Digital technologies in the regional management information system

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Abstract. Basic concepts of the "Regional Management Center" of the Krasnoyarsk Territory organization, aimed at continuation of the digital transformation of the activities of the executive authorities and local self-government bodies of the Territory with digital technologies and platform solutions application in the spheres of public administration and public service provision, ensuring qualitative improvement of indicators of socio-economic development of the region, are proposed.

1. Introduction
The modern intensive development of automatic data collection technologies, transmission and storage of information, data mining, as well as technological growth in many industries and economies have led to the emergence of gigantic arrays of multidimensional data [1]. In connection with the accelerated data volumes growth, the need in modern means and systems for collecting, storing and processing arrays of data is also growing, what results in their diversity increase [2, 3]. New methods and approaches are being constantly developed to speed up calculations, for example, with the CUDA architecture application [4], and some other promising studies are being used [5, 6].

Systems, which conduct quantitative operational analysis, have already been integrated into the structure of government bodies. But a high-quality analysis of a large amount of data, based on the so-called digital traces of users, is also needed. It allows not only to identify local problems and focuses of discontent, but also to study the preferences and motivations of the target audience, thereby providing a differentiated approach to the provision of public services. Nowadays the need and actuality of such systems is obvious, but they can be effectively implemented only in large and economically developed regions [7]. At the same time, the restrictions are connected not only with the resources of the region, but also with "political will" of the governor, as digitalization establishes an absolutely new political culture at the administrative level. And in this case not only the readiness to launch the project, but also the readiness to work with the negative situations is important, which will inevitably come along with feedback.

The Krasnoyarsk Territory is a gigantic territory, but at the same time there is good Internet coverage and many active users, therefore, operational data on the analysis of digital traces of users will contribute...
to making even more effective decisions to manage the territory, and, what is more important, perform it in a timely manner.

The first such regional management center was already created in the Moscow region at the end of 2018 and is considered to be one of the best in Russia, and the experience of our colleagues in the Moscow region will give the opportunity to solve problems, identical for all regions, using digital technologies.

2. The purpose of the project

The project "Regional Management Center" of the Krasnoyarsk Territory (further - RMC) is aimed at achieving national goals determined by the decrees of the President of the Russian Federation (of May 9, 2017 No. 203 and of May 7, 2018 No. 204). The RMC project causes a direct impact on the continuation of the digital transformation of the activities of executive authorities (EA) and local self-government bodies (LSGB) of the region by means of digital technologies application and platform solutions in the spheres of public administration and delivery of public services [8, 9]. In this regard, the quality of provided public services, both to the population and to small and medium-sized businesses, including individual entrepreneurs, is being significantly improved, as well as a qualitative improvement of indicators, reflecting the socio-economic development of the region, is ensured.

The regional RMC project realization will allow to execute the transition to electronic interaction of citizens and organizations with the Executive power of the region.

In particular, it is expected:

- realization of the registry model, extraterritoriality and proactivity mechanism in the provision of state and municipal electronic services;
- formation of feedback mechanisms with citizens and organizations;
- a rather high legally significant document flow in the region will become fully electronic.

Along with this, public authorities and local self-government bodies will get effective mechanisms for automating their activities at their disposal, as well as interdepartmental information circulation. Including:

- ensuring the provision of state and municipal services and services in digital form in accordance with the growing needs of modern society in the context of the digital economy formation;
- ensuring digital transformation of the activities of public authorities and local governments, aimed at improving the quality of the functions assigned to them, reducing costs of their realization, creating a data management system, including collection, storage, processing and data dissemination;
- operation and development of e-government infrastructure in Krasnoyarsk region.

The realization of the regional RMC project will give the opportunity to form a stable information and communication infrastructure of state and municipal bodies, including insurance of the uninterrupted functioning of government services, considered to be critical for citizens and organizations, including services for remote identification, information exchange, storage of legally significant information, a digital platform for the provision of state and municipal services (Decree of the President of the Russian Federation of April 25, 2019 No. 193).

The modern RMC is the headquarters under the Governor (Government), which can use digital technologies to organize quick interactive communication with the population. Residents will be able to send a message to the authority over the network, and the resource will automatically mobilize the responsible organizations to eliminate the problems operatively, the process can be controlled on-line. And this is the novelty of the process, the elaboration of which was earlier carried out only in some separate departments, for example, in the Ministry of Emergencies.
The regional RMC, being created, is to become a unified digital platform for collecting and processing data from state bodies, citizens and organizations of the Krasnoyarsk Territory. Its core will be the Governor’s Situation Center, which, in accordance with the decree of the President of the Russian Federation, is to be created in 2020 and included in the distributed network of situational centers of the Russian Federation.

The main basic concepts of a regional management center creation are shown in figure 1.

**Figure 1.** The basic elements of the concept of a regional management center creation.

### 3. Model of the regional RMC project

The manageability increase of the Krasnoyarsk Territory will be provided to a greater extent by priority cross-cutting digital technologies application.

The Analytical Center under the Government of the Russian Federation conducted a survey of 79 regions of the Russian Federation on the preferences of government bodies when choosing new digital technologies. Table 1 shows the digital technologies mostly demanded by regional authorities.

When establishing the regional management center (Krasnoyarsk Territory), the most demanded technologies are: "Big Data", "Industrial Internet and Internet of Things", "Distributed Register Systems".

Within this context, for creating aspects of cooperation when coordinating joint actions of different ministries and departments of the Krasnoyarsk Territory, the most acceptable is the organizational and functional structure of the regional management center, shown in figure 2.

Rather a wide range of regional tasks to be solved requires constant monitoring of the location of events and availability to conduct assessment of the situation at any period of time [10, 11]. These tasks may differ significantly in terms of duration, scope of interests, system response speed requirements, and the degree of geodata detailing.

Any incoming information about the situation is processed by the monitoring system unit when interacting with the monitoring database. It processes information in accordance with regulatory documents with the help of experts, who form the conclusion of their assessment of the current situation. This way, the result is generated and transmitted to the data analysis system block.
The classification of a situation being carried out, its model is created and a similar model is searched in the corresponding model database of the situation modeling and forecasting system block.

At the next stage, prediction of situation is done in the block of the situation forecasting system with the description of its potential subsequent development. On the basis of the forecasts, obtained in the block of the decision support system, the decision-making database is addressed, as well as the formation of a possible management decision based on the work of expert analysts, options are developed which most fully meet the task.

**Table 1. Results of regional preferences survey in choosing digital technologies.**

| The number of regions which have chosen the technology | The name of the digital technology, application of which will improve the efficiency of regional management | Technology summary |
|--------------------------------------------------------|-------------------------------------------------------------------------------------------------|--------------------|
| 63                                                     | Big data                                                                                        | (eng. big data) is a series of approaches, instruments and methods for processing structured and unstructured data of huge volumes and vast variety for obtaining human-perceived results effective in conditions of continuous growth, distribution over numerous nodes of a computer network, formed in the late 2000s, and being alternative to traditional database management systems and Business Intelligence solutions |
| 50                                                     | Wireless technologies                                                                            | serve for transferring information between two or more points, located at a distance, without a wired connection (radio waves, as well as infrared, optical or laser radiation can be used to transmit information) |
| 42                                                     | Industrial Internet and Internet of Things                                                      | (English Industrial Internet of Things - IIoT) - Internet of Things for corporate / industrial application is a system of interconnected computer networks and connected industrial (production) facilities with built-in sensors and software for collecting and exchanging data, allowing remote monitoring and control in automated mode, without participation of a man |
| 37                                                     | Neurotechnology and artificial intelligence                                                     | Neurotechnologies are technologies which use or help to understand the work of the brain, mental processes, higher nervous activity, including technologies, used to enhance, improve brain functioning and psychological activity |
| 34                                                     | Distributed Register systems                                                                   | Artificial intelligence is a complex of technological solutions which imitate human cognitive functions (including self-learning and searching solutions without a predetermined algorithm) and allows, when performing tasks, to achieve results, which are comparable not less than with the results of human intellectual activity |
| 24                                                     | Virtual and Augmented Reality Technologies                                                      | is a group of methods aimed at creating distributed databases and providing the consistency, synchronization, immutability and transparency of the information stored in them. |
| 22                                                     | New production technologies                                                                     | Augmented reality is a technology of adding, introducing virtual information into real life, into the three-dimensional field of human perception, which is perceived as elements of real life created for the first time, having no domestic or foreign analogues, with qualitatively new characteristics, which meet or exceed the requirements of the modern level cover the areas of development of automated technical systems and methods of their control, development of sensor systems and methods of processing sensory information, interaction of technical systems with each other and with a man |
| 21                                                     | Robotics and Sensing Components                                                                 | —— |
| 7                                                      | Other                                                                                            | —— |
Figure 2. Organizational and functional structure of the regional management center.

The decision being worked out, the final stage is the presentation of the results to the manager in the results visualization unit.

To ensure operative response to the situation, the following modes are to be used.

1. The normal mode of operation involves the development of scenarios of the socio-economic and socio-political situation, meanwhile this mode is supposed to ensure the implementation of the following tasks:

   - monitoring of current events (forms and methods of transition from observation to analytical processing of the accumulated information about the vital activity of the region are being formed);
   - identification of problematic situations, including the level of municipalities, administrative districts;
   - information and enquiry services, intended for solving a wide range of organizational, scientific and methodological questions, criteria for industry and integral assessments.

2. The planning mode allows to identify hidden cause-and-effect relationships of socio-economic processes, simulate the vital activity of the territory at the level of industries, individual enterprises, predict the socio-economic development of the region.

3. The crisis mode of operation is necessary for taking decisions in difficult or emergency situations, in particular, if:
there was a violation of normal of life conditions at the object, caused by the disaster, in this case the main efforts will be directed at eliminating the consequences of the emergency;
• economic processes are less well managed and their changes take place at a higher speed in comparison with daily mode, and in this case the main efforts will be directed at analyzing and predicting the situation.

4. Conclusions
The transition to digital technologies for managing the territory and creation of models of end-to-end ("cross-functional") automated processes which ensure "seamless" interaction of units and services of regional management entities, will allow to create mechanisms for business information cooperation between government and business by means of implementation of services for introducing and discussing initiatives, will help improve business climate, attracting small business investors, developing new technologies for managing the economy by local governments, creating new measures of institutional support, simplifying administrative and managerial procedures, increasing tax revenues to the regional budget system. The budgetary independence increase of local self-government bodies of the region, in its turn, will ensure the deficit-free consolidated budget of the Krasnoyarsk Territory.

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