integration within the EAEU require the acceleration of the coordinated policy of the EAEU member states in the field of intelligent transport systems, the transition to international standards of electronic transport and customs electronic documents, as well as to uniform rules for cross-border electronic commerce.

The study of the prerequisites for the development of digitalization in the field of economic relations in the EAEU countries, as well as a comparative analysis of the achievements and problems of economic digitalization in the Union countries, allowed us to identify and determine the following features of digital transformation processes in the EAEU:

1. *Anchoring digital transformation initiatives through policy documents and establishing the relationship between key integration goals and digital transformation. The digital agenda in the EAEU was approved in 2017.* Each state of the EAEU has adopted its own policy documents that lay down the main approaches to digitalization at the national level. The digital agenda in the EAEU was approved in 2017.

2. *The presence of a contradiction between the activities for the implementation of digital transformation at the level of the integration association and at the national level.* Despite common digital priorities, the internal development of the digital economies of the EAEU countries is fragmented. The key issue is the creation of a "space of trust" - the possibility of exchanging legally significant documents through the channels of an integrated information system. The EAEU countries have not agreed on the introduction of common standards for encryption, data transmission, a secure exchange system, etc. Thus, each country has its own standard, and any attempt to correct it is perceived as an attack on digital sovereignty.

3. *A well-defined sequence is crucial for the successful implementation of digital transformation within the EAEU.* The foundation of this sequence should involve changes that directly impact the real sector of the economy, as the transformation of infrastructure is intricately linked to the transformation of the real sector. The key areas of focus for digitalization currently include sector-specific and cross-sectoral transformation, digital advancements in common markets, digital transformations of integration processes (including activities carried out by the Eurasian Economic Commission), and the development of digital infrastructures. These areas collectively form the core pillars of digitalization within the EAEU, ensuring a comprehensive and systematic approach to digital transformation.

4. *Orientation of approaches in digital transformation, first of all, to services with high consumer demand*, as well as areas where distance creates costs for doing business, but these costs can be eliminated with the

help of new technologies. From the point of view of integration, digital transformation is necessary, first of all, in areas in which common markets are being created and the joint competence of the EAEU countries is being implemented. These are customs and trade in general, transport, the pharmaceutical market, the financial market, data exchange systems, the labor market, public procurement, industry and the agro-industrial complex. Thus, the Customs Code of the EAEU is focused on the use of modern technologies (for example, electronic declaration, which significantly reduces time, optimizes all procedures, transferring them from the format of physical communication with customs services to an electronic format).

In the trade sphere, digital transformation is aimed at the formation of mandatory requirements for products, the development of technical regulations and lists of international and regional standards in the field of technical regulation. The implementation of this direction is carried out through the creation of three services for digital technical regulation (a service for the development of technical regulations and a list of standards for them in a machine-readable format, a service for the formation of a single list, in respect of which mandatory requirements are established within the framework of the EAEU; a service for digitizing a complete set of data on mandatory product requirements).

5. *The project method is employed as a strategic approach in facilitating digital transformation within the EAEU*. It encompasses various initiatives, such as the establishment of a unified product traceability system and the implementation of an integrated information system. The project method utilizes a dual approach of interaction, incorporating both "top-down" and "bottom-up" perspectives. This involves the exchange of information and collaboration between the state and businesses, as well as the reciprocal flow of ideas and feedback from businesses to the state. To encourage active participation, a dedicated section has been created on the Eurasian Economic Commission (EEC) website, where individuals can submit their initiative proposals for consideration. This initiative aims to foster a dynamic and inclusive digital transformation process within the EAEU.

6. *Creation of digital platforms primarily in industry*. For example, the State Industrial Information System (GIIS) has been launched in Russia, and a number of digital services for industrial business cooperation have been presented. Using the capabilities of this digital platform, the Industrial Development Fund (IDF) is the coordinator of the project, which is associated with subcontracting and technology transfer. The project is being implemented for the development of industries and should ensure the creation of a register of capacities of all enterprises and their products, related processes, a high level of interoperability, it is also necessary to ensure the interconnection of the production chains being built with other sectors, with logistics and transport, mining and trade. Moreover, in the field of employment, a project is being implemented to find a job "Work without Borders", which is the beginning of the formation of a full-fledged ecosystem of employment for citizens of the Union. The project "Eurasian network of industrial cooperation, subcontracting and technology transfer" is being implemented by the EAEU countries and involves the creation of an automated system to provide economic entities of the Union countries with a mechanism for selecting the most effective partners, the possibility of involving SMB enterprises in the production chains of large manufacturers. As a result of the implementation of this project, access to a geographically distributed set of services of the EAEU member states will be provided.

7. *A key focus within the digital transformation efforts of the EAEU is the establishment of integration-related institutional institutions, such as integration competence centers*. These centers play a vital role in consolidating the expertise of specialists to collaborate on specific projects.[27] The EAEU recognizes two primary objectives in this regard. The first task involves initiating projects that are jointly developed and implemented through collaborations and consortiums, primarily involving enterprises and organizations from EAEU countries, with potential engagement of external participants. The second task involves engaging competence centers to conduct expert evaluations of initiatives submitted for consideration by the Eurasian Economic Commission (EEC). This collaborative approach and strengthening of horizontal connections within the new economic structure are now more crucial than ever. By fostering such cooperation, the EAEU aims to enhance synergies and promote effective digital transformation across its member states.

Moreover, through competence centers, it is planned to implement digital transformation activities that are not included in the digital agenda (for example, smart cities, smart environment). In this direction, the EAEU has 2 ways. First, use the experience of the EU-China partnership: the allocation of several regions in their countries to develop a pool of "smart" technologies. Secondly, the use of the program method: to develop and implement joint projects within the framework of the existing developments in the EAEU countries, identified development priorities, technological areas (for example, the implementation of a joint project to create a satellite constellation that unites satellites of several countries (an interstate program of the EAEU was adopted); development of digital transport corridors, assessment of the state of agricultural land, forest fund.

8. *Development of the Big Data system at the EAEU level.* At the moment, an integrated information system is being built in the EAEU, which is designed to exchange data between the authorities of the EAEU countries (a set of registers, general regulatory and reference information has been created and a system of common processes is being formed for partner agencies of the EAEU member states).

9. *Absence at the integration level of a regulatory legal document regulating the principles and rules of data circulation within the EAEU.* This document is currently under development.

It is important to note that in order to encourage the digital economy, it is necessary to remove the barriers that hinder the development of digitalization and digital commerce [19].

The COVID-19 pandemic has strengthened the role of e-government in delivering traditional digital services and new innovative crisis management efforts, highlighting the challenges and many forms of digital divides, especially among the poorest and most vulnerable groups.[20]. As information technologies develop, so does the vulnerability of cyberspace and its underlying infrastructure to a wide range of risks associated with both physical and cyber threats and dangers. In 2021, the average number of cyberattacks and data breaches increased by 15.1% compared to 2020. Cybercrimes act as a threat to the development of the digital economy. To steal money from people's e-wallets, a new technology has emerged in which hackers and scammers use phishing. extortion (cyber extortion) through the threat of possession and disclosure of personal information; intimidation with the use of violence, insults in social networks (cyberbullying), etc. In addition, the risks associated with damage and loss of information due to viral infections of communication channels and databases are becoming more and more serious [21].

According to the Central Bank of Russia, in 2020 the volume of transactions without the consent of customers in Russia increased by 53% compared to 2019, and the number of cybercrimes committed amounted to 773,000 and is growing steadily. Almost many economic crimes using IT technologies are committed in Russia and spread to the Russian-speaking audience, in particular the EAEU countries. In 2020, about 25 thousand cybercrimes were recorded in Belarus, and over the past three years the number of cybercrimes has increased tenfold. In Kazakhstan, more than 21,000 incidents of information security violations are detected annually. In Armenia, the number of such crimes is over 100. Such statistics show the need for IT specialists, especially in the areas of security, artificial intelligence and machine learning [1]. Under these conditions, one of the important prerequisites for a successful transition to digital transformation is the staffing of processes at all levels. An important condition for creating a digital ecosystem is the development of human competencies. Since the EAEU countries are only moving to new technological structures, their cyberspace is open to threats and vulnerable both in legal and practical terms.

Thus, the rapid digital globalization and regional integration within the EAEU require the acceleration of the coordinated policy of the EAEU member states in the field of intelligent transport systems, the transition to international standards of electronic transport and customs electronic documents, as well as to uniform rules for cross-border electronic commerce.

The growth of threats to economic security and cybersecurity and / or crimes, the uneven development and vulnerability of ICT infrastructure, the emergence of a digital divide between developed and developing regions, personnel restrictions and job losses are negative consequences and problems of the development of the digital economy in the conditions of Uzbekistan [22].

Conclusion

1. Numerous studies have revealed that within each sector, specific problems arise in relation to digitalization. These problems are typically associated with either the overall level of digitalization within the industry, deficiencies in the digitalization model, or errors made at various stages of the digitalization process. Examples include mistakes during the drafting of terms of reference, regional variations, errors in software product development, and organizational shortcomings during the implementation of digital products and customer service. These issues ultimately lead to challenges for both entrepreneurs and consumers of digital services. However, it is worth noting that comprehensive monitoring of these problems is generally lacking. There is often a lack of proper monitoring at the organizational level, within ministries and departments responsible for digital services, and even at the government level. This gap highlights the need for enhanced monitoring mechanisms to address and mitigate the challenges associated with digitalization in various industries.

2. Addressing these challenges requires close collaboration and cooperation among EAEU member countries, along with comprehensive strategies and policy initiatives. By overcoming these obstacles, the EAEU countries can unlock the full potential of the digital economy, fostering innovation, economic growth, and competitiveness within the region[26]. To address this, comprehensive scientific research and analysis are necessary to identify and understand the specific challenges faced by each industry during digitalization. This research should encompass multiple dimensions, including industry-specific issues, digitalization models, software development processes, organizational practices, and regional factors. Rigorous data collection and analysis methodologies should be employed to gather insights on the nature and extent of these challenges.

3. Furthermore, close collaboration between industry stakeholders, government authorities, and research institutions is essential to establish effective monitoring mechanisms. These mechanisms should involve regular assessments of digitalization progress, identification of industry-specific challenges, and the formulation of targeted solutions. Additionally, the establishment of feedback loops and knowledge-sharing platforms would facilitate continuous improvement and the exchange of best practices.

4. By adopting a scientific approach to monitor and address industry-specific challenges during digitalization, organizations, government bodies, and policymakers can make informed decisions and implement effective strategies. This will ultimately contribute to the successful implementation of digital initiatives, enhance the quality of digital services, and benefit entrepreneurs and consumers alike.

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