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A.A. Kuanaliyev

Karaganda university of Kazpotrebsoyuz, Kazakhstan
kuanali.krg@gmail.com
ORCID ID: 0000–0002–3035–1368

Digitalization of public administration as a main principle at the fighting corruption in the Republic of Kazakhstan

Abstract

Object: Digitalization itself and as a result of digitalization of public administration is a globally actual trend. Especially after last pandemic year when government staff mostly had to work remotely. This may be one of the reason of Kazakhstan's improvement at the corruption ranking. The purpose of this study is to determine the relationship between the level of digitalization of public administration and the level of perception of corruption.

Methods: Methods of grouping and classification, as well as methods of mathematical modeling were used in processing and systematization of data.

Findings: While looking over history of corruption and digitalization it was revealed that countries with high level of digitalization of public administration have good positions at the corruption perceptions index (CPI). Before starting the study, the author put forward a logical hypothesis about the presence of a high directly proportional relationship between these two characteristics, to confirm which mathematical analysis (Cramer's rule) was applied. A brief overview of the development of corruption and digitalization starting from the first moments of the beginning of both phenomena was given.

Conclusions: As a result of the study, a correlation with the R^2 coefficient equal to 0.8988 was found, which confirmed the accepted hypothesis. In other words, a high level of digitalization of public administration makes it possible to improve indicators in the corruption perception index.

Keywords: digitalization, corruption, digitalization of public administration, corruption perception index, information and communication technologies.

Introduction

The corruption perception index (CPI) in the Republic of Kazakhstan, despite the positive changes over last year (an improvement by 27 positions), still remains very low, so at the end of 2020 our republic took 94th place in the ranking of 180 countries, gaining only 38 points out of 100. Thus, the relevance of any research on this topic, with a search for possible causes or solutions to this problem, no doubt, will be high for Kazakhstan in the near future. Given the fact of the rapid development of both science in general and the information and communication technologies (ICT) sector in particular, we consider it necessary to conduct certain studies in order to understand if there is any chance to cure this «disease». The purpose of the research is to study in which way, and how much the development of digitalization is able to influence the level of perception of corruption. The author preliminarily put forward the following hypothesis about the presence of a direct connection between the level of digitalization of public administration and the level of perception of corruption in a particular country, so with an increase in the level of digitalization of public administration, its transparency and openness increase, and, accordingly, the level of perception of corruption increases.

Literature review

The problem of corruption and methods of fights against it has been the subject of research for a long period of time. Actually, from the moment the first manifestations of statehood emerged the problem of corruption and the search for means of combating it have arisen. For the sake of completeness, we consider it appropriate to briefly describe the history of occurrence and various definitions of corruption. The first mentions of this phenomenon dated to the times of the Sumerians and ancient Egypt, where complaints about bribery of officials and judges were mentioned. Several millennia have passed since then, civilizations have sunk into oblivion, and corruption only flourishes from year to year, acquiring new forms and manifestations. One of the first world empires, the Roman Empire, was also no exception and faced the problem of corruption. However, everything started out quite well and during the early republic, the state apparatus did an excellent job with the responsibilities assigned to it. The situation begins to change dramatically, starting from the II century BC, and by the end of the century Roman society is transformed unrecognizably: insanely wealthy citizens appear, and luxury begins to be displayed, an inappropriate increase in the accumulation

of wealth and real estate takes place. Basically, the land issue can be called one of the reasons for the extremely rapid raise of corruption in Rome, since along with the growth of the conquests of external territories, the question arose about their distribution among citizens, and, despite the existence of a developed law and legislative framework, among representatives of the authorities (senators), actual seizure of state property (state land) without any registration and payment for it took place (Kuzovkov, 2010, 11). The second, but no less important point contributing to the development of corruption in Roman society was the development of maritime trade and government contracts. As a countermeasure in this direction, a ban to participate in sea trade, financial transactions and government contracts was adopted for the senators (Kuzovkov, 2010, 10). However, these measures were easily bypassed by the senators due to participation through proxies. Over 2000 years have passed, but in this area we still see the same problems, a measures of counteraction to it are similarly useless. Concluding the Roman period of the development of corruption, it should be noted fact that the reason for the betrayal and murder of Caesar is considered by many as an act against his tyranny and for the revival of democracy, however the true reasons are much more prosaic: the measures taken by Caesar as to fight corruption in particular and improving the social situation in general, could not be liked the oligarchy, whose speculative and corrupt income he limited. All this resulted in a conspiracy and his subsequent murder (Kuzovkov, 2010, 22).

Continuing the disclosure of the phenomenon of corruption, we consider it is necessary to list some of the main types of corruption, because many do not suspect that corruption means not only bribery, but also crimes such as extortion, embezzlement or embezzlement of state property, nepotism, cronyism, patronage, rent seeking etc. If the first definition is clear, then the last ones should be clarified, since in Kazakhstani society with a strong family institution, nepotism has developed into its extreme form of tribalism, when not only relatives are patronized, but everyone belonging to the same clan. The rent seeking is the definition and assignment of certain benefits to certain groups for some gratitude, it can be exemption from taxation of a certain group of taxpayers for material «gratitude» and cash transfers to certain regions for intangible «gratitude» (votes) (Cingi, 2002, 30). Thus, we realize that corruption has many faces and waits us where we do not expect to meet it. There is a consensus among economists and sociologists that corruption is a phenomenon unique to the public sector. Also, speaking of corruption we will keep in mind the generally accepted definition, that is, corruption is the abuse of official rights in personal interests.

However, is it bad? For example, political scientist Nathaniel Leff in his published article «Economic Development Through Bureaucratic Corruption», argues that at a certain optimum, a bribe, from the point of view of economic development, can be a positive phenomenon. In his opinion, a bribe, being an additional and direct payment to an official for a unit of service, makes him more efficient. In addition, entrepreneurs can quickly and easily overcome multiple bureaucratic hurdles using bribes (Leff, 1964, 8). In the words of Bruce Lloyd, a bribe, creating an opportunity to pass (by-pass) «bureaucratic paperwork» has the function of accelerating economic growth (Lloyd, 1993). At the same time, Samuel Huntington noted in his article that corruption always accompanies social change. In his view, the change from autocratic to democratic rule is a process of political modernization, in which corruption is usually observed. This is due to the fact that under the leadership of the newly formed government there are old, undeveloped bodies (Huntington, 1968).

Despite the fact that some of the aforementioned political scientists have a positive attitude towards corruption, results of many studies clearly show that corruption impedes economic growth. Among the authors of such works can be listed such scientists as Gould, Klitgaard, Mauro, Shleifer, Vishny. If with the understanding that corruption, despite its apparent advantages, is an indisputable evil and a brake on the country's economic growth a relative consensus has been established, then, for our part, we consider it necessary to shed light on the fact that corruption, among other things, leads to a decrease in the level of prosperity, which is natural and logical. In support of this logical inference, we carried out a mathematical analysis and built a linear dependence of these two characteristics using the Cramer's rule.

Thus, having once again substantiated the assertion that corruption is harmful, we consider it possible to proceed to the assumption of an inverse correlation between the level of digitalization of public administration and the level of its corruption, as well as the possible reasons for this correlation.

Before beginning to reveal the essence of the question and, even more so, trying to give a complete answer to it, we should understand what exactly digitalization is and what does it mean. According to BCG (Boston City Group), digitalization is «the use of online and information digital technologies by all participants in the economic system, from individuals to large companies and states, is a necessary condition for maintaining competitiveness for all countries» (Lapidus, 2020). At the same time, one cannot fail to mention the term digital economy. There are several opinions about its origin: according to the first, its authorship

belongs to the Canadian researcher Don Tapscott, who in 1994 published the book of the same name (The Digital Economy) (Tapscott, 1994), where he, describing the characteristics, did not give a specific definitions of the digital economy. According to another opinion, Nicholas Negroponte, who actually used the term «information economy» in his 1995 work «Being digital», claims the authorship of the term «digital economy» (Negroponte, 1995). In his book, he used a metaphor about the transition from processing atoms to processing bits, noting the lack of classical goods in «physical» embodiment and the advantages of the new economy. Based on the above, the question about the authorship of the term has been removed. At the same time, the most laconic and most relevant definition of the digital economy is given by the World Bank: «the digital economy is a system of economic, social and cultural relations based on the use of digital information and communication technologies» (World Bank, 2016).

Having explained such concepts as digitalization and the digital economy, we can move on to the definition of digitalization in the field of public administration. According to T.A. Gerasimova and N.V. Moskvitina, digitalization in the field of public administration «means the development and use of new technologies and management tools that influence the formation of digital public administration in order to improve the efficiency of management decisions and public services provided to the population» (Gerasimova T.A., Moskvitina N.V., 2019). In the table below (Table 1), the model of the evolution of digital public administration proposed by S.G. Kamolov is presented.

Table 1. Evolution of the public administration system and information technology dominants

Phase	Evolutionary form of the public administration system	Information technology dominant	Period (estimated)
I-st phase	E-government	Mainframes / dedicated servers, computing power of terminal computing devices (fixed computing)	1990's
II-nd phase	Open government	Mobile (cloud) computing, open data	2000's
III-rd phase	Smart government	Internet of things, data miming, big data	Nowadays
Not: Compiled on the basis of the source: Public administration at the digital age, S.G. Kamolov			

At the same time, he put forward the assumption that personal government / i-government will become the fourth phase of the smart state, which will come in 10–15 years. It is difficult to argue with this logical conclusion, considering the current speed of digital technologies development and the process of commensurate evolution of public administration. An interesting fact is that among the three new opportunities he proposed to digitalize public administration, the first is new dimensions of the fight against corruption. However, the main emphasis in this issue is on standardization, as a blow to subjectivity, in the traditional sense of the word it is difficult to corrupt robotic systems. In his opinion, from this point of view, «digitalization of the public administration system is an absolute blessing» (S.G. Kamolov, 2017). At the same time, among the «traps» of digitalization of public administration the probability of substitution of goals by means is in the first place. This, in turn, is often observed by us already in our current life, when the digitalization of public administration is moving for the sake of digitalization itself, instead of making public administration more efficient or better provide public services to the population.

In addition to the phase evolution of public administration systems presented above, there are other classifications of the stage development of e-government proposed by various authors; they are presented in the table below (Table 2).

As has been said above, when determining the stage of development of e-government in a particular state, first of all, it should be remembered that the goal is the increase in the efficiency of public administration, and it should not be replaced by means of achieving it, among which we can note: the level of development of ICT and other means of communication (Sidorova, 2018, 26).

Table 2. Stages of e-government development

Stages of e-government development		
Inshakova	K. Lane and J. Lee	UN DESA
• Provision of information • Advanced presence • Interactive web presence • Transactional presence • Network presence	• Catalog • Transaction • Vertical integration • Horizontal integration	• The emergence of electronic government • Increased • Interactive • Transactional • Network state
Note: Compiled on the basis of the source: Sidorova A.A. E-Government: textbook and workshop for Bachelor's and Master's degrees		

Taking into account the gradation proposed by S.G. Kamolov, Kazakhstan presumably should have been in the third phase of the development of public administration systems, that is, at the stage of smart government. However, we should remember the fact that the beginning of evolution in the digitalization of public administration systems in our country, unfortunately, does not apply to the 1990s. The official history of digitalization in Kazakhstan begins in the late 2000s, or rather in 2008, when the decree was issued on the creation of the main locomotive and the main body designed to pursue a digitalization policy in the Republic of Kazakhstan, which is the Zerde National Information Holding. JSC «National ICT Holding «Zerde» was established in accordance with the decree of the Government of the Republic of Kazakhstan dated July 3, 2008 No. 668» On the creation of joint-stock companies «National Information Holding» «Arna Media», National Scientific and Technological Holding «Parasat», «National Information and Communication Holding «Zerde». The Ministry of Digital Development, Defense and Aerospace Industry of the Republic of Kazakhstan, exercising the rights of ownership and use of the state block of shares of JSC «Holding «Zerde», is the Sole Shareholder of the Company. As mentioned above, being the main participant at the forefront of the state, it should be noted that in order to address the issue of accelerated digitalization of the Kazakh economy, among other things, a separate ministry has been created: the Ministry of Digital Development, Innovation and Aerospace Industry of the Republic of Kazakhstan. The Ministry is engaged in the formation and implementation of state policy in the field of digital development of the country, in the areas of innovation, communications, provision of public services, electronic industry, and is also engaged in the development of e-government, coordination of the activities of the PC Government for Citizens, information security, aerospace industry, geodesy and cartography. The mission of the Ministry is the formation and implementation of an effective state policy in regulated areas, as well as the development of a competitive aerospace industry, the geodesy and cartography industry, information security in the field of informatization, the formation and provision of the development of information and communication infrastructure, innovation, scientific and technological development of the country, effective functioning of the communication services market. Since the establishment of JSC «National ICT Holding «Zerde» in Kazakhstan, two program documents have been adopted for the development of the industry: «Informational Kazakhstan 2020» and «Digital Kazakhstan», according to which the digitalization strategy of both the entire economy of the Republic of Kazakhstan in general and public administration in particular is being implemented.

In light of the to determine the level of digitalization, it would be appropriate to use the ICT Development Index, which characterizes the achievements of the countries of the world in terms of the development of information and communication technologies. This indicator is calculated according to the methodology of the International Telecommunication Union, a specialized UN subdivision that defines world standards in the field of ICT. The index was developed in 2007 based on 11 indicators that the International Telecommunication Union uses in its assessments of ICT development.

However, we are interested not only in the level of digitalization of a particular country, but in the level of digitalization of its public sector. We believe that in this light, the e-government development index is most suitable.

The UN Global E-Government Development Index of the United Nations (UN) is a comprehensive indicator that assesses the readiness and capabilities of national government agencies to use information and communication technologies to provide citizens with public services, it is published each two year.

The study contains data on the level of development of e-government in various countries, as well as a systematic assessment of trends in the use of ICT by government agencies. All countries covered by this study are ranked based on a weighted score index for three main components:

• Degree of coverage and quality of Internet services;
• Level of development of ICT infrastructure;
• Human capital.

We have accepted the latest study published in 2020. Slightly deviating from the topic of our study, it should be noted that the past year was in some way extreme in many respects: from extremely low oil prices to the global COVID-19 pandemic, which, unambiguously, left its mark on the entire further development of mankind as a whole. The pandemic announced by WHO and the quarantine regime introduced by many countries, including the Republic of Kazakhstan, served as a kind of crash test for the economies of countries in general, and influenced the level of their digitalization and readiness to solve global problems, in particular. This point is reflected in the «E-government. Research 2020 «(E-Government Survey, 2020).

Methods

Above, we suggested that the level of digitalization of the public sector should directly affect the level of perception of corruption in a particular country. In support of this logical conclusion, below we carried out a mathematical analysis and built a linear dependence of these two characteristics using the Cramer's rule (Table 3).

Table 3. Ranking of 19 countries in terms of corruption perception and EGDI index

№	Country	EGDI	CPI
1	Denmark	0,9758	89
2	Korea	0,9560	61
3	Estonia	0,9473	75
4	Finland	0,9452	85
5	Australia	0,9432	77
6	Sweden	0,9365	85
7	United Kingdom	0,9358	77
8	New Zealand	0,9339	88
9	USA	0,9297	71
10	Netherlands	0,9228	82
11	Singapore	0,9150	84
12	Iceland	0,9101	75
13	Norway	0,9064	84
14	Japan	0,8989	74
15	Turkey	0,7718	41
16	Poland	0,8531	61
17	Hungary	0,7745	47
18	Mexico	0,7291	30
19	Colombia	0,7164	37

Note: Compiled by the author

Using Cramer's rule, we draw up the regression line equation, assuming a linear correlation $y= \alpha+b*x$.

Let us assess the tightness of the relationship between the factors x and y by the value of the linear correlation coefficient. As a result of the above, we will construct a correlation field (diagram) and a regression line.

A preliminary analysis of the data, as well as logic, suggest that there should be a directly proportional relationship between the level of digitalization of the country's public administration and the level of perception of corruption in its government bodies. Moreover, we assume that it can be expressed in terms of a linear correlation dependence.

To confirm or refute this hypothesis, we took data for 2020, according to the available ratings of 19 countries of the world, which occupy medium and high places in the rating of electronic government compiled by the UN, as well as their corruption perception indexes (Table 4).

Table 4. Coefficients calculation for the Cramer's rule

№	Country	EGDI 2020 (x)	CPI (y)	x^2	x*y
1	Denmark	0,9758	89	0,9522	86,8462
2	Korea	0,9560	61	0,9139	58,3160
3	Estonia	0,9473	75	0,8974	71,0475
4	Finland	0,9452	85	0,8934	80,3420
5	Australia	0,9432	77	0,8896	72,6264
6	Sweden	0,9365	85	0,8770	79,6025
7	United Kingdom	0,9358	77	0,8757	72,0566
8	New Zealand	0,9339	88	0,8722	82,1832
9	USA	0,9297	71	0,8643	66,0087
10	Netherlands	0,9228	82	0,8516	75,6696
11	Singapore	0,9150	84	0,8372	76,8600
12	Iceland	0,9101	75	0,8283	68,2575
13	Norway	0,9064	84	0,8216	76,1376
14	Japan	0,8989	74	0,8080	66,5186
15	Turkey	0,7718	41	0,5957	31,6438
16	Poland	0,8531	61	0,7278	52,0391
17	Hungary	0,7745	47	0,5999	36,4015
18	Mexico	0,7291	30	0,5316	21,8730
19	Colombia	0,7164	37	0,5132	26,5068
	Summary	**16,9015**	**1 323,00**	**15,1506**	**1 200,9366**
	average	0,8896	69,6316		
Note: Compiled by the author					

The parameters a and b of linear regression are calculated as a result of solving a system of normal equations for a and b:

$$\begin{cases} na + b\sum_{i=1}^{n} x_i = \sum_{i=1}^{n} y_i; \\ a\sum_{i=1}^{n} x_i + b\sum_{i=1}^{n} x_i^2 = \sum_{i=1}^{n} x_i y_i \end{cases}.$$

Table 5. Solving a system of normal equations a and b

d=	19	16,90	2,20
	16,90	15,15	
d1=	1 323,00	16,90	-253,43
	1 200,94	15,15	
d2=	19	1 323,00	457,11
	16,90	1 200,94	
Note: Compiled by the author			

Then, a=d1/d= -115,2; b=d2/d= 207,78

Results and discussions

The calculation results are shown in the Figure 1.

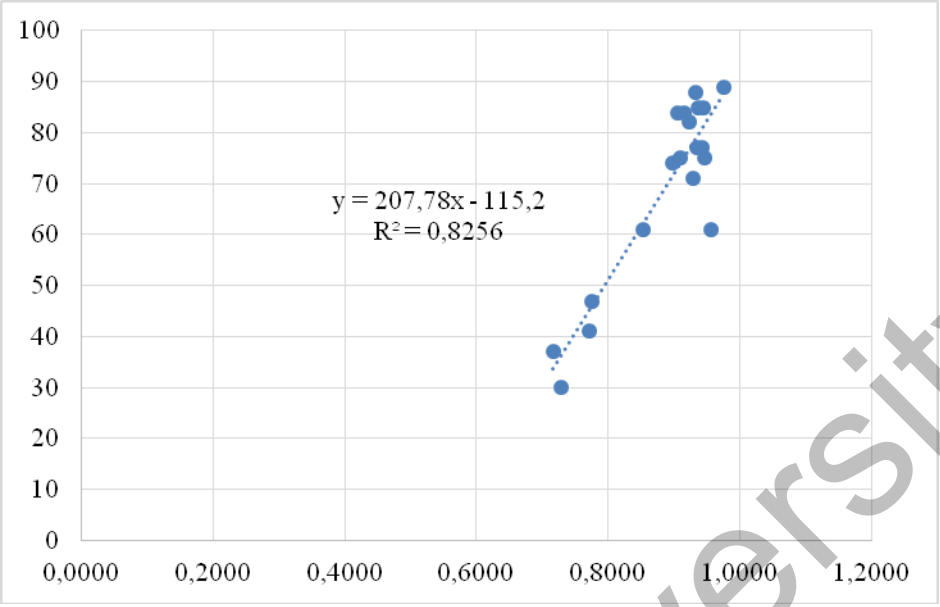

Figure 1. Correlation between the development of e-government and the level of perception of corruption

Note: Compiled by the author

The results obtained can be interpreted as follows: if the e-government development index changes by 1 unit, the corruption perception index will change by 207.78 units. At the same time, the R^2 indicator, equalto 0.8256, indicating a high correlation between the two indices we have taken. Consequently, our hypothesis about a high direct relationship between the e-government development index and the corruption perception index is confirmed.

Conclusion

When performing the analysis, the most relevant data available to date was used: the e-government development index was compiled as, the corruption perception index as of 2020. However, in our opinion, despite the confirmation obtained as a result of the analysis of the previously put forward assumption about the direct and high correlation of these two indicators, it is more correct to talk about the delayed effect of the level of e-government development on the level of perception of corruption in a particular country, since in addition to the direct effect, digitalization of the state sector hides much deeper effects, ranging from optimizing the costs of maintaining the state apparatus of employees to other endless opportunities for countering corruption, which, in our opinion, is perhaps the most important failure of the state. This effect of digitalization and the digitalization of the public sector are for further studies. It should be noted that, despite the active dynamics of different countries in terms of the level of e-government development (for example, Kazakhstan and Russia), the countries in the top dozen in this rating have practically not changed, as well as their level of perception of corruption. At the same time, it should be understood that the period of time of two and a half decades (the approximate time of existence of digitalization) is relatively short for global changes in the level of perception of corruption and a fundamental change in it.

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А.А. Қуаналиев

Мемлекеттік басқаруды цифрландыру Қазақстан Республикасында сыбайлас жемқорлыққа қарсы іс-қимылдың негізгі қағидаты ретінде

Аңдатпа

Мақсаты: Цифрландырудың өзі және мемлекеттік секторды цифрландыру жаһандық өзекті тренд болып табылады. Атап айтқанда, өткен карантиндік жылдан кейін, мемлекеттік қызметкерлер көбінесе қашықтықтан жұмыс істеуге мәжбүр болды. Мүмкін, бұл Қазақстанның сыбайлас жемқорлық дәрежесіндегі жағдайының жақсару себептерінің бірі шығар. Осы зерттеудің мақсаты мемлекеттік басқаруды цифрландыру деңгейі мен сыбайлас жемқорлықты қабылдау деңгейі арасындағы байланысты анықтау болып табылады.

Әдісі: Деректерді өңдеу және жүйелеу кезінде топтау және жіктеу әдістері, сондай-ақ математикалық модельдеу әдістері пайдаланылды.

Қорытынды: Сыбайлас жемқорлық және цифрландыру тарихын зерделеу кезінде мемлекеттік басқаруды цифрландыру деңгейі жоғары елдер сыбайлас жемқорлықты қабылдау индексі бойынша жақсы позицияларға ие екендігі анықталды. Зерттеуді бастамас бұрын, автор осы екі сипаттаманың арасында жоғары тура пропорционал тәуелділіктің болуы туралы логикалық гипотезаны алға тартты, оны растау үшін математикалық талдауды (Крамер әдісі) қолданған. Ең алдымен, екі құбылыстың пайда болуының алғашқы сәттерінен бастап сыбайлас жемқорлық пен цифрландырудың дамуына қысқаша шолу жасалды.

Тұжырымдама: Зерттеу нәтижесінде R2 коэффициентінің 0,8988-ге қатынасы анықталды, бұл қабылданған гипотезаны растады. Басқаша айтқанда, мемлекеттік басқаруды цифрландырудың жоғары деңгейі сыбайлас жемқорлықты қабылдау индексінің көрсеткіштерін жақсартуға мүмкіндік береді.

Кілт сөздер: цифрландыру, сыбайлас жемқорлық, мемлекеттік басқаруды цифрландыру, сыбайлас жемқорлықты қабылдау индексі, ақпараттық-коммуникациялық технологиялар.

А.А. Куаналиев

Цифровизация государственного управления как основной принцип противодействия коррупции в Республике Казахстан

Аннотация

Цель: Цифровизация сама по себе и цифровизация государственного сектора — глобально актуальный тренд. В особенности после прошедшего карантинного года, когда государственный персонал большей частью вынужден был работать удаленно. Возможно, это одна из причин улучшения позиции Казахстана в

коррупционном ранжировании. Целью данного исследования является выявление связи между уровнем цифровизации государственного управления и уровнем восприятия коррупции.

Методы: При обработке и систематизации данных использовались методы группировки и классификации, а также математического моделирования.

Результаты: При изучении истории коррупции и цифровизации было выявлено, что страны с высоким уровнем цифровизации государственного управления занимают хорошие позиции по индексу восприятия коррупции (ИВК). Перед началом исследования автор выдвинул логическую гипотезу о наличии высокой прямопропорциональной зависимости между этими двумя характеристиками, для подтверждения которой был применен математический анализ (метод Крамера). Прежде всего, был дан краткий обзор развития коррупции и цифровизации, начиная с первых моментов возникновения обоих явлений.

Выводы: В результате исследования была обнаружена корреляция с коэффициентом R2, равным 0,8988, что подтвердило принятую гипотезу. Другими словами, высокий уровень цифровизации государственного управления позволяет улучшить показатели индекса восприятия коррупции.

Ключевые слова: цифровизация, коррупция, цифровизация государственного управления, индекс восприятия коррупции, информационно-коммуникационные технологии.

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