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DIGITAL TRANSFORMATION AND COVID-19: EXPERIENCE AND PROSPECTS OF SMART SOCIETY DEVELOPMENT IN JAPAN

Due to the rapidly changing civilizational landscape of the world, the need for the evolution of modern society is increasing manifold, and Japan is the country where the new-style humanity is being formed at an unprecedented pace. Objective: to consider the peculiarities of the creation and development of Society 5.0 in the context of analysing the implementation of the direction in Japanese practice by summarizing the main components of the sphere. The main methods were the method of system analysis, using which the key components of digitalization of modern society in Japan were studied, and the historical method, using which the peculiarities of the introduction of information technology in all spheres of life of the country and society were summarized. The paper examined the basic semantic elements of such a phenomenon as “digital society” – designations, terms, characteristic features, common features, and distinguishing factors. It was recorded that the increased indicators of modern humanity in the early XXI century have ceased to fully satisfy its needs and demands, and, in connection with this circumstance, there is a need to create a new form of society – the symbiosis of man and digital technologies. In the context of the ethical side of the issue, social and cultural problems arise, namely, how the synergetic combination of the living organism and robotic elements will affect Japanese society in the future. During the period of pandemic restrictions in Japan, the “digital society”, the foundation of which was laid at the beginning of the twenty-first century, began to take shape. Due to the growing level of social and interpersonal isolation of Japanese citizens, such elements as the virtualization of public communications began to emerge in the environment of public communication, namely, the growing demand for online medical services, the popularity of online education, and the transfer of all traditional forms of communication to social networks. Through the prism of using the experience of digitalization of social, political, and other spheres of interaction in Japan, it is summarized that in Kazakhstan, there are all the prerequisites for its successful application in national practice. The results and conclusions of the work can be used as a practical basis for future scientific research, as well as in the context of developing strategies for state and social development in the coming years.

Keywords: Japan, Society 5.0, artificial intelligence, Internet of things, depopulation, robotics, pandemic.

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Цифрлық трансформация және COVID-19: Жапониядағы ақылды қоғамды дамытудың тәжірибесі мен перспективалары

Қазіргі дамыған заманда цивилизацияның деңгейі қоғамның дамуы мен эволюциясына деген қажеттілікті күрт арттырды. Society 5.0-нің қалыптасуы мен дамуы Жапонияда басқа елдерге қарағанда айқын байқалды. Мақаланың негізгі мақсаты – жапондық тәжірибеге сүйене отырып Society 5.0 концепциясының қалыптасуы мен дамуының ерекшеліктерін қарастыру және оның негізгі құрамдас бөліктерін айқындау. Зерттеу барысында талдау әдісі қолданып, қоғамның цифрлануының негізгі элементтері зерттелді. Ал тарихи әдіс арқылы ақпараттық технологиялардың барлық елдердегі салыстырмалы ерекшеліктері қарастырылды. Мақалада «цифрлық қоғам» ұғымының семантикалық элементтері – негізгі сипаттамалары, ерекшеліктері, орын алған факторлары талданды. XXI ғасырдың басында қазіргі халықтың өз деңгейінде қажетті мүмкіндіктері орын алмағандықтан, адам мен цифрлық технологиялардың симбиозына негізделген жаңа қоғам құру қажеттілігі туындады. Этикалық тұрғыдан алғанда,

дени мәселелерді көтереді: адам мен роботтандырылған интеграциясы болашақта жапон қоғамына қалай әсер ететіндігі маңызды. Пандемияда орын алған шектеулер негізінде Жапонияда ХХІ ғасырдың басында цифрлық қоғам жүйелі түрде қалыптаса бастады. Адамзаттың әлеуметтік оқшаулануына байланысты онлайн медициналық қызметтерге, қашықтықтан білім беруге және әлеуметтік желілер арқылы қарым қатынас жасауға сұраныс артты. Жапондық тәжірибесін талдай отырып, Қазақстанда осындай цифрлық қоғам модельдерін енгізуге қажетті құрылымдық және институционалдық алғышарттар бар деген қорытынды жасалды. Зерттеу нәтижелері ғылыми зерттеулерде, мемлекеттік және әлеуметтік даму стратегияларын әзірлеуде практикалық негіз бола алады.

Түйін сөздер: Жапония, Society 5.0, жасанды интеллект, Заттар интернеті, робототехника, депопуляция, пандемия.

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Цифровая трансформация и COVID-19: опыт и перспективы развития умного общества в Японии

В современном развитом мире уровень цивилизации резко возрос, что обусловило необходимость развития и эволюции общества. Формирование и развитие Общества 5.0 наиболее отчетливо прослеживается в Японии, чем в других странах. Главная цель статьи – рассмотреть особенности формирования и развития концепции Общества 5.0 и определить его основные компоненты на основе японского опыта. В ходе исследования с помощью аналитического метода были изучены основные элементы цифровизации общества. Сравнительные характеристики информационных технологий во всех странах были рассмотрены с помощью исторического метода. В статье проанализированы семантические элементы концепции «цифрового общества» – основные характеристики, особенности и факторы, приведшие к его возникновению. Поскольку современное население в начале ХХІ века не обладало необходимыми возможностями на своем уровне, возникла необходимость создания нового общества, основанного на симбиозе человека и цифровых технологий. С этической точки зрения такие изменения поднимают социально-культурные вопросы: важно рассмотреть, как интеграция человека и робота повлияет на японское общество в будущем. В начале ХХІ века в Японии, в условиях ограничений, введенных из-за пандемии, систематически начало формироваться цифровое общество. В связи с социальной изоляцией человечества возрос спрос на онлайн-медицинские услуги, дистанционное образование и общение через социальные сети. Анализ японского опыта позволил сделать вывод о наличии в Казахстане необходимых структурных и институциональных предпосылок для реализации подобных моделей цифрового общества. Результаты исследования могут служить практической основой для научных исследований, разработки стратегий государственного и социального развития.

Ключевые слова: Япония, Society 5.0, искусственный интеллект, Интернет вещей, депопуляция, робототехника, пандемия.

Introduction

The achievements of recent years show that humanity has already reached a new stage of civilizational development, and the processes of informatization, digitalization, and transition to a fundamentally new level of interaction contribute to the formation of updated principles and concepts of existence on the planet, based on synergetic contact between man and machine. After the society of gatherers and farmers, followed by the societies of agrarians and industrialists, the time of the so-called “information society” has come, the main feature of which is the active use of advanced innovations in

the sector of information and communication technologies. The problem of qualitative and effective transition to a new type of social interaction – “digital society” or “Society 5.0” – has long been studied and discussed in different countries and at different levels of state and civil administration. This issue became especially relevant in the times of the COVID-19 coronavirus outbreak and the limitations caused by the pandemic, because in that period the level of human interaction with virtual space reached the peak of its development, demonstrating the advantages of this type of interaction. Studying the specifics of this area is an extremely relevant and timely task today, in the context of globaliza-

tion and transformation processes on a world scale. The need for human transition to a qualitatively new level of development based on the use of the latest innovative achievements of science and technology arose long ago, and the key task in this regard is to thoroughly understand all aspects of this transition – social, political, economic, as well as psychological, ethical, religious, and others – in order to maximize the harmonious development of society within a state or region, thus forming the basis for future generations.

The problematic is to identify the main factors and conditions for the creation of a “digital society” in Japan, which has become particularly relevant in the period of constraints during the COVID-19 coronavirus outbreak. The resolution of controversial points, social and cultural issues, settlement of the ethical component of the direction and the search for consensus in the solutions of these or those disputes of the sphere arouses genuine interest and concerns both directly in the society and in the governing circles. This issue became particularly relevant during the period of isolation, when society was deprived of access to many elementary and basic needs – communication, personal meetings – and began to actively seek ways to replace lost opportunities and options to minimize such losses in the future. Therefore, it is important to carefully analyse the activities of all the subjects of the subject under study, as well as to summarize all the positive and negative aspects of the issue for the most successful implementation of the identified tasks, namely, the formation of a renewed “smart society” in the near future.

According to N. Kurmanov et al. (2022), it is more rational to develop strategies for the digitalization of a state based on the regional and geographical characteristics of that state, especially if its size exceeds the average size of the continent as a whole. However, the experts did not consider situations where a certain country has minimal regional differences and there is no need for diversified development. For Y. Amanbek et al. (2020), information and communication technologies are of increasing importance for the economies of the developed world and such trends are particularly evident in the political sector – in the field of e-government. However, the presence of national peculiarities, economic and social barriers are practically not taken to be analysed by specialists.

The changes that befell modern society during the COVID-19 coronavirus outbreak, for A. Turkiilmaza et al. (2021), were some factors to start updating the existing concept of “Society 5.0”. Although

the main one, according to the authors, was the civilizational development of mankind. According to the findings of B. Chereyeva et al. (2023), in the era of technology, the role of innovation is increasing, the development of which depends on financial investments, which indicates a close relationship between investment and research. A. Mukanov (2023) believed that digitalization has become an important aspect of everyday life in intellectually developed countries and is seen as an essential strategy to promote and accelerate economic growth. However, in the context of comparing countries as diverse as Japan, Kazakhstan, France and others, the factor of difference in certain attributes was not a determining factor in the analysis.

To Y. He et al. (2022), Japanese society met the decisive actions of the authorities during the COVID-19 coronavirus outbreak rather ambiguously: a significant part of Japanese people had a negative attitude to the prospect of tangible restrictions on communication and widespread control of their contacts, while the rest showed support for such reforms. According to H. Okubo et al. (2022), “smart societies” or “Society 5.0” have recently been listened to more and more often, and this is mainly connected with the concept of mental and intellectual superiority of the representatives of the new generation, primarily due to their merging with technical machines of a high level of complexity.

The aim is to study the issue of the formation of a “smart society” in Japan in the context of the introduction of information and communication technologies through the prism of analysing the dynamics in the field of digitalization of the population at the current stage of development.

Materials and Methods

The main methods used in the process of preparing the presented work were the method of system analysis, the method of system modelling, the method of comparison, as well as the historical method and the method of series of dynamics of statistical analysis. The method of system analysis was used to outline the basic elements of the research topic: basic terms, concepts, characteristic features, common and distinctive features. In addition, the method was used to form the semantic content of the topic of work through the prism of implementation of some of its elements in the process of development of the new geopolitical situation in the world. The historical method was used to draw parallels by studying different periods in the history of creation and fur-

ther development of the idea of forming a new information society in the temporal aspect.

The method of series dynamics of statistical analysis was used to examine the key qualitative and quantitative indicators of information and communication technology development in Japan in the context of the formation of the “smart society”. The method was also used to find out the level of innovation and technological development of the world’s leading states. The method of system modelling was used to develop and present general practical recommendations for the Republic of Kazakhstan in the context of successful application of the Japanese experience of creating “Society 5.0”. The method of comparison was used to analyse various characteristic factors and basic elements in the context of comparing certain historical periods, social and economic conditions, geopolitical circumstances, and other situations. The method was also used to assess the prospects and directions of development of various components of digitalization of industrial and economic sectors based on circumstances such as geographical location, remoteness from major cities, availability of mobile communications and the Internet.

In order to study in more depth, the topic of creating a “digital society” in Japan and the development of a new formation of modern humanity, the following materials were studied and analysed:

- legal and regulatory acts (Ministry of Education, Culture, Sports, Science and Technology, 2021; Resolution of the Government..., 2023; Address by the President..., 2012; Bellamy, 2014);
- reports of international institutions (Muratbekova, 2022);

- statistical data (Global Innovation Index, 2024; International Institute for..., 2022, 2023; Global Real Gross..., 2024);

- publications in media resources (Lu, 2023; Gershgor, 2021).

All the above materials and documents contributed to a deeper and more meaningful study of the digital transformation of Japanese society in post-pandemic conditions and provided a basis for the development of practical recommendations for the successful implementation of Japan’s experience in this area in practical activities in the Republic of Kazakhstan.

Results

Digital transformation of society in the post-pandemic period

In the context of transformation of socio-cultural, political, economic, as well as historical, ethical, and other aspects of the development of modern mankind, it is quite natural to question the timely updating of the technological component of this direction (Carayannis and Morawska-Jancelewicz, 2022). Traditionally, the most developed states in terms of innovation and scientific renewal are also the most socially oriented and democratic on the planet: Switzerland, Sweden, the United States of America have some of the most modern information and communication systems in the world (Agrawal et al., 2019; Beltagui et al., 2020), which function as efficiently as possible both for the state itself and for the individual citizen in order to provide him/her with all the necessary services and facilities (Table-1).

Table 1

Rating of states according to the Global Innovation Index, 2020-2023

State	Place (total score*)			
	2023	2022	2021	2020
Switzerland	1 (67.6)	1 (64.6)	1 (65.5)	1 (66.08)
Sweden	2 (64.2)	3 (61.6)	2 (63.1)	2 (62.47)
USA	3 (63.5)	2 (61.8)	3 (61.3)	3 (60.56)
Great Britain	4 (62.4)	4 (59.7)	4 (59.8)	4 (59.78)
Singapore	5 (61.5)	7 (57.3)	8 (57.8)	8 (56.61)
Finland	6 (61.2)	9 (56.9)	7 (58.4)	7 (57.02)
Netherlands	7 (60.4)	5 (58.0)	6 (58.6)	5 (58.76)
Germany	8 (58.8)	8 (57.2)	10 (57.3)	9 (56.55)
Denmark	9 (58.7)	10 (55.9)	9 (57.3)	6 (57.53)

Continuation of the table

State	Place (total score*)			
	2023	2022	2021	2020
The Republic of Korea	10 (58.6)	6 (57.8)	5 (59.3)	10 (56.11)
Japan	13 (54.3)	13 (51.8)	13 (54.5)	16 (52.7)
Kazakhstan	81 (26.7)	83 (24.7)	79 (28.6)	77 (28.56)
Uzbekistan	82 (26.2)	82 (25.3)	86 (27.4)	93 (24.54)
Kyrgyzstan	106 (20.2)	94 (21.1)	98 (24.5)	94 (24.51)
Tajikistan	111 (18.3)	104 (18.8)	103 (23.9)	109 (22.23)
Turkmenistan	-	-	-	-

Note: * – calculated based on indicators of the performance of government institutions, the quality of human capital, the availability of scientific research, infrastructure, development of the technology market, and the functionality of the business environment.
Source: compiled by the authors based on Global Innovation Index (2024).

In order to understand the meanings and concepts of the phenomenon under study as clearly as possible, it is necessary to analyse the main theoretical aspects of the sphere. Thus, the main and primary factor that forms the prerequisites for the development of the concept of new-style societies – the “digital society” – is the achievement of the highest possible level of technological and scientific development at a particular point in time (Deguchi, 2020). The concepts of “waves of innovation”, “technological patterns”, “technological breakthroughs”, as well as the practice of digitalization and digitalization contribute to the promotion of the idea of creating a “digital society” or “Society 5.0”, where humanity transitions into the digital space in a controlled and planned way by combining human needs and digital capabilities into a unique symbiosis of a new generation (Selvam et al., 2023).

Ideas for the formation of a digital society emerged almost simultaneously in many countries around the world, and a distinctive feature of this process was the fact that these ideas were based on already existing concepts (James, 2020). For example, in Germany, the concept of “Industry 4.0” became the basis, in Singapore – “RIE 2020”. Japan, which has been among the leaders in innovative development for a long time, is also developing plans for the digitalization of society based on already existing concepts (Okubo et al., 2022). The COVID-19 coronavirus outbreak and the subsequent limitations of the population in basic needs and demands have contributed to accelerating trends towards the use of new modern information technologies and digitalization tools. In connection with a kind of the highest point of human development (after the society of

gatherers and hunters, agrarians, industrialists, and information consumers) should become a “digital society” – the so-called “Society 5.0”.

Formation of “Society 5.0” in Japan

Unlike most countries, where the concept of a new society is mainly theoretical and is at the stage of discussion and search for common ground, in Japan the idea of “digital humanity” has taken real shape. Thus, the term “Society 5.0” (referring to the future highly intelligent and digital humanity) was first defined in the Basic Plan for the Development of Science and Technology for 2016-2021 (Ministry of Education, Culture, Sports, Science, and Technology, 2021; Rojas et al., 2021). The document stated that in the 21st century, it was necessary to empower humanity by ensuring economic well-being, social equilibrium through the integration of physical (human) and digital (virtual) factors. It was assumed that with the help of numerous various auxiliary elements (sensors, systems) it would be possible to receive and exchange information from person to person and from person to cloud services (databases).

The fundamental elements of interaction in such a society will be artificial intelligence, the Internet of Things, Big Data, robotics, 5G technology, unmanned vehicles, cashless financial and banking transactions (Piddubna and Gorobynskaya, 2023; Del Rio et al., 2021). The presence of all the above-mentioned elements in the environment of the modern population will mean its readiness for the transition to a qualitatively new level of development or the already accomplished fact of transformation and the emergence of a new social society of the model of the XXI century (Table-2).

Table 2
Factors contributing to the formation of “Society 5.0”

Information and communication tool	Characteristic
Internet of Things	Various instruments, sensors, and devices form new connections through the transfer of data from people to technology and vice versa, thus creating a unique Internet symbiosis
Cloud technologies	The ability to carry out various operations (primarily financial) by accessing a specific server, which provides the necessary resources for organizing these operations
Big Data	Collection, processing, analysis of large structured and unstructured arrays of digital information
5G technology	New opportunities in the field of mobile technologies and Internet communications
Artificial intelligence	Gradual intellectualization of robotic machines and tools with systematic training in their skills of calculation, analysis, forecast, followed by self-learning
Blockchain	Possibility of conducting free transactions between various financial entities
3D printing	Creation of a variety of real three-dimensional objects using a special computer program
Robotics	A universal programmed machine capable of performing functions previously assigned to it by the developer
A virtual reality	A technology that allows creating a visual image of objects of maximum realism, the perception of which occurs with the help of auxiliary tools

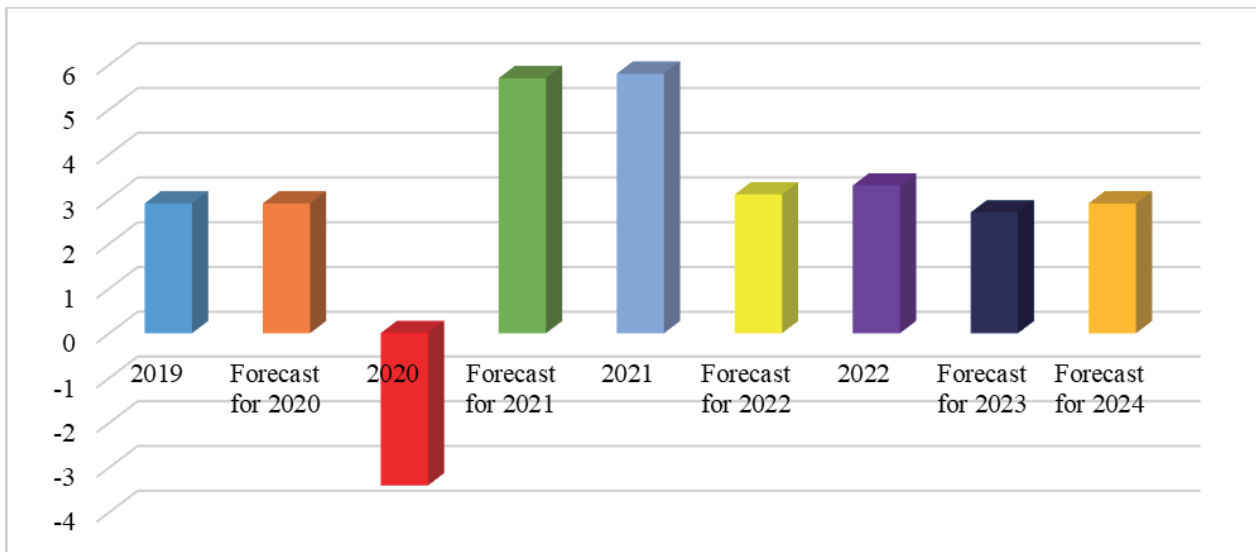
Source: compiled by the authors based on H. Okubo et al. (2022) and J. Cho et al. (2023).

Given all the obvious benefits of implementing the concept of “smart society” (e.g., formation of a modern economic system capable of withstanding crises; development of a socially mature society with the maximum number of services and facilities available) (He et al., 2022), the Japanese government has become actively engaged in the implementation of various components of this concept. Despite the presence of serious obstacles – excessive bureaucratization of government agencies, imperfect regulatory framework, reluctance of some people to accept and use new technologies, and general illiteracy of the population – the creators of the concept started its implementation.

However, due to the fact that the idea of creating a new “digital society” is associated with many controversial issues (preservation of physical and mental independence and uniqueness of a person, minimizing the growth of unemployment), it was rather doubly assessed in different public and government circles. Thus, while political elites perceived the idea of digitalization of society as an opportunity to increase the state’s economic growth indicators on the global stage (which have significantly decreased in recent years, in particular, due to the COVID-19 coronavirus outbreak; economic growth indicators are gradually returning to pre-pandemic levels (Figure 1), representatives of civil

society considered this idea to be an infringement on the freedom and independence of the human being as an individual, which may bring serious global problems in the future (Stein and Banks, 2023; Zosh et al., 2022).

E.G. Carayannis and J. Morawska-Jancelewicz (2022), and J. James (2020) suggested that further digitalization of society will bring only pleasure and joy, explaining their position by the fact that in this case people will have more free time, because almost all the work will be done for them by machines – robots, devices, artificial intelligence. At the same time, L. Piddubna and M. Gorobynskaya (2023), and also A. Tashiro and R. Shaw (2019) warn that in the case of an exodus to online services (as was the case during the coronavirus restrictions), the practice of real communication may undergo serious changes: practical skills and experience of face-to-face communication may be lost or at least severely deformed. In this case, the person will become socially incapacitated, which entails further problems of a more serious level, for example, economic ones. The paper proposes to consider the most obvious and most attractive, from the point of view of the creators of the concept of “Society 5.0”, the results of practical application of the components of this idea in real life. And also to assess their impact on the socio-cultural side of human life.

Figure 1*Global real gross domestic product growth since COVID-19, 2019-2024*

Source: compiled by the authors based on *Global Real Gross Domestic Product (GDP) Growth after the Coronavirus (COVID-19) from 2019 with a Forecast until 2024 (2024)*.

The main achievement of the post-pandemic development of the state is considered to be the entry of medical services to a new, virtual level (Zosh et al., 2022; Lee et al., 2023): now most services (consultations, primary examinations) are conducted online with the use of auxiliary tools – video cameras, special sensors and so on. Whereas before the COVID-19 coronavirus outbreak, virtual doctor-patient communication was more of a private experiment, nowadays, such examinations and online education are becoming more and more widespread (receiving professional education remotely or online is becoming a widespread phenomenon, facilitated by the unprecedented growth in the number of relevant educational programmes and courses). From the point of view of social interaction of people with each other, the idea of transferring medical services to the virtual plane is not quite the right solution, because personal contact in this industry, as well as the ethical side of the issue plays an important role. The level of education also suffers, because Y. He et al. (2022) and J. Cho et al. (2023) proved the advantages of offline learning over virtual education.

From the previous point, the next element that emerges is medical technology and innovative treatments. Life prolongation, increasing the functioning time of certain organs, replacement of organs on a permanent basis, correction of genes by modifications at the cellular level – all this becomes possible

with the application of various artificial intelligence technologies, as well as other achievements of science and technology (Beltagui et al., 2020). However, in doing so, the moral and ethical side of the issue suffers, namely, does man have the right to interfere with what nature has created? Also, the use of these technologies, which is obviously an extremely expensive process, will increase the already huge gap between the poor and the rich in the context of the quality, duration, and conditions of their lives.

In relation to this example, it is important to emphasize a serious problem in Japan, which has become particularly acute in recent years – the problem of rapid depopulation, formed due to low birth rates and the rapid increase in the number of elderly people (Zosh et al., 2022). The insufficient number of able-bodied people, the uneven development of the economy in favour of supporting the elderly, and the accumulation of unresolved issues regarding children, youth and young families make the problem of population decline in Japan a major dilemma in the coming years. In this context, the creation of a new social society in which medical technology and new treatments will artificially maintain the longevity of the country's elderly population is creating a situation in Japan where a rapidly ageing society will reach a point of no return, and it will be impossible or extremely problematic to regain the previous figures.

The use of search algorithms in social networks and Internet browsers (Facebook, Google) based on the user's previous queries is also becoming particularly popular. The search is based on the collection and analysis of information about the person, based on their habits, food preferences, health status and so on. However, in this case, there is an explicit collection of confidential information, albeit in a rather convoluted way, and with the use of impersonal artificial intelligence. This also includes surveillance programmes (e.g. the Sharp Eyes surveillance system in China has been operating for several years and collecting all kinds of data, and the level of dissatisfaction with the system, which residents feel violates their right to privacy, is increasing) (Gershgorin, 2021).

The digitalization and informatization of certain production processes contributes to the optimization of work activities with the abolition of some specialities and with the introduction of algorithms for simplified actions (with the help of robots, sensors, systems). This situation is predicted to have a positive impact on the economic development of the state, however, the growth of unemployment among the population is evident, which is fraught with outbreaks of social discontent. Such areas as the creation and operation of unmanned transport (primarily taxis) and large-scale digitalization of agriculture will make it possible to achieve the set goals many times faster. Thus, Y. Lu (2023) stated that unmanned cars are a completely safe mode of transport, allowing to get to any place without problems, and digitalization of the agribusiness sector will allow creating more products in a short period (which became especially important in the period of pandemic isolation and problems with logistics in terms of delivery of products to shops and supermarkets). However, accidents involving unmanned vehicles are becoming more frequent, and products grown under the influence of robotics and with the addition of genetically modified components very often have pronounced allergenic effects. In both cases, unemployment rates are also rising, because these sectors can now do without the human involvement that often causes breakdowns and malfunctions.

Digitalization can be no less effective in political activities: the development of e-government, online monitoring of deputies and officials, and the openness and transparency of their activities on the Internet make them behave in the most correct and professional way possible. Due to this, so-called "horizontal ties" are created (Selvam et al., 2023),

where activities are concentrated not from top to bottom, but in one plane, on equal terms. But, it is worth noting that under such conditions, the level of competition between similar groups increases manifold, which hinders the rapid and qualitative process of political decision-making for the good of the state. Before the pandemic restrictions, the idea of equality in the context of the management of public affairs was in its original form – as a theoretical idea. Today, however, it is evolving, as demonstrated by the large-scale digitalization of the sector for the provision of various public services – registering a marriage, obtaining a variety of documents, opening bank accounts, and buying or selling a flat. The implementation of online services significantly reduces the time to perform these services – from the moment of application to the direct fulfilment of the requirements or request takes a record short time. (Nazarova and Rudenko, 2023) Although, there are cases where a personalized approach should be taken to some issues, taking into account the special circumstances; this cannot be done in an automated mode.

So, having considered the main elements that contribute to the development of a digital society, in terms of both positive effects and negative impacts, it is possible to summarize several groups of risks that arise in the creation of such a society. The group of problems of the social type includes:

- increasing unemployment among the local population (replacement of simple unskilled labour by robotic and automated processes);
- increasing the gap between the poor and the rich (the use of the results of medical achievements – gene technologies, modifications with organs and other manipulations – is expected to cost large financial investments, for which ordinary citizens simply do not have the means. Affluent representatives of mankind will continue to improve by modification, while the poor will remain in the same initially unfavourable positions, and the situation will worsen);
- transferring of the solution of issues of strategic importance to the competence of artificial intelligence (the solution of political disputes, socioeconomic challenges will depend on a virtual server, which may well become a kind of power centre, endangering traditional state institutions).

Cultural and humanitarian risks include:

- total social exclusion, which began in the process of isolation due to the COVID-19 coronavirus outbreak and continues to worsen even after it has ended);

- lack of clear boundaries between representatives of different genders, races, religions, sexual orientation (this factor has both positive and negative aspects: the erasure of boundaries contributes to the rapprochement of people, mutual understanding between them, but, at the same time, creates a threat of loss of personal qualities, firstly, national differences and cultural traditions).

- The next group of problems represents dilemmas of psychological direction:

- loss of the meaning of human existence (generalized: if it is possible to live a life, getting rid of all diseases, not having the need to work and receive serious education, then why to exist at all, what is there to live for?);

- complete loss of personal space and the concept of privacy as a right to private life (with the total introduction of all kinds of technologies of surveillance and control over people in social life, as well as in the Internet space, it becomes almost unrealistic to maintain a semblance of privacy).

Digital transformation in Kazakhstan

The key principles, basic concepts, and key tasks for the near future in the sphere of digitalization and large-scale informatization of Kazakhstan society and the state as a whole are outlined in Resolution of the Government of the Republic of Kazakhstan No. 269 “On Approval of the Concept of Digital Transformation, Development of the Information and Communication Technologies and Cybersecurity Industry for 2023-2029” (2023), Strategy Kazakhstan 2050 (Address by

the President..., 2012), the 2030 Agenda Reducing All Forms of Violence (Bellamy, 2014) and a number of other individual legislative documents. They present the problem of the future transformation of the Republic, taking into account the new challenges and demands of modern humanity, and present ways of solving this problem through discussions, debates, as well as through reforms and renewals of various spheres and sectors, primarily the social and economic sectors. Also, the task of digitalization of all areas of the economic sector is indicated as a key factor in transforming the current humanity into a “digital society”, a new kind of society of the third millennium.

Responsible authorities in Kazakhstan have long been studying international experience in the introduction of digital technologies and information and communication systems to start the process of forming a “smart society” in the Republic. Among the most valuable and practical examples is the experience of Japan; some elements of the strategy for the development of a “digital society” have been adopted by Kazakhstani experts (Mukanov, 2023; Zhailauov et al., 2021). Strategy Kazakhstan 2050 (Address by the President..., 2012) plans to reform key areas of the economy, social and industrial spheres, create e-government, guarantee appropriate support for entrepreneurship, and more. Thanks to the reforms undertaken over the past time, Kazakhstan firmly holds a place among the first forty countries with a high level of digital competition and development of information technologies in various sectors of the economy and industry (Table 3).

Table 3

Overall level of digitalization by country, 2022-2023

Place (point)*	A country	Knowledge (point)**	Technologies (point)***	Ready for the future (score)****	Place in 2022 (point)*
1 (100)	USA	92.56	91	98.14	2/3 (99.81)
2 (98.1)	Netherlands	88.96	91.7	95.35	6 (97.85)
3 (97.4)	Singapore	92.11	94.67	87.11	4 (99.48)
4 (96.93)	Denmark	86.19	89.39	96.9	1 (100)
5 (96.24)	Switzerland	92.9	86.25	91.28	5 (98.23)
6 (94.8)	Republic of Korea	83.99	82.1	100	8 (95.20)
7 (94.12)	Sweden	90.55	85.83	87.68	2/3 (99.81)
8 (94.05)	Finland	83.91	87.95	92.01	7 (96.6)
9 (93.73)	Taiwan	78.35	93.31	91.23	11 (94.11)
10 (93.64)	Hong Kong	89.81	94.32	78.51	9 (94.36)

Continuation of the table

Place (point)*	A country	Knowledge (point)**	Technologies (point)***	Ready for the future (score)****	Place in 2022 (point)*
32 (75.43)	Japan	69.58	70.91	67.49	29 (76.84)
34 (71.84)	Kazakhstan	69.1	59.41	68.73	36 (73.03)

Note: * – includes points according to the following criteria: knowledge, technology, readiness for the future; ** – denotes the know-how necessary to discover, understand and create new technologies and includes: human talent, training and education, scientific concentration; *** – denotes the general context facilitating the development of digital technologies and includes: regulatory framework, financial capital, technological basis; **** – indicates the country's level of readiness to use digital transformation and includes: adaptive attitude, business flexibility, IT integration.

Source: compiled by the authors based on International Institute for Management Development (2022, 2023), M.J. Sá et al. (2021).

Studying the experience of Japan, in particular, analysing the Science, Technology, and Innovation Basic Plan (Ministry of Education, Culture, Sports, Science and Technology, 2021), Astana paid special attention to some of the items that were decided to be implemented as a priority. Among them:

- transition to a fully digital state (transformation of all components of infrastructure – services, social assistance, entrepreneurship – in the context of innovative renewal of systems);

- actualization of human capital (combining human knowledge and skills and information and communication technologies into a fundamentally new toolkit);

- reforming the scientific and educational sector (formation of an ecosystem of innovations on the basis of the existing “education-science-business” link under state monitoring, as well as improving the quality of the educational process in higher education institutions);

- development of bi- and multilateral cooperation in the digital sector (expansion of contacts with China and Central Asian countries in the context of realizing the objectives of the Silk Road concept).

Analysing the achievements of Kazakhstan in recent years in terms of the implementation of the above tasks, we can say that this activity is carried out with rather variable success. There are both positive and negative consequences as a direct result of the adoption of certain reforms developed on the basis of the introduction of the Japanese experience of digitalization of the main spheres of activity (Turkyilmaza et al., 2021; Chereyeva et al., 2023).

In the area of legislative regulation, Astana has been quite successful in developing and supporting the direction of general digitalization of all sectors of the economy and industry. A variety of documents, legal acts, strategies, and plans contribute to a clearer understanding of the topic and the for-

mation of a vision of the future development of the country in the context of transformation (for example, the widely used in practice Concept of Digital Transformation, Information, and Communication Technology Industry Development and Cybersecurity for 2023-2029 from 28 March 2023). However, it is worth noting the fact that most of the documents were still adopted mainly before the COVID-19 coronavirus outbreak and no basic acts have been developed to date based on the new, post-pandemic circumstances and challenges, as was done by the Japanese government.

Due to the rather low and uneven level of digital literacy of the Kazakhstani population, it is extremely difficult to quickly and effectively introduce Internet technologies based on artificial intelligence into the sphere of social policy, as it was done in Japan (Zhailauov et al., 2021). The various ethical, psychological, and religious debates arising in the process about the future of man and his form in the digital transition and the creation of a symbiosis between living beings and robotic technology are already creating enough obstacles on the way to the creation of a new social society.

In Japan, strategies for the development of digital space and the formation of “Society 5.0” refer to tasks that require the involvement of all administrative actors, from large cities to remote villages (Mukanov, 2023). Tokyo forms the policy of digitalization at the national level, which acts as a basic and key vector for future evolution. In Kazakhstan, however, due to its geographical size, large distances, and conflict situations in border regions, the formation of certain areas of activity takes place at the level of individual regions – both within the country and within Central Asia. Therefore, the use of Japanese experience in this context is very problematic due to the difference in fundamental approaches.

The introduction of online medicine and virtual appointments and medical procedures will have highly controversial results (due to the aforementioned geographical remoteness of some areas and the lack of normal mobile and Internet connections, it will not be possible to use digital medicine services; this will endanger the health and lives of citizens); the use of new medical technologies and genetic engineering for human modification (this aspect contributes to the widening of the gap between the rich and the poor); real-time monitoring of the state of humanity (the replacement of the human factor with robotic technology will increase unemployment, forcing the population to seek alternative ways of earning a living, for example, in criminal activities); the use of new medical technologies and genetic engineering for human modification (this aspect contributes to the widening of the gap between the rich and the poor). The replacement of the human factor with robotic technology will increase unemployment, which will force the population to look for alternative ways to earn money, for example, in criminal activities); real-time monitoring of the health of the population (this may increase the risks of data leakage, as all information will be stored in cloud centres, servers with remote access, which, although they have a high level of protection, are still exposed to the risk of cyberattacks and hacking, despite all the efforts to protect the IT sector in the country (Muratbekova, 2022).

It is also worth noting the high level of patriotism and national ideas in Kazakhstan. Protection of identity and historical heritage, support for customs and traditions, and the desire to preserve religions and beliefs are characteristic features of the Kazakhstani population. In the context of globalization and digitalization, when the boundaries between gender differences, religious preferences, sexual orientation, and other factors are blurred in the virtual world, encroachment on the above-mentioned features can become a catalyst for the outbreak of protests and aggressive actions. This can significantly harm the state development and the rule of law, especially in the period of formation of e-government, which implies full transparency and maximum accountability to the citizens of their country. It should be added that this practice is quite successfully implemented, however, due to the rather high level of bureaucracy and the presence of corruption schemes, the process is often slowed down, various specially created obstacles appear in order to delay the moment of creating a transparent system of public administration (Amanbek et al., 2020).

So, as can be seen from the results of the analysis of the Japanese experience in the field of digitalization of society in the new civilizational conditions in the context of its use in the practice of public administration in Kazakhstan, we can say that Japan's experience is actively used by Astana. However, their efficiency and effectiveness depend on many factors and circumstances that create both positive trends and negative consequences. In connection with the growing popularity of the strategy "Society 5.0", the developers and ideologists of which are Japanese futurologists and economists, and through the prism of implementation of its individual components in the practical sphere of Kazakhstan society, in order to improve the quality and efficiency of implementation of these elements, the following recommendations are offered. Firstly, it is necessary to develop an effective and flexible legal and regulatory framework for the development of digitalization of the public sector, particularly in the economic sphere. The current main legislative documents (e.g. Strategy Kazakhstan 2050 (Address by the President..., 2012)), although acting as basic regulatory acts, do not address the main problem of development of the sphere after the outbreak of coronavirus infection COVID-19, which had a huge impact on the transformation of Kazakh society.

To further improve the scientific and technological base, the budget allocated to this sector should be revised upwards. Scaling up the volume of investments in the sphere of scientific and scientific-technical component will soon bring positive results – growth in the number of scientific works, practical experiments, development of prototypes of new technologies and information systems – which, in turn, will accelerate the transition of Kazakhstan's society to a new level of civilizational development. It is important to develop and actively operationalize the ethical side of the synergistic process of human-technology fusion. In the course of the planned evolution, it is essential to preserve one's individuality, preserve identity, identity, gender and religious differences, and maintain social skills. The development of certain codes of ethics and strategies for the digitalization of society will help to achieve this goal. In addition, ties with neighbouring countries should be systematically strengthened, primarily with the Central Asian states of Uzbekistan, Turkmenistan, Kyrgyzstan, and Tajikistan. Interaction with them in the context of data exchange, protection of national and regional interests, study of useful experience, implementation of advanced technologies in the real economy and creation of

modern digital infrastructure will allow faster and more effective adaptation to new conditions and challenges of the modern information world.

Discussion

Studying the issues of digital renewal of various spheres of state and public administration through the prism of challenges and contradictions that arose before modern society after the outbreak of coronavirus infection COVID-19, using the Japanese experience as an example, the following conclusion was made. The issues of information-technological modernization and digitalization of public control and monitoring sectors are extremely important and urgent tasks for almost all democratic states not only to strengthen their positions in the international arena according to some ratings, but also to improve socio-political relations for further development of the country in the civilizational sense. Considering the works of scientists on the subject of digitalization of production and financial capacities of countries, it is concluded that the transformation of existing systems is necessary due to the accumulation of the latest technologies and mechanisms necessary for the subsequent evolutionary changes of mankind. Japanese researchers carefully considered the issues of changes in the country and the creation of “Society 5.0”, starting from the global challenges of the XXI century, in particular, calling pandemic restrictions a key factor contributing to the acceleration of the process of population transition to the new “digital society”. Experts from such countries as China, the United States of America and others focused on the problem of digitalization in the national context, summarizing the global nature of humanity’s transition to virtual space. Specialists from Kazakhstan particularly focused on the problem of digitalization of the Republic by studying the existing legal framework and practical application of the points of national strategies in this direction, calling them the basic elements of digital evolution of man. In general, the results and conclusions of scientists say that the importance of the process of renewal of the existing civilization process can hardly be overestimated and the prospect of creating a “Society 5.0” is logical and necessary for the population of the planet in order to more confidently confront new global challenges, such as the outbreak of COVID-19 coronavirus infection.

In this paper, the idea was voiced that in today’s world, digitalization, virtualization and being online all the time are becoming the norm, in line with cur-

rent and future expectations of humanity, increasingly influencing all spheres of social and governmental interaction. A similar idea was voiced by M. Sá et al. (2021), stating that, having initially a political-ideological form, the concept of “Society 5.0” now allows for various transformations of the process of forming a society in which digital technologies are increasingly used in the service of sustainable social and economic development.

The complex formation of the future “digital society” based on innovations, which are the result of the revolutionary development of scientific and scientific-technological potential of mankind, has been identified as one of the main conditions for the creation of the social society of the third millennium. A. Beltagui et al. (2020) also had similar beliefs, stating that future ecosystems of digital innovation determine the sector-wide dynamics of cooperation and competition between different actors of social interaction. At the same time, the authors argued that such ecosystems often begin to develop in isolation, from which state control can be ineffective.

The Japanese experience in the process of digital transformation of society was analysed in this paper because of the specific approach in the context of the desire to take advantage of technological achievements in order to finally solve the problems that currently threaten Japan – ageing of the nation, falling birth rates, and so on. The same view was held by C.N. Rojas et al. (2021), emphasizing the need to contribute to the country’s progress and to develop a framework for a better – renewed – society, especially in the wake of the COVID-19 coronavirus outbreak.

In the presented paper, it was emphasized that during the period of isolation restrictions during the COVID-19 coronavirus outbreak, virtual communication through social networks became the main tool to prepare society for the transition to a new level of global and civilizational development. Such an idea was also voiced by Y. Lee et al. (2023), who believed that this toolkit is one of the most successful technological achievements of mankind over the last hundred years. However, experts in their reflections called the presence of negative factors characterizing online communication as circumstances not worth serious worries about their solution.

The introduction of new technological tools, such as robotics, virtual reality, artificial intelligence and 5G technologies, and online communication, were considered in this paper as key factors, the presence and successful use of which is a sign of humanity’s readiness for its transition to a new

“digital society”. This was also the opinion of J.P. Stein and J. Banks (2023), saying that although public attitudes towards, for example, robots are mixed, the effectiveness of their use has long been proven. Although, given the increasing number of incidents from the widespread implementation of artificial intelligence technologies, especially in the transport and carriage of passengers and other goods, scientists did not consider accidents as a reason to stop the development of the field of automation of various sectors and directions.

Intelligent synergetic existence of a human being (physical aspect) and a machine (virtual aspect) is a way to solve many problems, including social and humanitarian issues. This thesis, which was presented in the paper, is in harmony with the ideas of H. Okubo et al. (2022), who called the concept of “smart society” the only possible option for the further transformation of the modern inhabitants of Japan, in particular, in the conditions of postpandemic development of the political and economic component of the state. At the same time, experts believed that in the case of the creation and full functioning of “Society 5.0” it is possible not to develop physical abilities of a person, focusing only on the mental state and mental attitude.

The policy steps taken by the Japanese government after facing the difficulties created by economic and social constraints during the COVID-19 coronavirus outbreak and acting as an important step towards the digitalization of the technological process in the country, became the key idea of this paper. This was the view of A. Tashiro and R. Shaw (2019) in the context of analysing the national documents and strategic concepts of the Japanese government against the background of the growth of new forms of social interaction in virtual space.

In the process of researching the issue of formation and development of the idea of creating “Society 5.0” by means of widespread digitalization of various branches of state and civil administration in the context of humanity’s adaptation to new conditions of existence after the COVID-19 coronavirus outbreak, using Japan as an example, a number of conclusions were made. Thus, considering the scientific works of some specialists – sociologists, political scientists, futurologists, as well as civil servants and analysts – it was determined that the issues of qualitative renewal of modern society are long overdue and are widely discussed at all levels of state and public administration in many countries

of the world. The main factor that contributed to the development of the concept of “Society 5.0”, in the context of studying this direction in Japan, was the rapid deterioration of the economic situation in the country – due to depopulation, population ageing and other related problems. However, due to several controversial issues – religious disputes, problems of national identity and identity, the search for ways to preserve mental health and social behaviour skills – the task of developing a “digital society” is seen as extremely controversial and ambiguous. Nevertheless, given the positive effect that is taking place in Japan, for example, in the direction of virtual medicine, robotisation of labour processes, and optimization of industrial production, it is possible for the Republic of Kazakhstan to move to a new level of civilizational development, provided a competent approach to the topic and taking into account national peculiarities and other differences.

Conclusions

Japan’s post pandemic digital transformation demonstrates that the development of a smart society isn’t limited to technological modernization alone, however also requires institutional adaptation, social readiness and cultural acceptance of digital innovations. The implementation of the Society 5.0 model revealed that digital technologies can significantly improve the efficiency of public administration, healthcare, education and economic management during periods of global instability.

At the same time, the Japanese experience illustrates that rapid digitalization may intensify social inequality, increase dependence on technological infrastructure and create new challenges related to cybersecurity and personal data protection. Therefore, the transition toward a digital society should be accompanied by balanced state policies aimed at preserving social stability and human-centered development.

The practical significance of the Japanese model lies in its potential applicability for other developing regions, including the countries of Central Asia. Japan’s experience demonstrates the importance of combining technological innovation with long-term strategic planning, investment in human capital and gradual institutional reforms. These approaches may serve as a useful framework for states seeking sustainable digital modernization in the post-pandemic era.

Authors' contribution:

Kuvatova Kh.R – conceptualization, writing the original draft, data collection and processing, preparation of tables, graphs, and visual materials. Contribution percentage: 50%.

Ashinova Zh.Ye – conceptualization, editing and revising the manuscript, scientific supervision and research coordination. Contribution percentage: 35%.

Ogihara Atsushi – scientific supervision and overall research guidance. Contribution percentage: 15%.

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