

DIGITAL GOVERNMENT MODEL: THEORY AND PRACTICE OF MODERN PUBLIC ADMINISTRATION

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ABSTRACT

This study aims to present the model of digital government which has replaced the Weber's model, the "progressive era" model and the new public government model. An important components of the research subject are: 1) open data representing numerous sets of government data, cloud processing technologies, as well as their distributed production, involving a network of civic activists, taking advantage of mash-ups web applications and crowdsourcing platforms; 2) big data as a combination of modern ways of working with large information arrays, emerging in various spheres of public life - from the sphere of security to the area of online education and health. The main innovative features of this study are using the empirical models of modern resources and foreign experiences, innovative practices of applying the digital governance model in the public administration, introduction of open data in the production of public services and exploring the feasibilities of using and developing new digital platforms and Internet applications. The author has explored innovative ways of applying big data in the public administration, including the areas of security and protection from emergencies, education and health, transport and budget.

Keywords: Digital Governance, Public Administration, Internet Culture, Data.

INTRODUCTION

In the early 21st century most states depend on the quality and scale of their presence in the digital world and a complex network of information systems that ensure the smooth functioning of the administrative mechanism and support the development and implementation of public policy. These systems largely determine the process of practical implementation of state policy, permeate almost the entire context in which it involved, they are the basis of innovative developments in the public administration. As a result, many or even most of governments and government offices are already equipped with information systems and they demonstrate a high degree of digital participation (UN E-Government Survey) and transparency (The dynamics of increasing the openness of ministries and departments 2016). In a rapidly changing digital environment, the state has to build a complex system of communications and feedback cycles with citizens. However, digital worlds of the government and citizens remain relatively separate from each other: the state can lag behind the current trends in the development of digital technologies and society can underestimate the problems of protecting digital sovereignty. In the era of cloud computing, big data and social media, there is the establishing of a digital government model (DGM), in which digital technologies occupy a central position in the public administration and bring organizational cultures formed outside the government sphere under the influence of information technologies on the Internet. The digital government model, which combines principles of anarchism and cyber-utopianism in the early years of the Internet and also principles, which underlies the movements to protect open data and digital citizens' rights, serves as a basis for developing practical recommendations in the sphere of the

public administration, as well as government decision-making in an increasingly large and complex world of digital technology (Mihajlov, 2017).

MATERIALS AND METHODS

The study materials include Russian and foreign scientific monographs, articles, Internet resources, summaries and reports of international governmental and non-governmental organizations, as well as Russian, European and international regulatory and legal sources. The methodology of the study includes historical and analytical methods: the historical method allows us to trace the history of the public administration models development, beginning with the Weber model and ending with the model of digital government, relying both on the historical framework of their formation and on the driving causes of the transition to a particular model; analytical method makes it possible to identify key features of the digital government model, taking into account not only technological features, but also basic trends in the development of the public administration in the era of open and big data.

THEORITICAL BACGROUND

The study of the public administration digitalization problems, the introduction of digital technologies in the administrative practice of the bureaucracy is represented in a significant number of works by foreign scientists. However, an analysis of the literature on this subject showed that, despite of many scientific researches, there are practically no works devoted to the development of a digital government model in the context of the spread of open and big data technologies. Thus, the theoretical foundation for comprehending the digital age, as well as the waves of digitalization of state administration, are considered in the works of Dunleavy & Hood, 1994; Dunleavy & Margetts, 2015; Helen Margetts & Dunleavy, 2013; issues of digital government, its open architecture are devoted to the works of Fishenden and Thompson (2013). A number of foreign studies focuses on certain aspects of digital governance, in particular, Hallsworth (2016) analyses the place and role of digital technologies in modernizing the modern healthcare system, Bertot, Estevez & Janowski, 2016; Glick, 2015; Hallsworth, 2016; Janssen, Rana, Slade & Dwivedi, 2017, etc. emphasize the importance of digitalization of the production and consumption process state services, Glick (2015) criticizes the experience of introducing digital technologies in the work of government organizations. The study of open data and big data in the development of the digital era of the public administration is devoted to the research of Margetts (2013), Card (2015), Hao (2015), Aggarwal (2016), while Höchtl, Parycek and Schöllhammer (2016) emphasize the increasingly important role of big data in the process of making government decisions . The problem of digital government also is one of the current problems in the Russian literature. The theoretical interpretation of the administrative paradigm of the state and the bureaucracy transformation that contributes to the crisis state of the modern state administration is devoted works of Barabashev (2016); open data as a new instrument of interaction between the state and society, tasks and prospects for the implementation of open data in Russia are considered in works of Dmitrieva and Styrin (2014), Vidyasova and Karachai (2014), Ignatova (2015), etc. In general, studies of Russian authors correspond to key trends in the study of digital governance in foreign literature: Arkhipova (2016) emphasizes the evolution of the modern state in the conditions of the development of digital technologies in the direction of digital government. Sidorova, 2017; Avdeeva (2016); Bulgakova and Akimov (2015) pay attention to the possibilities and prospects of using big data in modern Russia, taking into

account foreign experience, Savelyev (2015) emphasizes the importance of protecting personal data and the problems of applying legislation in this sphere in the era of big data.

RESULTS AND DISCUSSION

The modern digital era in the development of the public administration rests on a number of government models that emerged at the turn of the 19th and 20th centuries. The first of these can be considered Weber model built around the management of large government structures with a rigid hierarchy and the use of mainly print media. This model was the basis of the "state administration of the progressive era"-the Western administrative model of the late XIX-early XX centuries, characterized by the idealization of public service, its isolation from the general labor market and the development of general rules codes that limit and regulate the government functions of civil servants. In this model, the role of information technologies was minimal (the transmission of text data through the state courier service was supplemented by the use of telegraph and telephone lines) and even the initial modernization of administrative operations, the formation of the first databases, catalogues and card files resulted mainly in strengthening the role of the bureaucracy.

Since the 1980s and until the early 2000s, the model of new public management (NPM) began to dominate in the countries of the Anglo-American organizational culture as an approach to the reform of public administration. Proponents of the NPM emphasized the importance of competition that promotes the emergence of alternative producers in the public services market, which stimulates the outsourcing practice in their production, supporting not only the formation of strategic thinking among the producers, but also the establishment of appropriate markets, the reduction of the role of state institutions, privatization and financing, to the end user. In many countries, the requirements of the NPM model have been put into practice, such as the separation of large government departments, increased competition in the public sector and market incentives for public servants. In this model, digital technologies were of secondary importance, since their initial application was aimed mainly at improving such indicators of the provision of public services as efficiency and speed of information transfer.

Since the beginning of the 2000s, a new management model has begun to spread in the world, with digital technologies at its centre. The transition from the NPM to the digital government model is not a simple change, but rather a radical turn within the general boundaries of social modernization, which became possible together with the development of the Internet and a qualitative immersion of social processes in the Internet space. The digital government model mainly concerned such topics as:

- Reintegration of bureaucratic structures with the simultaneous alignment of horizontal links both within government departments and levels of government and with their external medium. Such reintegration took place at a new technological level through the creation of new administrative mechanisms by the central government that reduce costs and redundant and duplicative functions of certain administrative institutions, as well as by simplifying the organization of the public administration based on the unification and standardization of the work of its constituent elements;
- The organization of public administration in the spirit of holism, oriented to the needs of the population and the practice of public services, has become an end-to-end product redesign from the customer's point of view, the creation of integrated tools such as "one window" or electronic queue services, modernization or increased operational flexibility

of government structures, which in real time can solve the tasks and respond to the deviations from the set indicators;

- The digitization of public administration, both in terms of full coverage of government departments and in terms of the widespread introduction of electronic delivery of services, where possible, through centralized public online purchases or new forms of automation focused on zero-touch technologies that do not require intervention of a person. Digitization is also a key incentive for the radical "unloading" of the public administration and the transfer of redundant functions to public and commercial structures. As a result of the development of such a technocratic administration, it becomes possible to move to more open government and access to public information regimes.

The development of digital governance at the present stage is a complex and multilevel process, the consideration of which goes beyond the purely technological aspect of the DGM. Digital control is made possible by the digitalization of the society as a cultural adaptation to key technological achievements, the digitalization of the state apparatus and its reintegration at the organizational and financial-budgetary levels, the convergence of the production and consumption of public services in the "citizen-state" chain, where the producer carries out constant feedback with the customer-consumer. The most important sub-steps of the observed transition to digital governance that directly exert influence on the development of the whole society was the evolution of the Internet within the framework of the 1st generation (The World Wide Web, Web 1.0, 1990-2000), 2D generations (Social Network (The Social Web, Web 2.0, 2000-2010) and the currently developing 3rd generation (The Semantic Web, Web 3.0, 2010-2020). As a result, at present a new system of interaction between society and the state is being formed, largely shifted to the Internet medium, moreover, "cloud" and "ubiquitous computing" contribute to the emergence of new organizational forms and methods of the public administration.

The spread of digital technologies and the Internet in the 2000s contributed to the gradual flow of the organizational culture of the Internet to the government, which ultimately formed the basis for the digital government model. Digital technologies have become a kind of a channel for the exchange of new types of professional knowledge and introduction of innovative developments directly into the work of the government. The Internet has become the first technology that has penetrated the everyday life of citizens at a faster rate than in the daily practice of bureaucracy. Moreover, new cultural movements have grown up around a number of technological trends, in particular, the movement of open source code, the open access movement and the movement of open standards, culminating in the movement for open data in the mid-2000s (Group). Representatives of this movement O'Reilly and Malamud in 2007 developed the principles of open data underlying the MSC: accessibility, completeness, primary nature, high speed of delivery, machine-readable format, non-discriminatory nature, non-proprietary format and dissemination of data to conditions of an open license. State initiatives to promote open data, as a rule, had three main objectives: increasing the transparency of the work of state authorities and management, improving the quality of public services, stimulating innovation in public administration. If we try to generalize the advantages of open data, which resulting from more open and active exchange of government data, we should talk about the following:

- Open data contribute to a wider practice of providing services through web applications: active citizens and entrepreneurs can use raw information arrays as a resource for creating new data sets and developing mobile and web applications, web-applications "mash-ups" (combining data from a number of sources and creating unique web-based tools, for example, when applying data on leasing, buying and selling real estate on a cartographic Google service) by accessing government data archives.
- Technologies of cloud processing of open data and knowledge production on the basis of distributed networks of civilian analysts. The state can contribute to the creation of a large number of civilian analysts mobilized through various crowdsourcing projects that can significantly expand the analytical capacity of the state by opening public access to government databases within the framework of an open data strategy. Providing researchers with access to raw government data allows using data visualization and geolocation services to develop new approaches to solving a wide range of socio-economic problems.
- Transparency and accountability of public procurement on the basis of open data: the more people are aware of how they are organized, what federal, regional and local budgets are being channelled to, as well as funds from extra-budgetary sources, the less space there is for corruption, related to the lobbying by officials of the certain suppliers interests. As a result, public resources are spent more purposefully, social and economic returns are enhanced and confidence in the government and the legitimacy of public authority in the "sphere of the individual's moral choice" is growing (Kosorukova, 2017).

The state has to come to terms with new realities and start using numerous digital computer-readable formats -CSV, XML, ZIP, JSON, GZ, XLS, XLSX, RDF, etc. In the era of public authorities digital governance and government need to more actively exchange open data both among themselves and with the corporate and civil sectors, building a network of interconnected data sets that are a source of undisclosed economic potential activation (Auer, Lehmann, Ngomo & Zaveri, 2013). The creation of a mechanism for exchanging data between state information systems is an important direction in increasing the efficiency of using open data. In 2001, an inter-departmental electronic communication system was launched in Estonia and in 2014, an e-citizenship system that supports a multilateral connection between government organizations and distributed data storage on multiple servers (Anthes, 2015). This approach allowed to avoid high expenses associated with the system of bilateral connections and the exchange of data large amounts and also reduced the risk of data concentration on a single server.

Within the framework of the DGM, the government is viewed as a set of open information platforms that can be quickly adjusted to the specific goals and objectives of certain government, corporate or civic organizations. The creator of the government model as a platform, O'Reilly (2011) refers to the successful experience of creating DC Mobile Apps, a mobile applications site in urban management developed by the technology department of the Washington government. Moreover, the government of Washington allowed independent developers to develop applications. Such an organizational culture of digital governance is promoted by the Government of Great Britain digital service in the structure of the Cabinet of Ministers. This service promotes the idea of creating software in the field of public administration that allows making public services in digital format free by default, uses many

open information products-platforms, to create mobile applications, using common technical standards that ensure the consistency of all applications.

The DGM provides the active role of citizens in the production of public services and treats the latter not as consumers, but rather as co-producers of this good. The idea of co-production of public services has become central to the paradigm of digital governance, based on crowdsourcing ideas and the use of user content integrated into the concept of "Web 2.0. At the individual level, this implies that citizens take on an increasing responsibility in the production and provision of public services. For example, the growing number of mobile applications in the healthcare sphere and Internet allow a person to carry out self-monitoring of health at home, to transfer data to medical professionals and to adapt the treatment process, as well as health insurance products to individual conditions and human characteristics. At the collective level, co-production of public services involves the practice of crowdsourcing, for example, when citizens notify the government about problems related to the management of apartment buildings, schools, clinics, public transport and emergency response (see the mobile applications "Our City", "Washington DC 311", etc.).

An integral element of the further development of the digital government model is big data as a set of information arrays of varying degrees of statistical processing and structuring, as well as methods of their processing that make it possible to improve the effectiveness of management decisions at various levels in the political, administrative, corporate and public sectors. At the present stage, large data are generated on the basis of an increasing number of active and passive sources, including clicks on the Internet, mobile calls and SMS, user content and social networks, as well as business transactions. Innovations in the sphere of machine learning, relating to the production, collection, storage and analysis of data huge amounts allows for a new technological basis to review the content and to improve the efficiency of each stage of government decision-making (Soloviev, 2014).

The value of big data consciousness is to combine traditional public data with geospatial data, such as real-time satellite data, GPS data from cellular operators, economic transaction data, Internet browsers and applications, including social networks tracking geography users. Such data can be combined with data collected by the state, for example, open data, data on emergency calls 911, financial and credit histories of employees and businesses. As a result, researchers are able to use a method or algorithm for structuring big data to compare them with available open government data and to gain information about a socially significant problem, to find more optimal ways to solve it.

Realizing the value of numerous sets of big data for the public administration system, states tend to control the processes of their collection, storage and practical application. Thus, there are already amendments in 242-FZ in the Russian Federation, according to which all personal data on Russian citizens who are a part of big data sets should be stored on servers located in Russia. In October 2016, the Public Government proposed to develop a concept for the development of big data in Russia in order to support the relevant information market, but today main efforts are towards control of all data types that minimize possible risks of using personal data of Russians by foreign states and corporate agents.

An important feature of the DGM is the ethical aspect of collecting, storing and using big data. Thus, the state and large corporations composing sets of large data from various sources, to gain access to personal data, doing so without the explicit consent of citizens or bypassing imperfect laws in this sphere of activity. An important component of the ethical aspect is the use of big data in the healthcare sphere, in which sets of collected data that describe the state of

human health, combined with their online behaviour, including activity in social networks, data on the purchase of medical products and medical equipment, as well as policy numbers of medical insurance, to provide an idea of the potential health risks for both individuals and groups of people. The state can also adjust the state healthcare policy on the basis of big data sets, the comparison and analysis of which allows to predict the demand for certain medical services, depending on the environmental situation in the region, the directions of external and internal migration and the spread of certain infectious diseases.

A significant amount of researches in the sphere of knowledge is devoted to the technological aspect of the big data development. Building a "smart city" on the basis of the Internet and cloud computing can lead to a revision of the established practice of state government of social and economic development of cities. Buildings can automatically transmit any information needed by public services for their quality service, industrial infrastructure can transmit information about levels of water or air pollution and cars can transmit information about weather conditions on the road thanks to the development of the Internet. Such data on public infrastructure, collected through the activity of citizens themselves or collected by sensors passively, can help public servants conduct socio-economic analysis of the city's development and allocate the necessary resources in real time, to design public mobility and to make more informed investment decisions, to improve the quality and productivity of city services, to practice of rendering public services, rational use of energy and water resources, utilization of municipal waste.

In recent years, big data analysis technologies are increasingly used in the domain of security and crime control in many countries around the world. In 2013, based on the analysis of data from social networks and mobile devices, US special were able in a few days to calculate and to find the suspects in the terrorist attack at the Boston Marathon. In 2017 three big data centres and cloud computing centres have been built in China to analyse the dynamics of the urban crime situation and to calculate current or possible security threats within the urban environment. In the future, China plans to build an integrated national centre for processing and storing big data (China, 2017). Currently, the Chinese company Didi Chuxing, which provides information services in the field of transport, works in conjunction with the traffic police of 11 Chinese cities, helping the local police, through the analysis of data collected by mobile phones and smartphone drivers, as well as traffic safety cameras, to identify violators of traffic rules, making electronic profiles of drivers (Chuxing, 2016).

In the field of the population and territories protection from emergencies, employees of state rescue services are able to operate several big data streams, processing incoming telephone calls and summarizing the GPS data of mobile devices from which calls are made from the emergency zone, which together allows them to specify the geographical location of the victims and receive more detailed information for effective response. However, automated monitoring of on-site monitoring data can be carried out, which records and places information on social networking sites, photo and video hosting sites, which is especially important for rapid response, in particular, for natural disasters. Applications for mobile devices that allow users during the emergency to provide mutual assistance and help rescuers, transmit information about the whereabouts and physical condition of victims, conduct preliminary medical diagnosis, disseminate information about points of medical care, etc. are developing.

Practical application of open data as an integral element of the digital government model promotes an ever more active involvement of citizens in the process of solving various tasks of the public administration. So, crowdsourcing platforms used in budgeting and improving the

efficiency of budget spending allow citizens individually or at the level of public expertise to connect to the budget process. The introduction of big data in the practice of the public administration helps to build a more effective model of public administration or co-management, in which the state is trying to expand the channels for citizen participation, introducing innovative developments in the field of transport, education, health, safety and etc. Moreover, large data become an important element of monitoring the effectiveness of the state and warning of possible errors and deviations from the set goals; provide not only analytical support for the decisions made, but also support the operation of the feedback mechanism that allows detecting problems and correcting errors in real time.

It should be noted about vulnerability in the face of increasing problems and challenges of the digital sphere, despite a number of advantages of the digital government model, reflecting the gradual convergence of the digital worlds of government and citizens. Thus, due to the conduct of digital reconnaissance by states and large corporations, in the conditions of the vulnerability of imported software and hardware and the growth of the potential of cyber weapons, citizens need additional protection of personal data and the right to confidentiality and the state is not always able to cope with this task and adequately protect the digital sovereignty. As a result, movements to protect "digital rights." Postigo (2012) have appeared and are actively operating in a number of countries and access to the Internet has been recognized as one of the basic digital rights and is confirmed in international law (Assembly, 2005), EU law (Proclamation, 2000; Regulation, 2016) and the legislation of a number of countries. The protection of digital rights generates confidence and readiness for further changes in the direction of the practical implementation of the digital government model and the transition to digital public administration, while the problems of protecting the citizens' personal data and the digital sovereignty of the state generate corresponding fear and resistance.

The results of the research show that the digital government model integrates the most significant achievements in the field of the public administration digitalization and public participation, but faces the need to resolve a number of problems, from the need to produce more and more sets of open data at all levels and in all areas of the public administration, the integration of open data with the use of big data technologies and ending with the protection of digital sovereignty and digital rights of citizens.

In general, the results of our study are consistent with a number of foreign studies on this topic (Dunleavy & Hood, 1994; Dunleavy & Margetts, 2015; Fishenden & Thompson, 2012; Helen Margetts & Dunleavy, 2013), however, evaluating prospects for the practical implementation of digital technologies in the public administration in modern Russia (Barabashev, 2016; Dmitrieva, 2014; Ignatova, 2015; Vidyasova, 2014) focus on the need to adapt the administrative paradigm of the modern state and bureaucracy to the requirements of openness and digitization in the first place and only then move on to the widespread introduction of digital technologies. Moreover, Savelyev (2015) on the Russian example draws attention to the problems of spreading and application of big data technologies in the context of imperfect legislation on personal data.

Thus, the considered digital government model considered is an important analytical tool that develops as digital technologies evolve, allowing to evaluate and compare the degree of digital technologies implementation in the system of the public administration of individual states, as well as the levels of the public administration in a single country.

CONCLUSION

In conclusion, it should be noted that the introduction of the digital government model in practice in many countries reflects not only the need for the state to adapt to the rapidly changing digital environment, but also to the long-term trend of increasing digital openness in the work of government institutions and to mechanisms of public services quality improving provided in the growing expectations of society. In addition to the above mentioned, it is important to take into account that the digital government model replaced the previous government models not only because of public pressure and the spread of the Internet culture, but also because of the need to resolve the most acute problems of the public administration under condition of the growing global financial and economic crisis at the present stage concerning education and culture, health, transport, emergency response, etc.

Facilitating a solution to these problems, the digital government model finds political support among many politicians and government officials, as it allows strengthening the digital sovereignty of the state at the new information and technological level and contributing to the socio-political stability of the society.

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