

**II International Scientific Conference GCPMED 2019
"Global Challenges and Prospects of the Modern Economic Development"**

**METHODOLOGY FOR THE DEVELOPMENT OF DIGITAL
PLATFORMS BASED ON KNOWLEDGE MANAGEMENT**

T. B. Efimova (a), S. A. Chevereva (b)*, V. V. Agafonova (c)
*Corresponding author

(a) Samara State University of Economics, 443090, Soviet Army str., 141, Samara, Russia, TB_Efimova@mail.ru
(b) Samara State University of Economics, 443090, Soviet Army str., 141, Samara, Russia, Chevereva@yandex.ru
(c) Samara State University of Economics, 443090, Soviet Army str., 141, Samara, Russia, wagaf@mail.ru

Abstract

Nowadays, usage of digital technologies is being actively discussed: it is important to forecast how the state, business community, education and society will change in the course of digital transformation. In the Russian Federation, there is a large number of disparate information systems, which often duplicate each other, because during the period of their implementation the process approach was not fully implemented, and as a result, they do not function optimally, and often they are duplicated even by the paper document flow. Digital platforms are designed to modify all types of relations, it is seen in the example of such successfully functioning platforms as Uber and Yandex, Amazon Web Services and others. When developing and implementing them in the Russian Federation, it is necessary to take into account the specifics and uniqueness of the processes, to conduct additional research and analysis of all areas of life. Digital platforms are implemented not only in production and transport, telecommunications and high-tech markets, but also in the mass market of consumer goods, changing traditional economic principles. The use of digital platforms is related to the trend towards a knowledge economy. The consolidation of intellectual and productive resources on their basis is important. Cognitive technologies are used to identify, accumulate and use knowledge about the entities that affect the performance of organizational systems, thus making the digital economy a knowledge economy.

2357-1330 © 2020 Published by European Publisher.

Keywords: Digital platform, knowledge management, digital transformation.



1. Introduction

There are many different definitions of the digital platform, but none of them are exhaustive: the digital platform should be understood not only as a toolkit, but as a set of mathematical models and methods. Thus, the digital platform is a set of ordered digital data on the basis of ontological modeling; mathematical algorithms, methods and models of their processing, software and hardware for data and knowledge collection, storage, processing and transfer, optimally integrated into a single information management system designed to manage the target subject area with integrated reasonable digital interaction of stakeholders (Medennikov, 2019). This study will consider the methodology of development of digital platforms based on knowledge management.

Nowadays, the creation and development of digital platforms in the Russian Federation is characterized by the need to develop a unique architecture of digital solutions, which entails changes in organizational aspects and the regulatory framework. One of the criteria for the success and efficiency of the use of the digital platform is the growth in the number of its participants, in which case the network effect increases and the interaction costs decrease. Another important criteria is government support and the availability of basic developments in this area. The Russian Federation is successfully using state information systems that can be successfully transformed into digital platforms, such as public service portals (www.gosuslugi.ru) and public procurement portal (zakupki.gov.ru).

Is it especially interesting how digitalisation is approached in Russian scientific sphere: the concept of "data-intensive science", in particular, "X-informatics" (bioinformatics, geoinformatics, etc.) has appeared recently. Such hybrids require new methods of analysis of different types of data to extract the necessary knowledge, and the effective use of such methods requires special training. This factor determines the relevance of the creation and development of the national system of management of scientific infrastructure services. The term "big science – fundamental scientific research, which involves serious funds, world-renowned scientists, breakthrough scientific installations, distributed data processing and storage centers" has long been used in the international scientific community. A new organizational form of scientific research is a distributed team of scientists-researchers - it is an up-to-date approach, as it helps to form national innovation systems. The basis for further development in this area is the digital system of management of services of scientific infrastructure of collective use (USNIKP AC), which will automate the functions of management of scientific services of collective use centers and unique scientific installations of organizations subordinated to the Ministry of Education and Science, private ministries and departments, corporations, business structures. Based on these systems it is currently planned to create a Unified Digital Platform for Science and Higher Education of the Ministry of Education and Science of the Russian Federation to implement the main directions and measures of the state policy in the field of scientific and technical development of the country. In addition to the basic platform and applied digital services, the digital platform will allow to connect services aiming to promote Russian goods and services. Its implementation will help to protect intellectual property and increase the volume of export of copyrighted technologies owned by Russian rights holders. Educational organizations will be connected to federal digital platforms, which will improve their cooperation. The use of common services will optimize costs, increase the reliability of information, and ensure the principle of unified input of information.

Interesting solutions are also available in the field of transport, housing and communal services, and urban agglomerations. Let's consider in detail the sphere of transport, namely the solutions offered by JSC Russian Railways, as they are of the greatest interest from the point of view of development of digital platforms on the basis of knowledge management.

2. Problem Statement

On March 19, 2019, the Government of the Russian Federation approved the long-term development program of JSC Russian Railways until 2025, in which the aspects of the industry's transition to digital technologies were considered. In order to increase the income from freight and passenger transportation and logistics activities, it is planned to create appropriate common information spaces, to improve the efficiency of transportation and use of infrastructure, it is planned to implement end-to-end digital technologies. Certainly, at present JSC Russian Railways is a forward for the development of corporate information systems, and this knowledge will be used as a basis for further implementation of the "digital railway": the existing information systems will be improved, supporting the unified integrated automated management system of the holding company, which will lead to the optimization of corporate governance.

By 2025, digital platforms will be created that actively interact with the current information systems of the holding, in addition, it is planned to link them with digital platforms of other modes of transport, with passenger services, services of shippers and service companies through electronic channels. The active participants of the platform will be federal state authorities.

The holding's technological processes will be supplemented by a distributed register, capabilities of big data processing and artificial intelligence, IoT systems. Changes are also expected to be made in the relevant computer and telecommunication infrastructure, the existing document management system – they will be improved to ensure a guaranteed level of information services. At the same time, information security systems will be introduced, and the solutions used will be independent of imported technologies.

All these achievements will contribute to reducing the share of the holding company's operating costs, ensuring cost transparency and increasing labor productivity.

3. Research Questions

Let us consider in more detail the issues of digital transformation in order to further assess their feasibility. Firstly, the implemented digital platform for freight traffic management and monitoring will allow to monitor the location and condition of cargoes, to create legally valid electronic documents, to use end-to-end digital transport data. As part of the platform solution for multimodal passenger transportation, appropriate electronic services will be implemented, which will require a high level of customer focus. Intelligent traffic management will also be implemented, which implies digital modeling and monitoring of vehicles and infrastructure, which will allow to obtain up-to-date data on the objects corresponding to the processes with reference to time and budgeting, to make predictive diagnostics. At the same time, a high level of developed services will be achieved due to modernization and optimization of the holding's

information systems and use of domestic software. The regulatory framework and technological processes will be changed and improved accordingly.

The holding's development program will strengthen its position as a forward for the use of digital technologies and innovations, and JSC Russian Railways will become a partner of the state in the implementation of the digital economy program.

In September 2019, the Company approved the Digital Platform for the Transport Sector of the Russian Federation programme until 2024, which is aimed at improving the accessibility of transport services provided to the public and ensuring an appropriate level of security. The projected digital platform will allow to provide the management bodies with information on the state of the transport system, to forecast the demand for the services provided, thus improving the quality of managerial decisions. The program will make it possible to increase the speed of justification of investment transport processes, assess their economic efficiency, and compare implementation options.

4. Purpose of the Study

The aim of the research is to study the existing technologies on transport, which will allow to achieve the digital transformation objectives set by the Government of the Russian Federation. At present, a significant number of modern studies are devoted to the methodology of development of digital platforms: the following works are interesting Ojanperae, Graham, and Zook (2019), Murphy, Coiro, and Kiili (2019), Lee and Jang (2019), Wood, Graham, Lehdonvirta, and Hjorth I. (2019), within the framework of transport monitoring, studies worth mentioning are Hasan, Kadiran, Yusop, Hairuddin, and Mohamad (2017), digital technologies of a smart city are the focus of work of Stone, Knapper, Evans, and Aravopoulou (2018), Chiariotti, Condoluci, Mahmoodi, and Zanella (2017). Knowledge management issues are addressed in the work of Lukyanova (2011), Pogorelova, Izmailov, and Notin (2016), Shabanov (2018), Zimova (2019), Gruzina and Andreev (2019), Sidorov (2019).

The applied significance of the study is in the possibility to use the results and estimations obtained while analysing possibilities of achieving the objectives considered in the large-scale implementations of digital technologies.

5. Research Methods

Let us consider the existing services of JSC Russian Railways, on the basis of which the digital transformation of the holding company is carried out. Undoubtedly, customer focus is one of the company's priorities. A single module of preliminary calculation of the cost of cargo delivery and provision of additional services has been created, which makes it possible to preliminary calculate the cost and terms of provision of services related to cargo transportation, as well as to receive information about transportation of cargoes of JSC Russian Railways through the personal account .

Subsystems that are being implemented:

Personal account of the client "RZD-GROUZ" (Russian Railway Cargo), which allows to calculate the cost of transportation, to assess the terms of service, to display the route of the cargo and information about the subdivisions of JSC RZD and business units operating in the region of departure or destination

of the cargo on the map, to display information about transportation services, to register new users and authorize registered, to form and send requests to the Unified call-center of the holding, to manage information about the user, view the status of the personal account, download electronic copies of the necessary documents, generate applications for contracts or agreement to the terms of services, order and monitor the status of services.

The office of RZD-GROUZ performs the functions of administration.

Self-diagnostic subsystem: self-diagnostics of the software infrastructure and application software of the Unified Module of Preliminary Calculation of Cargo Delivery Costs and Provision of Additional Services.

Subsystem of interaction with information systems of service providers.

Subsystem for interaction with the information systems of JSC Russian Railways.

The service is constantly improving, being the basis of an automated resource for maintaining a unified catalogue of services in the field of freight transportation.

Also within the process of digital transformation there is a noticeable role of artificial intelligence in systems of movement control. On the basis of the advanced control systems of stations there is a development of "intellectual" stations. Also on the basis of the infrastructure management system a corresponding digital platform is created. Currently, the company has switched to electronic tax monitoring, which significantly simplified the process of work of tax authorities and increased the transparency of activities. The experience of blockchain application is also interesting: the platform united JSC Russian Railways, repair companies and the owners of rolling stock. This platform makes it possible to reduce the level of counterfeiting, and in the future it will be expanded to other areas of activity. The smart contract on blockchain is being actively developed - JSC Russian Railways, sea transport and shippers are being united within the framework of the platform. The Internet of Things is used in the holding's logistics activities: thus, international transit traffic through the territory of our country is controlled.

6. Findings

Modern management models are based on the synergy of logic, analytics and cognitive technologies. In this study, we will look at examples of such platforms and elaborate on the advanced developments of the Russian Federation in this area, paying particular attention to digital platforms in transport. It should be noted that the digital transformation is considered by JSC Russian Railways first of all as a cultural transformation, each process is divided into components with the definition of objectives. Digital transformation leads these processes. Much attention is paid to cyber security and the use of domestic software: by 2020, it is planned to increase its share to 80%. Up to 100% will be achieved for the use of Russian models and algorithms. It is planned to improve legislation within the framework of the ongoing digital transformation. The issue of development of the electric grid economy is quite acute – for 2019-2024 it is planned to spend 1.3 trillion rubles (Efimov, Pogorelova, & Efimova, 2019).

7. Conclusion

In conclusion, the methodology of development of modern domestic digital platforms will make it possible to reduce the cost of operations, increase the speed of service delivery and improve customer

focus. The repudiation of paperwork in favor of electronic documentation will significantly increase productivity. At the same time, many existing corporate information systems will have to be abandoned, as they will be replaced by highly productive digital platforms, bringing together participants of the transport market, business, the state and education into a common information space.

References

- Chiariotti, F., Condoluci, M., Mahmoodi, T., & Zanella, A. (2017). SymbioCity: Smart cities for smarter networks. *Transactions on Emerging Telecommunications Technologies*, 29(1), e3206. <https://doi.org/10.1002/ett.3206>
- Efimov, A. A., Pogorelova, E. V., & Efimova, T. B. (2019). Development prospects of a digital platform for kuybyshev power supply central office. In V. Mantulenko (Ed.), *Proceeding of GCPMED 2018 - International Scientific Conference Global Challenges and Prospects of the Modern Economic Development. The European Proceedings of Social & Behavioural Sciences EpSBS*, 57, (pp. 590-596). London: Future Academy. <https://doi.org/10.15405/epsbs.2019.03.58>
- Gruzina, Y. M., & Andreev, N. V. (2019). Leadership role in organization of knowledge transfer in knowledge-intensive companies. *Samoupravlenie*, 2(2(115)), 48-50. [in Rus.].
- Hasan, K. K., Kadiran, K. A., Yusop, Y., Hairuddin, M. A., & Mohamad, S. (2017). Development of university public transport monitoring system with mobile communication application. *International Journal of Advanced and Applied Sciences*, 4(7), 141-146. <https://doi.org/10.21833/ijaas.2017.07.021>
- Lee, A., & Jang, I. (2019). Implementation of an open platform for 3D spatial information based on WebGL. *ETRI Journal*, 41(4), 277-288. <https://doi.org/10.4218/etrij.2018-0352>
- Lukyanova, A. A. (2011). Knowledge management in the context of HR management. *Bulletin of Omsk University. Series Economy*, 2, 23-29. [in Rus.].
- Medennikov, V. I. (2019). Integration of industry digital platforms on the basis of mathematical modeling. *Information Technology*, 2(7), 70-75 [in Rus.].
- Murphy, V. L., Coiro, J., & Kiili, C. (2019). Exploring patterns in student dialogue while using a digital platform designed to support online inquiry. *Journal of Interactive Media in Education*, 1, 13. <https://doi.org/10.5334/jime.518>
- Ojanperae, S., Graham, M., & Zook, M. (2019). The digital knowledge economy index: Mapping content production. *Journal of Development Studies*, 55(12), 2626-2643. <https://doi.org/10.1080/00220388.2018.1554208>
- Pogorelova, E. V., Izmailov, A. M., & Notin, D. G. (2016). Knowledge management in the various stages of the life cycle of development. *Science of the XXI Century: Current Development Directions*, 2-2, 103-108. [in Rus.].
- Shabanov, A. P. (2018). Innovative digital platforms in the knowledge economy. *Systems of Control, Communication and Security*, 3, 106-135. [in Rus.].
- Sidorov, L. G. (2019). Knowledge management in the context of post-non-classical rationality. *Manuscript*, 12(4), 111-116. [in Rus.].
- Stone, M., Knapper, J., Evans, G., & Aravopoulou, E. (2018). Information management in the smart city. *Bottom Line*, 31(3/4), 234-249. <https://doi.org/10.1108/BL-07-2018-0033>
- Wood, A. J., Graham, M., Lehdonvirta, V., & Hjorth, I. (2019). Networked but commodified: The (Dis) embeddedness of digital labour in the gig economy. *Sociology*, 53(5), 931-950. <https://doi.org/10.1177/0038038519828906>
- Zimova, N. S. (2019). Implementation features of knowledge management systems in Russian companies. *Research Result. Sociology and Management*, 5(3), 100-116. [in Rus.].