

Efficiency of Digital Public Administration System in the Course of Implementing the Innovative Potential of National Economy

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Abstract

The goal of this study is to identify the most efficient practices in exercising the digital public administration in the context of implementing the innovative potential of national economy. This goal was achieved through highlighting the distinctions and peculiarities of Social Credit System as China's administration model. The study determines the impact of Social Credit System on economic and social indicators of China's economy. The authors assessed the efficiency of Social Credit System based on the indicators of the countries, which had the alternative approaches to digital public administration and were characterized by a high level of application of digital technology to monitor the economic processes. This paper provides evidence that the Chinese system of digital administration has its own advantages in implementing the innovative potential of national economy as it highly impedes the increase in corruption. However, this system is inefficient in ensuring market transparency.

Keywords: Digital; Public; Administration; Social credit system; Economic; Social; Indicators; Efficiency of technology; Innovations.



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1. Introduction

Digital public administration pertains to the form of national administration with the assistance of modern computers, network communications and other technologies, like daily office work, data mining and dissemination as well as management of public institutions in digital and network environment (Chatfield and Reddick, 2018; Lee *et al.*, 2005). The system of digital public administration has diverse content, such as automation of government offices, communication between all levels of government, etc. In general, the development of the digital model of public administration in the context of innovative potential of national economy is at the stage of formation. Nevertheless, it is very popular among countries (Zhang and Kim, 2016). This system is relevant due to a capability of digital government to improve the efficiency of public governance and, as a result, to increase the innovative potential of national economy. Traditional bureaucracy can be replaced by more efficient system of digital circulation. Within the framework of digital public administration, diverse documents, archives and socio-economic data are stored in a digital environment on web server, enabling a prompt access to this data and an opportunity to use it (Wang *et al.*, 2018). Thus, for example, socio-economic statistics is a valuable resource, which mines data from multiple human and financial pools. If this data is stored on paper, its utilization rate is very low. If database files are stored in Internet, a great deal of useful information can be extracted for taking economic decisions by all target users (Dong and Ji, 2018; Falco and Kleinhans, 2018; Mergel, 2016). The first models of digital public administration were focused on increasing the scope of online services. Although, the efficiency and honesty of officials have not been taken into consideration. Today's government officials are assessed within the framework of digital public administration. This assessment is conducted even in non-working time. It is assumed that the Social Credit System monitors officials' behavior in all financial and social spheres, excluding the possibility that the corrupt officials can come to power (Latham, 2018; Luna-Reyes *et al.*, 2007). Modern system of digital public administration sets objectives for creation and operation of "virtual space". Any individual, enterprise or organization can contact the government, even without leaving their home. Digital government changed the structure of their organization. Traditional government institutions are represented by hierarchical structures, which are divided into several parts – from central level to the lower one, and several lower levels are governed by the upper level (Ku *et al.*, 2016). Digital government is characterized by distributed structure of network. The level of public officials is expressed as certain rights of network users. The government is optimized and the number of public

officials is considerably decreased, thereby saving a huge amount of national resources (Berger *et al.*, 2016; Henninger, 2018; Lin and Eschenfelder, 2010).

Within the framework of such system, the development of innovative potential of national economy moves towards democratization, which became possible owing to technological progress. As far as “digital government” is linked to a huge number of users’ computers, any citizen can participate in public administration. Moreover, digital government allows reducing corruption, because the system takes decisions automatically and officials just maintain the system. This measure is necessary to implement the innovative potential of national economy (Gasova and Stofkova, 2017). A personality of the majority of officials is reflected in user authority. All official actions can be verified through log files. Official processing of data is performed by computer to avoid human interference (Luna-Reyes and Gil-Garcia, 2014; Sullivan, 2016). However, today’s models of digital public administration have a huge level of differentiation, and there is no well-established model, which could be applied in most of the countries. The studies of the Chinese national system of public administration Social Credit System are relevant in this context. This system was introduced in 2014 and it is a unique phenomenon, which still remains unexplored in terms of impact on social and economic processes in a country.

A definition of the digital public administration is a new paradigm for the existing classical models of public administration. It is a quite new solution for the innovative potential of national economy. This problematic has a large number of focuses. Many authors lay emphasis on “blockchain” technologies of public administration. Thus, Ølnes *et al.* (2017) study the benefits and practical advantages of using the “blockchain” technologies in government processes and point out that in future such technologies will become the most widespread approach to public administration. More specific results of using “blockchain” technologies in public administration are analyzed in the scientific papers of Huckle *et al.* (2016), Albarghothi *et al.* (2018). The key idea of the study is that “blockchain” is able to consolidate the key processes of public administration, such as property rights, tax relations, currency and credit relations, etc. As noted by the other researchers (Sivarajah *et al.*, 2015), the national systems of public administration, which introduced, at least, the technologies like Web 2.0, had a chance to cut transaction costs on account of informal impact on the systems, workload limitation and risk reduction. In the context of the development of digital economy, the technologies (Web 2.0) are able considerably to increase the efficiency of public administration and reduce the cost of transactions. Although, “blockchain” technologies can reduce the above-stated costs to zero.

The other researchers Ali *et al.* (2018) highlight another aspect of development of digital public administration. They lay emphasis on cloud computations as far as the accumulated data continue to expand regularly. Therefore, the costs on digital government rise on continuous basis. The study emphasizes the importance of cloud technologies in public administration. This is due to the fact that, along with development of the scope of services, it becomes more difficult to implement this model of government. Therefore, this paper suggests creating all government services based on “Cloud Computing”. Unlike the above-listed scientific researches, the authors Rose *et al.* (2018) state that in many cases, an introduction of digital public administration does not entail any considerable benefits. One of the reasons of such a low output from introduction of digital public administration is a disproportion between the participants of economic processes. The authors believe that such a systemic problem can be addressed by decentralization and advancement of digital solutions for public administration. In this context, the authors unveil the importance of private digital systems (Gao and Lee, 2017). The study emphasized the significance of the existing private systems of digital communications (e.g., Twitter, Telegram) for reducing the transaction costs on public administration. Findings of the study provide grounds for affirming that there is a relationship between servicing the electronic government and involvement of Facebook and Twitter for the purposes of local self-government. Using the public statistics of local government authorities in Nebraska, the authors prove that transaction services involve the use of Facebook in public administration.

It should be noted that the above-listed scientific studies are of fragmented nature. These papers highlight the problems of digital public administration just from a certain perspective. However, along with the publications, describing just certain focuses of development, the papers, suggesting the change of general paradigm of public administration, related to the concept of “smart society”, become more popular. In this context, Sangki (2018) analyzes the change of social paradigm and describes modern models of public administration as a system, which abolishes classical approach, where a citizen has to obtain certificates for certain benefits. The author suggests replacing this system by the one, where all such actions are monitored automatically and any citizen automatically obtains access to common benefits. In the study, the author describes modern model of digital public administration, which is beyond the scope of classical schemes of government administration and it is focused on political and socio-economic aspects. The paper also contains classification of administration models by maturity of digital public administration – from web technologies to the concept of “smart society” (Nam, 2014; Wang, 2018).

Apart from theoretical aspects of complex systems of digital public administration, there are a number of empirical researches. Thus, Das *et al.* (2017), based on calculation of regression models, generalized the impact of diverse economic factors, such as the level of infrastructure, dynamics of human capital, etc., on development of digital public administration. Within the framework of the study, they proved that such factors as the growth of gross domestic product per capita and improvement of information technology infrastructure have the largest impact on the development of digital public administration. At the same time, the level of human capital and education has no significant impact on the above-mentioned parameter. Therefore, the authors determined improvement of information and communication system as the most critical factor for the innovative potential of the Chinese national economy.

Another example of the study, aimed at revealing the responses to introduction of digital public administration, is the paper of Lallmahomed *et al.* (2017). According to the key research findings, the expected duration of work is positively associated with employees' behavior at the workplace. The authors prove that the efficiency is negatively associated with behavioral intention and resilience to changes. Thereby they prove that introduction of the model of digital public administration has not only positive effects, but also negative ones – in case of insufficient adaptation to the existing system of socio-economic relations. All the above-stated studies, on one hand, describe the relationship between society and government in digital economy in terms of theory and practice of certain tools and, on the other hand, currently there is a gap in studying the phenomenon of complex model of digital government administration Social Credit System, which is implemented in China. Such system of digital public administration integrates all aspects of digital government and, at the same time, it is fundamentally different from classical schemes of public administration, used by Japan, Germany, South Korea and other countries, having the well-developed target infrastructure. Exploration of specifically this model of digital public administration is quite relevant as far as China is one of the largest economies in the world and introduction of full digital monitoring of their citizens will result in powerful socio-economic effects globally.

Proceeding from the fact that modern models of public administration are at the stage of transformation and there are no firmly established systems among the existing ones, this study is to identify distinctions and peculiarities of Social Credit System as a model of digital public administration, and to evaluate the impact of this model on the innovative potential of the Chinese national economy. The authors also set an objective to make critical evaluation of the potential of such system of public administration.

2. Methods and Materials

While studying the efficiency of the digital public administration in the course of implementing the innovative potential of national economy, the primary problem was to identify metrics for such analysis and chose proper methods. The authors' study was also limited by the need to apply such tools and approaches, which will enable not only to evaluate the efficiency of digital public administration system, but also to compare it with similar systems of other countries. An analysis of publications about digital government and technologies, related to this problematic, revealed that the use of open data and reports of international financial organizations is a quite precise tool. Therefore, the research was based on data of the World Bank and International Monetary Forum. The open data of these international organizations allowed the authors not only to evaluate the degree of dependence of the increased innovative potential of the Chinese national economy on introduction of Social Credit System, but also to find out what elements the Social Credit System influences in a positive way, or whether it has any influence at all. Thus, a logical structure of the research consists of three parts. In the first part, the authors identify the key goals and objectives of the Chinese system of digital public administration, its tools and other functional characteristics. The second part contains a summary of the dynamics of indicators of the innovative development of Chinese economy as well as dynamics of introducing the Social Credit System. In the third part, the authors conduct a comparative study of the Chinese Social Credit System and similar systems of Germany, Japan and South Korea (Flores and Rezende, 2018). Based on this logical scheme, it becomes possible to find an answer to a very important question, related to efficiency of the digital public administration system in the course of implementing the innovative potential of the Chinese national economy and prospects for introduction of such system in other countries.

3. Results

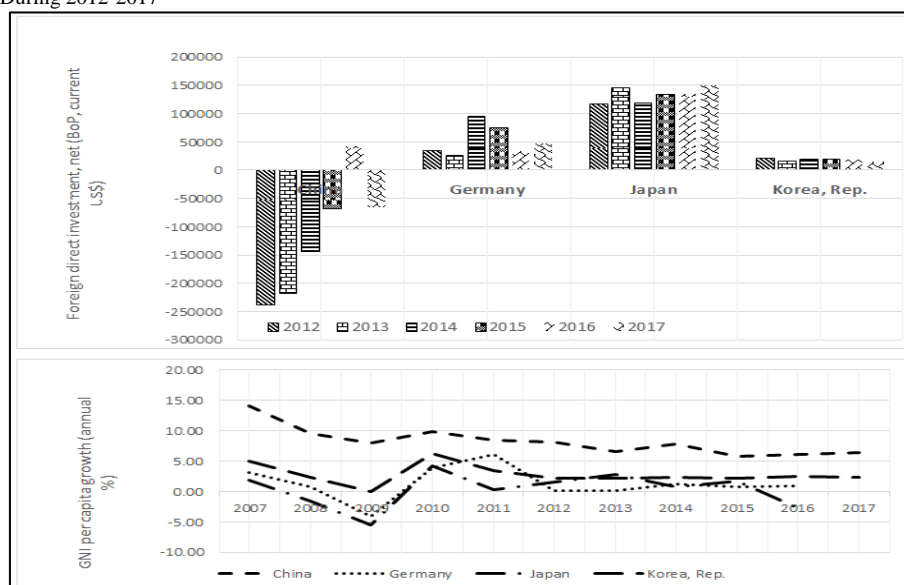
In order to conduct the analysis, the authors systematized the key goals of the Chinese digital public administration system and identified the spheres of its impact on economic and social processes in the Chinese economy. It allowed substantiating the consequences and prospects for application of such system to increase the innovative potential of national economy. The Social Credit System is a critical part of the market economic system of the Chinese public administration. Social Credit System, as a model of digital public administration, is based on the network of credit infrastructure, which involves all members of a society. Having collected the data on bank services of the citizens, administrative violations and other available sources, the public administration departments of all levels, including the National Development and Reform Commission, evaluate the behavior of private individuals. It is possible to make daily social behavior more positive and to reduce corruption. Ultimately, the evaluation results generate cost of access to such services as individual trips, career development, property ownership, school attendance and other services, monitored by the government. In order to assess social rating of a citizen, the Chinese government freely collects data from social media, public and private institutions, using their system of access personal data. Platform operators can mine data left by individuals in order to obtain full social profile, including: information on the location, friends, medical records, insurance, personal messages, financial status, home statistics, preferred newspapers, shops and contacts. The goal, pursued by the system of the Chinese public administration in the course of creating a digital society, is to enhance the trust and increase the innovative potential of national economy. It is also essential to ensure transparency of business, social equality and satisfaction with distribution of economic benefits. The goals that the Chinese government strives to achieve by forming Social Credit System are associated with improvement of the following focus areas of socio-economic processes.

The first focus is an improvement of public administration standards based on transparency and reduced corruption. This initiative is associated with the higher degree of protection and accelerated exchange of information, enhanced efficiency of municipal governments and authorities, willingness to transform municipal functions of public administration. It should be noted that the key goal is to make the decision-making process more transparent

and to ensure greater trust in government among the citizens. It is not a secret that corruption is one of the most critical problems to increase the innovative potential of national economy. It is possible to reduce corruption and improve economic situation owing to more efficient public administration by creating rating of officials of all levels. The next goal, pursued by implementation of Social Credit System, is to enhance transparency of conducting business and to promote the enterprises, which have the highest ratings in terms of social responsibility and financial reputation. For this purpose, the information is gathered not only about the individuals, who are the employees and owners of the enterprises, but also about activities of the enterprise in general. As a result, general rating of the enterprise is created with black, red and green zones. The black zones denote individuals, management and owners of the enterprise, who systematically violate the law in the area of tax, labor, and trade relations. The red zone lists the enterprises, which just occasionally violate the law. The green zone is the enterprises, which have no violations and are characterized by the high social responsibility. Such system of public administration of business should become a basis for successful business relations, cutting the costs on commercial transactions and general improvement of business environment in all economic sectors. Moreover, Social Credit System makes it possible to build a system of corporate data on trade turnovers, creditworthiness, sustainability and other aspects. It will become much easier to improve conditions of cooperation between the buyers and sellers, to make anti-monopoly legislation more efficient for competition, to arrange investigations due to sale of poor-quality products or other activities and the cases of unfair competition. At the same time, by the use of this model of digital public administration it becomes possible to provide more justification while providing the enterprises, which have the highest social creditworthiness, with the credit resources. Besides the above-stated goals, Social Credit System has one more quite controversial goal that is a creation of transparent data in the area of tax relations. Thus, the Chinese government declared the creation of ratings of all taxpayers in respect of transaction data, for instance, transfer of property or tax returns. The controversial nature of this goal consists in the fact that the algorithm of rating creation is nonpublic and the data on the citizen's rating are available only in the form of points, without specifying the violation, if any. Using this approach, they intend to create credit rating that will make credits for individuals much cheaper. This approach will also facilitate the implementation of tax credits and other forms of financial remunerations for taxpayers in practice. For some categories of people, who have systematic violations of tax law, it is expected to make a blacklist. People from the blacklist can be a subject to considerable sanctions in the form of no access to certain social benefits. In general, Social Credit System as an approach to upgrading the model of public administration, covers almost all spheres of socio-economic activities. However, the other countries do not hurry to transit to the Chinese model of digital public administration. Therefore, for the purpose of reasonable justification of the efficiency of such model, let us make an analysis of progress in indicators relative to the goals that were declared. Proceeding from the goals of the Chinese government, while introducing Social Credit System, transaction costs on conducting business should be significantly reduced, thereby making business in China more profitable than in other countries. As we know, the lower costs on conducting business attract direct foreign investments. Figure 1 shows the dynamics of such investments.

In order to assess the efficiency of Social Credit System, we selected the countries (Table 1), which have the alternative approaches to digital public administration and which are characterized by the higher level of using the digital technologies to monitor economic processes. As a result of systematizing statistical indicators, we can come to the conclusion that functioning of Social Credit System has no correlation with such indicators as the amount of foreign direct investments and growth in such investments. However, obviously, it is incorrect to draw conclusions on the efficiency of any system just based on a few indicators. Moreover, the official data of the Chinese government differ from the international publicly-available statistical sources (China Statistics Press, 2016). The statistical database "World economic forum report 2018" was used for more precise analysis.

Figure-1. Foreign Direct Investment, Net (BoP, Current US\$) and GNI Growth Per Capita (Annual %) in China, Germany, Japan and The Republic of Korea During 2012-2017



Source: <https://data.worldbank.org/indicator/BN.KLT.DINV.CD?locations=CN-DE-KR-JP>

Table-1. Country Comparison by Direction of the 1st Pillar: Institutions in Methodology of the Global Competitiveness Index

	China	Germany	Japan	S. Korea
1.01 Property rights	53	23	10	37
1.02 Intellectual property protection	49	20	18	54
1.03 Diversion of public funds	43	21	19	58
1.04 Public trust in politicians	27	13	26	90
1.05 Irregular payments and bribes	49	29	15	45
1.06 Judicial independence	46	24	15	72
1.07 Favoritism in decisions of government officials	20	10	15	81
1.08 Efficiency of government spending	19	6	29	53
1.09 Burden of government regulation	18	7	59	95
1.10 Efficiency of legal framework in settling disputes	45	15	16	54
1.11 Efficiency of legal framework in challenging regulations	30	9	20	56
1.12 Transparency of government policymaking	45	18	13	98
1.13 Business costs of terrorism	80	67	66	88
1.14 Business costs of crime and violence	64	51	20	63
1.15 Organized crime	79	59	35	66
1.16 Reliability of police services	60	38	16	40
1.17 Ethical behavior of firms	49	22	12	34
1.18 Strength of auditing and reporting standards	71	24	18	23
1.19 Efficacy of corporate boards	126	24	18	32
1.20 Protection of minority shareholders' interests	38	17	14	19
1.21 Strength of investor protection 0-10 (best)	102	51	51	21

Source: <http://www3.weforum.org/docs/GCR20172018/05FullReport/TheGlobalCompetitivenessReport2017%E2%80%932018.pdf>

Given the goals, set force in the Chinese system of digital public administration, the Social Credit System is primarily focused on enhancing the transparency of transactions in all spheres of socio-economic processes. However, it is not possible to assess majority of the results in a quantitative way. That is why we selected the methodology of the World Economic Forum. This international institution annually analyzes the indicators of progress of all countries, involved in the global economy, and calculates the index of their competitiveness, containing a large number of qualitative characteristics. For analysis, we chose a number of indicators, which demonstrate the quality of functioning of national institutions, allowing us to evaluate the efficiency of the models of digital public administration. In order to ensure that the analysis provides a representative picture, apart from China, the table includes the indicators of such countries as Germany, Japan and South Korea. These countries, as well as China, declare the formation and functioning of their own digital models of public administration.

4. Discussion

The first and the most critical aspect of formation of digital public administration in the context of increasing the innovative potential of national economy is the protection of property rights. In terms of this indicator, China occupies 49th position in the overall rating and they are at the bottom place among the countries under analysis. Japan demonstrates the best practices in this breakdown. Systematization of normative documents, related to property rights, demonstrates that, in contrast to China, Japanese system is built using “blockchain” technology. Such system allows to considerably reduce transaction costs on property ownership. This system is also introduced in the sphere of intellectual property protection. Although, the rest of the analyzed countries still use the systems of electronic registers, which slows down and complicates the transaction process.

The next block of activities of national institutions is: public trust in politicians; bribes; judicial independence; favoritism in decisions of government officials; efficiency of government spending; burden of government regulation. Analyzing the functioning of Social Credit System, we should note the significant changes for the better since the beginning of 2014, when this system was introduced in the largest cities of China. It can be seen according to the internal statistics of the country as well as the ratings by such indicators as “Efficiency of government spending” and “Burden of government regulation”. For the period of introducing “Social Credit System” in the rating, China is almost in equal position with Germany, and they leave behind all other analyzed countries. Therefore, we can draw a conclusion that Social Credit Systems the most efficient tool for development of digital public administration.

As for enhancing the efficiency of legal framework in settling disputes, the efficiency of legal framework in challenging regulations and transparency of government policymaking, China demonstrates quite low indicators. Although, this situation is caused not by implementation of Social Credit System, but rather by single-party system in the country. The next block of indicators, which can be used to identify the efficiency of the Chinese model of digital public administration in terms of increasing the innovative potential of national economy, is as follows: ethical behavior of firms; strength of auditing and reporting standards; Efficacy of corporate boards; Protection of minority shareholders' interests; Strength of investor protection. In this context, China has the worst indicators among all the analyzed countries. Having analyzed the normative and legislative acts of China in the sphere of corporate rights, we can see that the reason for such low positions is not in Social Credit System, but rather in geolocation. The modern Chinese policy in the sphere of corporate rights, intersecting with the rules of international

trade, declare the strategy for export expansion, following which all national resources are spent on supporting the huge corporations and export industries. As a result, insufficient attention is paid to transparency of investor's protection, because the government is an investor, in most cases, replacing the function of foreign investments (Polyakov, 2017). However, it does not mean that Social Credit System does not improve the situation with protection of investor's rights in general. Thus, despite of the fact that China is behind the analyzed Germany, Japan and the Republic of Korea by the indicator "protection of minority shareholders' interests, it has high rating by the size of economy, taking into account the amount of countries in the rating (over 200).

5. Conclusions

The systematization of data of the Global Economic Forum and open data of the World Bank, allows making reasonable assessment of the efficiency of Social Credit System as a model of digital public administration of China in terms of increasing the innovative potential of national economy. Social Credit System is the most efficient in reducing corruption of government bodies as it allows monitoring the flow of budget money online. All government officials should have high ratings in order to obtain one or another position. This model significantly impedes corruption schemes. In comparison with the models of digital public administration of Germany, Japan and the Republic of Korea, the Chinese Social Credit System definitely has higher efficiency in formation of the innovative potential of national economy. At the same time, by the indicators of transparency of corporate right and the issues of international trade, the Chinese system of digital administration is far behind Germany and Japan. The reason for this situation is the way of building the algorithms. Germany and Japan, unlike China, create rating systems with open data, which enable every user to find out the state of affairs of any company or other individual. The system of publicly available data allows economic agents to evaluate the rating and make assessments themselves. Therefore, such an open system motivates local entrepreneurs and attracts foreign investments. Moreover, costs on development and support of such system are much lower as there is an opportunity to attract private capital. In general, it should be noted that the Chinese system of digital public administration has advantages in terms of increasing the innovative potential of national economy, because it impedes corruption. Although, it is ineffective for enhancing the market transparency. Due to its centralized control, the system is vulnerable to manipulations at the highest level of government administration. The Chinese system of digital public administration is a matter of great interest, but only for transformation of the working principles of public government administration.

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