Digital public administration infrastructure and its effectiveness

Цифровая инфраструктура государственного управления и её эффективность

La infraestructura de la administración pública digital y su efectividad

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Abstract

Digital innovation in public administration is critical. It's necessary to work effectively with the digital resources of public servants. In Russia, successes are observed, requirements for IT competencies of employees, interactive interactions with infrastructure are increased, motivation is updated - the balance of state and corporate interests and the employee. The purpose of the work is a systematic analysis of problems and some solutions with "leadership in results". It's also relevant to assess the evolutionary potential of infrastructure, not only the requirements of a state institution. The work uses methods of system analysis, decision-making, situational and comparative analysis and others. Our main results are the analysis of key tasks, the solution of which is assigned to the digital infrastructure of public administration. In particular, analysis of monitoring and identification of risk states, anomalies, opening of hidden vulnerabilities, situational forecasting, analytical support, reduction of resource consumption (costs), audit of population satisfaction, quality of work of employees, systematic automation and intellectualization of public administration was carried out. All this supports strategic management, develops performance indicators. A table of professional qualities, the development of competencies of the state manager has been built. The problem of "noises", uncertainties in decision-making is considered, because adaptation to "noise effects" in public administration can be accompanied by an increase in the homogeneity of decision-making employees and an increase in their differentiation, as well as a decrease in their number. The role of institutional, social and personal barriers, motivation, as a balance between the interests of a state institution and an employee, when both are interested in improving internal indicators, as well as involving citizens and organizations in the provision of public services, was noted.

Key words: public administration, digital infrastructure, efficiency, system analysis, professional qualities.

Абстрактный

Цифровые инновации в государственном управлении имеют решающее значение. Необходимо эффективно работать с цифровыми ресурсами государственных служащих. В России наблюдаются успехи, повышаются требования к ИТ - компетенциям сотрудников, интерактивным взаимодействиям с инфраструктурой, обновляется мотивация-баланс государственных и корпоративных интересов и сотрудника. Целью работы является систематический анализ проблем и некоторых решений с "лидерством в результатах". Также важно оценить эволюционный потенциал инфраструктуры, а не только требования государственного учреждения. В работе используются методы системного анализа, принятия решений, ситуационного и сравнительного анализа и другие. Наши основные

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результаты - анализ ключевых задач, решение которых возложено на цифровую инфраструктуру государственного управления. В частности, был проведен анализ мониторинга и выявления состояний риска, аномалий, выявления скрытых уязвимостей, ситуационного прогнозирования, аналитической поддержки, снижения потребления ресурсов (затрат), аудита удовлетворенности населения, качества работы сотрудников, системной автоматизации и интеллектуализации государственного управления. Все это поддерживает стратегическое управление, разрабатывает показатели эффективности. Построена таблица профессиональных качеств, развития компетенций государственного менеджера. Рассматривается проблема "шумов", неопределенностей при принятии решений, поскольку адаптация к "шумовым эффектам" в государственном управлении может сопровождаться повышением однородности сотрудников, принимающих решения, и увеличением их дифференциации, а также уменьшением их числа. Отмечена роль институциональных, социальных и личностных барьеров, мотивации, как баланса интересов государственного учреждения и работника, когда оба заинтересованы в улучшении внутренних показателей, а также вовлечении граждан и организаций в предоставление государственных услуг.

Ключевые слова: государственное управление, цифровая инфраструктура, эффективность, системный анализ, профессиональные качества.

Resumen

La innovación digital en la administración pública es fundamental. Es necesario trabajar eficazmente con los recursos digitales de los servidores públicos. En Rusia, se observan éxitos, los requisitos para las competencias de TI de los empleados, aumentan las interacciones interactivas con la infraestructura, se actualiza la motivación: el equilibrio de los intereses estatales y corporativos y el empleado. El propósito del trabajo es un análisis sistemático de problemas y algunas soluciones con "liderazgo en resultados". También es relevante evaluar el potencial evolutivo de la infraestructura, no solo los requisitos de una institución estatal. El trabajo utiliza métodos de análisis de sistemas, toma de decisiones, análisis situacional y comparativo y otros. Nuestros principales resultados son el análisis de tareas clave, cuya solución se asigna a la infraestructura digital de la administración pública. En particular, análisis de seguimiento e identificación de estados de riesgo, anomalías, apertura de vulnerabilidades ocultas, pronóstico situacional, soporte analítico, reducción del consumo de recursos (costos), auditoría de la satisfacción de la población, calidad del trabajo de los empleados, automatización sistemática e intelectualización del público. se llevó a cabo la administración. Todo esto apoya la gestión estratégica, desarrolla indicadores de desempeño. Se ha construido una tabla de cualidades profesionales, el desarrollo de competencias del administrador estatal. Se considera el problema de los "ruidos", incertidumbres en la toma de decisiones, pues la adaptación a los "efectos del ruido" en la administración pública puede ir acompañada de un aumento de la homogeneidad de los empleados en la toma de decisiones y un aumento de su diferenciación, así como un disminución en su número. El rol de las barreras institucionales, sociales y personales, la motivación, como equilibrio entre los intereses de una institución estatal y un empleado, cuando ambos están interesados en mejorar los indicadores internos, así como involucrar a la ciudadanía y las organizaciones en la prestación de los servicios públicos, fue señalado.

Palabras clave: administración pública, infraestructura digital, eficiencia, análisis de sistemas, cualidades profesionales.

Introduction

Digital competencies change the means of production, production relations, manufactured products (goods, services), productivity and employees themselves. The development of IT-oriented competencies, professionalism, and infrastructure with the potential for evolution is the basis for digital transformations in society, the economy and state institutions.

Management in the IT environment is an important part of the competencies of a public servant, an official. Without the appropriate professional competencies, it's impossible to conduct efficient and safe work with analytical

applications, digital content and resource in the context of digital transformations, it is impossible to manage. It's important to have evolutionary mobility, media, and IT competencies.

For the business processes of public administration in the Russian Federation, appropriate systems, automated and intelligent workplaces have been developed. For example, 1C: Personnel, Consultant +, Lotus, etc. Recently, special attention has been paid to BigData, DataMining, SocialMining, Crowd- and Blockchain-technologies and cognitive schemes.

The field of requirements is limited by the requirements of leadership (Staut, 2002), the VUCA paradigm (Sizova, 2019).

There are successes in the field of digital feedback to the population in a number of regions of Russia (for example, in Krasnogorsk, Tatarstan, Moscow, etc.), as well as the conscious need to replicate them throughout the country, which will allow at the federal level to improve the coordination of local self-government, its adaptability. For this purpose, it is important to make a systematic analysis of the effectiveness of public administration infrastructure and its evolutionary potential. Our work is dedicated to this.

Theoretical bases

Digital public administration in a broad (systemic) sense processes are qualitative, "by order", changing society and the economy, their infrastructure. Often reduced to transformations that change the evolutionary potential of society, its intellectual, human and organizational capital.

In a narrow sense, evolutionary potential (usually applied to some subject environment) is technology and systems that affect quantitative and/or qualitative info-logical changes in this area. Often, such potential is reduced to spatio-temporal, material-energy and financial changes. For example, industry, corporate or, as in the works (Lindgren & van Veenstra, 2018; Petrov et al., 2018) - to the field of public services, public administration and its evolution.

The paradigm of digital public administration in Russia should take into account the planning, monitoring, formation of the infrastructure of decision evaluation criteria (Dobrolyubova, 2018) using ElasticData, AI (Artificial Intelligence), IoT (Internet of Things), Blockchain (Ydjakov et al., 2017). This is in contrast to the concept of "new public administration" in the sense of work (Dunleavy, Margetts, Basfow, et al, 2006), which does not provide for state liability "based on results", but civil liability, public liability (Bryson, Crosby, & Bloomberg, 2014). As a maximum, with the involvement of citizens, organizations and the business community and processes in the provision of services (Janssen, 2013).

Motivation of employees is an important aspect of management. For an employee, the opportunity to increase his salary or career advancement is a significant criterion for choosing work and behavior in the team, motivation. If the company has a flexible system of motivation and encouragement of employees, then they will be more loyal to management (Kleiner, 2018), and staff turnover will decrease and personal efficiency will increase along with the effectiveness of the organization.

Motivation is a balance between the interests of a state institution (employer) and an official (employee), when both are interested in improving the internal indicators of the system, management.

Methodology

Digital infrastructure is built and developed with the help of relevant ICT system and ideological data models, decision-making computation. For example, using BigData, DataMining, predictive analytics analogs, and others.

Such an environment allows real-time use of monitoring, planning, planning situational modeling (forecasting), intelligent adaptive management and the provision of public services. For example, the capabilities of tracking allows you to effectively conduct marketing (neuro-marketing), ensure security, individualize relations, services, trade, improve the tools of civil servants (direct them to the optimal final effect). The toolkit is developing, covering crowd models (Kaziev, Kazieva, & Gedgafofa, 2018), end-to-end technologies, platforms and standards,

simulation scenarios and behavioral reactions, that is, everything necessary for the development and implementation of an effective state response policy (Kudrjavceva, 2013).

We used such methods of system analysis as analysis-synthesis, composition-decomposition, modeling-prediction, identification-decision making, taxonomy-classification and others.

Results

The efficiency of digital control is achieved due to predictability, accounting for the response of actors (reaction addresses) in real mode, iterative improvement of system approach control, access to self-development, self-regulation and self-organization situational modes and processes.

Among the key tasks that we place on the digital infrastructure of public administration as a result of the carried out system analysis, we will highlight the tasks of the following 10 classes.

1. Monitoring and identification of risk states, anomalies, latent anomalous behavior.
2. Establishment of causal relations of facts and decisions, opening of latent vulnerabilities.
3. Modeling (situational, simulation prediction) of processes, system behavior.
4. Analytical support (especially, DataMining) optimization, for example, getting rid of intermediate links, redundancy of complexity and adaptation of management influences, information flows.
5. Intelligent support for platform decisions, both strategic and tactical (AI, SLR, Blockchain, Cloud and Fogs).
6. Reduce the resource intensity of government services (transaction costs).
7. Improving the quality of services, the satisfaction of citizens and the organization - recipients of public services.
8. Development of monitoring systems (including social networks), satisfaction level audits, neuro-tracing systems of key factors (KPI) affecting this level and their automatic regulation.
9. Improving the professionalism, quality of training of employees, their responsibility for planning and supporting plans, state support programs and development policies.
10. Systematic use of automation systems in public administration (CRM, ERP and others).

The work (Dobrolyubova, 2018) notes that the introduction of digital technologies can be considered as a tool for improving traditional practices and management mechanisms based on results, and elements of such management "will survive new public administration".

Digital control technologies are knowledge-intensive, applied and multi-platform (cross-platform), with multi-criterion choice and multi-dimensional performance assessment. With the growth and taking into account the role of individualization of digital participation of citizens, structures in digital governance of the state (state structures), governance is facilitated and complicated.

Facilitation is carried out by taking into account the interests of all participants, the future generation, preserving resources, freedom and responsibility of management personnel, etc. The complication is due to the need to manage in real mode, to be more careful about the quality of the management criteria and procedures used, to plan and implement management and accounting procedures, including all stakeholders.

Due to the fuzziness, uncertainty and diversity of risk situations, the lack of very necessary professionally trained personnel in the field of public and municipal administration. You often have to redistribute risks with a long-term effect, reduce costs, and simultaneously increase the quality of solutions.

For example, an anti-crisis manager has to individually develop a specific program, taking into account:

1) stability of the enterprise's solvency, stability of financial flows, ability to solve versatile target tasks;
2) tools that are specific, effective for current tasks and are necessary to relieve financial difficulties;
3) changes in the environment of the enterprise, a set of different scenarios of actions (actors).

In addition to direct monitoring research, alternative sources of statistical data are used (Morozov, 2018), this is especially important at the level of primary data, documents, a costly "routine", which is nevertheless important for managing results.

Data Science-class digital, intelligent technologies, advanced analytics tools and techniques reduce transaction costs, expand and deepen public administration infrastructure capabilities. There is an opportunity to improve state organizations, investment and innovative projects, including crowdsourcing, crowdfunding, actively using IoT ("Internet of Things") and IIoT ("Industrial Internet").

Adaptation to the requirements of the institution, public service requires significant intellectual and moral costs from management, HR specialists.

In our opinion, the process can be divided into five stages:

1) analysis of the current situation - identification of the situation within the system, its position in the structure of state and market relations, for example, financial stability;
2) setting the goal - setting targets, for example, in which it is necessary to obtain an acceptable quality of relations even taking into account force majeure circumstances;
3) simulation calculations - analysis of opportunities and remuneration for motivational payments, for example, by priority positions;
4) development and implementation of the KPI system depends on how the state institution will feel in innovative, digital conditions;
5) KPI performance analysis - assessment of justification of introduction of a new employee motivation system.

The professional qualities of Russian civil servants can be represented in table 1.

Table 1.
Competencies of civil servants.

System-wide	Competencies Applied	Managerial abilities Qualities
Result-oriented	Search and update of relevant information, resource source	Planning of targets, their ranks, resources, works
Work on authority, PR	Quality of office work, PR	Organization and management of works
Interpersonal relations, their evolution, self-organization	Protecting the interests of citizens, creativity, using innovation, "soft skills", self-development, ability and readiness to transfer experience, competencies	Motivation of staff, quality of management decisions, strategic thinking, management of risks, time, personnel, external relations, internal optimization

In general, as polls confirm (Vasil'eva, Puljeva & Udina, 2018), the skills of digital transformation, flexible employment, intelligent management (human-automatic-environment symbiosis in a single environmental-economic environment, ecosystem of state structures) are moving to the first places.

Digital literacy, estimated according to the data and indicators of ROCIT using three digital components - consumption (be able to use web services in life and at work), competencies (effectively use technologies) and security (ability to work safely in networks).

Discussion

Management is always complicated by noises, uncertainties and delays. Noise isn't only "white", "Gaussian". Some of them are deliberately provoked and leading to deterministic chaos. The relevant approach takes into account their initial distribution, negative impact.

Signs of controllability may be a reduction in the term, an increase in the rate of accumulation of evolutionary potential and as well as involving citizens and organizations in the provision of public services.

It should be borne in mind that adaptation to "noise effects" in public administration can be accompanied by trends:

1) increasing homogeneity of employees making decisions and reducing their number and qualities;
2) increasing their differentiation.

Factors of significance, values of the decision made are decisive for assessing public administration. Response time is especially important, it is even more important than the accuracy of the response. Here come institutional, social and personal barriers (Arrow, 1994) and risks.

Weighted average risk assessments can be applied:

$$R = \frac{1}{n}\sum_{i=1}^{n} r_i R_i,$$

where n is the number of risks (hazards), R_i is the risk assessment with the number i, r_i is the importance of this type of risk, the degree of need to take it into account.

The value of R_i is determined using the distribution function of a random variable (probabilities). You can also set in an expert way, as well as weights r_i.

Risk area is defined as a set of potentially realizable risk states, and R_i - a weighted average value of realization of danger i:

$$R_i = \frac{1}{m_i}\sum_{j=1}^{m_i} R_{ij},$$

where R_{ij} is the probability of the j-th risk by the i-th hazard, m_i is the number of all risk states for the i-th hazard.

The value R_{ij} is defined as the product of the cost of damage c_{ij} realization of each danger and probability of p_{ij} of the specified state:

$$R_{ij} = c_{ij}p_{ij}.$$

To provide information support for the risk management program, you need to contact DataMining, BigData, ElasticData, SocialMining, etc. This allows you to go "from quantity to quality".

There are also technological barriers, for example, social networks, cause and effect relationships, infrastructure, employee competence, innovative approaches to describe and implement constructive algorithms for achieving goals. By applying system analysis and synthesis, taking into account uncertainties, fuzziness and multi-criteria, it is possible to improve public administration.

Conclusion

Implementing effective public administration supported by relevant IT infrastructure will require more attention to infrastructure quality, employee competence, and system analysis of management processes.

A public clerk often has to make decisions in harsh conditions of uncertainty. Here, three main types of decision models are possible: in full certainty; in conditions of complete uncertainty; in mixed conditions, if there is a risk (probability of loss, risks). The most common situation is a mixed situation.

It's assumed that these risk probabilities are known to the public servant, for example, they are determined by expert or heuristic procedures.

There is a growing trend in the role of systems management in public administration. This leads to the development of the scale and effectiveness of socio-economic relations, a systemic and evolutionary paradigm. Instrumental support and institutional management cannot be dispensed with.

Digital transformations change management approaches and methods.

The digital potential used in the management and interactive relations of the state and the population is also changing.

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