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## **Development of information infrastructure organization management using it outsourcing**

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### **Abstract**

The rapid development of information technology (it) in recent decades has led to qualitative changes in the information management systems of organizations, information management systems. These changes require not only theoretical understanding, but also pose to the management of organizations a number of applied problems associated with ensuring the effectiveness of management in the digital economy. Building new economic relations, ways of interorganizational interaction, organization of management processes, forms of cooperation and coordination of activities of various organizations for the joint solution of certain problems of development and functioning – all this requires revision as the formation of the digital economy.

Today there is a steady increase in the impact of the it factor on the results of economic activity, social processes. It infrastructure from providing management components, which previously served as a technological environment for information exchange between subjects and objects of management, as its technical improvement and intellectualization, is transformed into a key factor of competitiveness and viability of organizations. The formation and maintenance of a developed it infrastructure is becoming a key strategic factor for the success of organizations, which requires a review of management priorities. The consequence of this is to increase the requirements for the efficiency of it infrastructure management of organizations, the professionalism of the specialists performing these functions.

One of the most effective ways to improve the efficiency of management, as shown by Russian and international management practice, is the use of outsourcing. It allows the outsourcing organization (customer) to focus on key competencies, transferring to specialized performers (outsourcers) certain functions that require specific resources. The fundamental reason for the development and spread of outsourcing is the manifestation of the General economic law of division of labor. The main reason for the transition to outsourcing of specific organizations is the inability (given resource and time constraints) to perform the functions transferred to the outsourcer with the same high quality.

It outsourcing, which allows to operate and develop the information infrastructure of management of organizations with the achievement of a rational balance of results and costs, has become widespread in Russia and the world. At the same time, the methodological basis for the implementation of it outsourcing projects is still underdeveloped. In this regard, it is relevant to conduct a special scientific study aimed at resolving this contradiction between science and practice.

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**Keywords**

Information infrastructure, organization management, IT-outsourcing.

## Introduction

The modern economy is developing in conditions of intensive digitalization. This is reflected, among other things, in government policies and programmes. In particular, the government approved and is implementing the program "Digital economy of the Russian Federation". Similar processes are observed in foreign countries. The level of penetration of information and telecommunication technologies, the development of it infrastructure become indicators of the level of economic development at the country, regional and sectoral levels. In turn, at the level of organizations, the key factor in ensuring their competitiveness is the development of the information infrastructure of management.

As a result, the balance between the personal and technological components of the management of modern organizations is shifting in favor of the latter. Leadership, creativity, professionalism, stress tolerance, psychological readiness to changes, etc. do not lose their significance in the achievement of management efficiency. At the same time, the management information infrastructure of organizations creates an instrumental environment for the activities of managers, which can both multiply the positive effects of their activities and block them. In this regard, there is a transformation of this infrastructure into a critical, strategic resource of the organization, which determines its life, competitiveness and ability to sustainable development.

## Main content

Due to the importance of information infrastructure management organizations for their functioning and development, it becomes a priority object of management, which requires consideration of its properties and specifics due to the processes of digital modernization of the economy. The thesis highlights the following features of information infrastructure management organization as an object of management:

- increasing technical and organizational complexity. Information and communication technologies are developing at a faster pace than other sectors of the economy. The presence of devices for working with information becomes an integral attribute of the workplace of managers and specialists, which requires their technical integration and organizational integration into a single system of information infrastructure management organizations. The volume and specificity (and, consequently, the costs) of resources allocated for the implementation of these works tend to accelerate growth;

- integration into the global information infrastructure. The development of public commercial and non-commercial information and communication systems creates prerequisites for expanding the functionality of the information infrastructure of the management of organizations through the use of external resources. An example of this use is the widespread practice of cloud storage and cloud computing. Management of organizations in these conditions requires special knowledge about the

prospects for the development of the global information infrastructure, the order and possibilities of using its resources;

- merging of information subsystems of management of technological and management processes. Today there is a formation of a new phenomenon: cyber-physical systems uniting, on the basis of the developed information infrastructure, management of the technological and office equipment, organizational and technological processes. As a result, the objective technological difference between management methods at different levels of the organization hierarchy is leveled, management is universalized, and its processes are typed. But this is possible only with a flexible and rapid adjustment of the information infrastructure to the changing needs of managers;

- continuous modernization and improvement. Technological progress in the field of information and communication technologies is developing rapidly. This reduces the life cycle of elements and devices of the information infrastructure of management of organizations, leads to their accelerated obsolescence, resulting in the deterioration of the capabilities of this infrastructure and the growth of costs for its maintenance and development. The solution of these problems requires both professional management, based on the relevant competencies, and modernization of the modes of use of information infrastructure (shared access, equipment rental, replacement of acquisition by obtaining specialized services, etc.);

- personification and gadgetize. Due to the development of "Internet of things" technologies and integration of heterogeneous devices into a single infocommunication space, the structure of the information infrastructure of management of organizations becomes heterogeneous, they can work as specialized devices owned by the organization, and various personal devices (gadgets) of employees, customers and other business partners. This actualizes the problems of ensuring their compatibility and information security;

- intellectualization of automated control subsystems. The share of intellectual components (expert systems, support and decision-making systems, information and reference systems, etc.) in the structure of information and algorithmic support of management of organizations is growing, which leads to a tendency to replace routine management operations performed by personnel with their robotic (automatic) implementation. This intellectualization is largely based on the processing and interpretation of knowledge and competencies that make up the intellectual capital of organizations, and requires special highly professional efforts.

The peculiarities increase the importance of effective management of the development and functioning information management infrastructure, organizations are bringing to this activity increased requirements, including professional, as a result, formed the preconditions for the expansion of it outsourcing, as technology is a successful solution of the tasks of information security management systems of organizations.

Issues of coordination of organizations in the formation, use and development of management information infrastructure, creation of a network infrastructure of joint business, including on the basis of Outsourcing, creation of common information fields in common standards and tools for coordination of internal processes of various organizations without combining them on a corporate basis are poorly studied. These issues are studied quite separately and without connection with the problems of outsourcing development. The issues concerning the details of the algorithm for implementing it outsourcing, tools for selecting outsourced activities and/or business processes, the development of a system for assessing the results of interaction between organizations in the processes of it outsourcing, focused on the sustainable functioning and development of management information infrastructure, remain insufficiently studied. These circumstances predetermined the choice of the topic of scientific

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research, its object, subject, purpose, objectives and General orientation.

The research is based on the theories, models and methodology of strategic and operational management, process and project management, special methods of justification and implementation of outsourcing projects, in particular – it outsourcing, set out in the scientific works of domestic and foreign scientists. The study was also based on publications that reveal the theoretical and applied aspects of the development of information infrastructure management organizations based on outsourcing, the trend of digitalization of business and management processes of modern organizations.

In the process of research methods were used system approach, operations research, monographic and comparative, induction and deduction, analysis and synthesis, comparison, scientific generalization, modeling, methods of economic-statistical analysis, tabular and graphical interpretation of empirical and factual information, etc.

The information basis of the study was made up of legislative acts and normative documents, concepts, strategies and programs of state bodies of the Russian Federation related to the object of the study, data of state statistical reporting, data of industry information and analytical agencies, results of management surveys conducted with the participation of the author in organizations implementing it outsourcing projects. In the course of the research, the author used relevant information contained in numerous publications (monographs, collections of works, articles, conference proceedings, dissertations), including those posted on the Internet, concerning the problems of formation and development of information infrastructure of management of organizations.

Outsourcing is considered by the author not just as a type of partnership, but as a specific strategy of organization management, which involves a certain restructuring of internal corporate processes and external relations of the company, resulting in cost reduction, increasing the value of goods/services for customers, increasing the speed of reaction to market signals, etc., and ultimately – increasing competitiveness.

In this regard, the development and maintenance of the information infrastructure of the organization's management on the basis of it outsourcing is of particular importance in the period of digitalization of the economy. This creates technological prerequisites for more active networking of the organization with business partners, which is a source of additional value creation for owners, customers, employees and other stakeholders.

In connection with the above, requires modification of the strategic management system of the organization. In particular, the process of strategic analysis of the organization, which includes the stages of analysis objectives, analysis of the strategic positioning of the organization and its competitive environment, the formation of a strategic vision for the future of the organization, are proposed to Supplement the analysis phase, the feasibility of using IT-outsourcing and portfolio of outsourcing projects.

It outsourcing serves as a flexible form of organization of network inter-organizational relations. Establishing and maintaining interaction and information exchange between all participants of the multilateral network economy platform is the basis for the development of it outsourcing. The decision to transfer part of business processes to outsourcing by the customer, as well as the decision to form a portfolio of projects by the outsourcer, is formed under the influence of environmental factors and has feedback from the activities of all participants in the it outsourcing project.

As a methodological tool to reduce the cost of external transactions of organizations using it outsourcing, the author proposes the use of Gary Hamel's business model, which integrates the principles of strategic, project and process approaches to management. Integration of management ideas about the potential of organizational profitability, efficiency, uniqueness and internal consistency

of processes, is implemented when deciding on the transfer of the former internal processes to outsourcing, so there are more opportunities for coordinated coordination of business processes of the organization and its business partners. It outsourcing connects the internal value chains of the organization itself, as well as its suppliers and customers.

Some parts of the consumer value chain in the network model are implemented by external network communities. The basis of network models is a network platform that creates and supports organizational and technological space for interaction of agents. due to its integration (non-internal) nature, it is advisable to transfer the functions of its maintenance and development to an it outsourcer.

At the same time, the issues of ensuring the high quality of the information infrastructure of management become fundamentally important for the implementation of such outsourcing projects. To solve this problem, it is proposed to use a comprehensive model of quality management. The main idea of the author's approach is to move from managing the results to managing the process itself, which creates additional value of the project result due to the transformation of inputs and outputs.

At the first stage of development of the technique on the basis of the specified threshold values of the specified indicators potential suppliers are selected. At the second stage, potential it outsourcers are evaluated according to the system of criteria given in table 1. The weights of the criteria were determined by the author as a result of the study performed using The method of T. Saati hierarchies. On the basis of weighted summation of normalized numerical values of particular criteria presented in the table, quantitative evaluation of it outsourcers and their ranking is performed.

In addition to assessing the content characteristics of the it outsourcer, the cost characteristics of the services provided by it are also important. They are determined in the course of bilateral negotiations held at the final stage of the methodology for justifying the management decision on the choice of an it outsourcer. The study allowed to substantiate the conclusion that the analytical dependence (price formula) for the cost of outsourcing services for the maintenance and development of information infrastructure management of the organization can not be offered.

This is because the activity is a project, i.e. unique and requires a specific pair of client – authoriser, as well as strategic, which implies the need of refusal of the effects of short-term gains in favor of the longer-term mutual interests that could lead to synergies on the basis of joint creation and development of business partners (outsourcer and outsource) specific assets and the formation of a unique competitive advantage.

Based on the processing of a substantial array of empirical data obtained in the study by interviewing the managers and specialists of organizations implementing projects of it outsourcing, it is established that in the course of price negotiations should consider the following factors: the level of quality of service provision; compliance with deadlines; composition services; fleet customer (range, distribution density, quantity, age, etc.).

Approbation of the developed technique were performed on the materials of the it project portfolio-outsourcing – company "US", implemented in the field of printing services support computer workstations and service ATMs. This testing confirmed the high efficiency of the proposed method.

On the basis of PDCA (Plan-Do-Check-Act) and project portfolio management methodologies, the author developed and tested (on the materials of a sample of clients of "NAS" company) the method of selecting an it outsourcing service provider. This methodology is focused on continuous improvement of the process management system throughout the organization, based on the constant development of its information management infrastructure. Figure 4 shows the basic block diagram of the author's technique.

The emphasis in the proposed methodology is not on the traditional improvement of internal

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business processes of the customer organization by improving its IT infrastructure, but on the growth of customer satisfaction with the goods and / or services of the customer organizations, in this regard, the customer's requirements for the IT outsourcer change. The latter is designed primarily to improve those elements of the IT infrastructure that allow you to build an effective customer relationship management.

The main indicators by which IT outsourcing services are evaluated according to the methodology proposed by the author of the study are: service composition; service quality; warranty; service level (SLA); service quality indicators (KPI); financial responsibility for failure to comply with service quality indicators; the order and timing of the project launch; financial responsibility for failure to comply with the terms of service launch.

As it was found in the course of the study, during the implementation of IT outsourcing projects, the model of organization of the outsourcing company is transformed, which is due to the need for deep integration into the processes of business partners. This integration is dual in nature:

- on the one hand, it is integration with service partners. The processes of implemented IT projects of the outsourcer organization permeate the processes of its service partners in such a way that if they suddenly decide to stop interaction, it will lead to the closure of the business. This is due to the critical dependence on the software support of the information infrastructure. Service partners use software (warehouse management, financial accounting, service Desk, etc.) that depends on the software of the outsourcer organization. The latter provides stable employment in the projects of service partners with constant IT support, training and provision of the necessary resources for the implementation of projects, and the service partner, in turn, ensures quality performance of the work and functions assigned to it;

- on the other hand, it is integration with customers. The growing volume of tasks transferred by the client to the outsourcer and the quality of solutions increase the cost of switching to another IT outsourcer. This ensures a stable long-term cooperation. Also, in the process of project implementation, the client's service Desk is integrated with the company's service Desk or it is proposed to use a customized service Desk of the company itself with the support of a mobile application in which the company's client can monitor all processes and manage their own devices.

Thus, effective management of IT infrastructure outsourcer is directly reflected on the results of the management of the IT infrastructure of the customer, thereby increasing end-user satisfaction with goods and/or services the end user customer. This provision, based on the network representation of value creation for the end user, is embedded in the proposed by the author in the research universal system of selection of IT outsourcing service provider and the criterion model of supplier evaluation. This requires the integration of criteria for measuring the success of jointly implemented projects of all participants of outsourcing cooperation, as well as continuous and coordinated improvement of their activities based on the implementation of the project approach in management.

Approbation of the developed methodological support was performed on the materials of organizations, interaction with which in the framework of IT outsourcing is carried out by the company "NAS". The sample includes projects implemented jointly with such companies as "Svyaznoy", "Euroset", "M-Video", "Eldorado", "Sberbank", "VTB", "Rosselkhozbank", "Alfa-Bank", etc. It was found that within the analyzed portfolio of projects it is advisable to make changes aimed at further development of the integration of the information infrastructure of the outsourcer and outsourcer.

By results of theoretical and applied modeling of trajectories of development of network interaction it is proved that the main changes within project outsourcing interaction in the sphere of development of information infrastructure of management of the organizations need to be focused on the following areas: strengthening of relationship with the main partners due to development of system of contract relations, clearer specification of mutual obligations and the rights; creation of conditions for mutually

beneficial (from economic and strategic positions) cooperation; improvement of methods and algorithms for selection of outsourcing partners; development of the mechanism of project management of it outsourcing in order to comply with the established budget, deadlines and achieve the required quality characteristics of implemented and planned projects.

Evaluation of it outsourcing projects should be based on the concept of "end-to-end" value chain management. This requires a change in the model of interaction with service partners. These relationships should be aimed at creating networks of inter-firm interaction to improve the quality of it outsourcing services for the customer in order to increase the satisfaction of its customers with the results of its core activities. Thus, the development of information infrastructure management organizations based on it outsourcing leads to qualitative changes at the industry level: the formation of inter-organizational digital ecosystems.

The analysis shows that the development of a strategy of inter-firm interaction and the subsequent creation of a network of inter-firm interaction on the basis of this kind of joint information infrastructure will contribute to: increase productivity; reduce costs; increase the level of competence of personnel, etc.

In result of the conducted research the author proves the complex of theoretical and methodical provisions and practical tools of development of the information management infrastructure of today's organizations, characterized by the use of the project approach and this form of inter-organizational interaction as it outsourcing and strategic orientation of outsourcing projects in a modern economy, transformed under the influence of global tendencies of its digitization.

The paper identifies and systematizes the features of the development of information infrastructure management organizations in terms of digitalization (growth of technical and organizational complexity, integration into the global information infrastructure, merging of information subsystems of technological management and management processes, etc.), characteristic of Russian and foreign business.

Their critical analysis allowed to justify the conclusion that the level of development of information infrastructure management of modern organizations is a critical factor determining the strategic prospects for their development in the medium term. It is shown that the priority tool of formation, development and improvement of information infrastructure of management of the organizations is it outsourcing which is offered to be analyzed with use of methodology of project and process approaches that allowed to study more deeply and comprehensively system properties of it outsourcing, its influence on management systems of the modern organizations.

## **Conclusions**

Based on the noted strategic importance of it outsourcing, the author modified the traditional scheme of strategic analysis of the organization, which further proposed to include the stage of justification and decision-making on the possibility and feasibility of using it outsourcing. At the same time, this outsourcing is considered not as a way of tactical optimization of business processes and costs, but as a tool for creating additional value for the organization and its stakeholders.

The applied results of the research consist in the development of new elements of methodological support of management systems of organizations focused on the development of their subsystems of management information support, including: methods of evaluating it outsourcing projects and methods of justifying the decision to choose an it outsourcer. These methods have been tested in practice and confirmed their effectiveness and adequacy.

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## Развитие управления организацией информационной инфраструктуры с использованием ее аутсорсинга

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### Аннотация

Бурное развитие информационных технологий (ИТ) в последние десятилетия привело к качественным изменениям в системах управления информацией организаций, системах управления информацией. Эти изменения требуют не только теоретического понимания, но и ставят перед руководством организации ряд прикладных проблем, связанных с обеспечением эффективности управления в цифровой экономике. Построение новых экономических отношений, способов межорганизационного взаимодействия, организации процессов управления, форм сотрудничества и координации деятельности различных организаций для совместного решения определенных проблем развития и функционирования - все это требует пересмотра по мере формирования цифровой экономики.

Сегодня наблюдается устойчивое усиление влияния ИТ-фактора на результаты хозяйственной деятельности, социальные процессы. Именно инфраструктура от



предоставления компонентов управления, которые ранее служили технологической средой для обмена информацией между субъектами и объектами управления, как ее техническое совершенствование, так и интеллектуализация, превращается в ключевой фактор конкурентоспособности и жизнеспособности организаций. Формирование и поддержание развитой ИТ-инфраструктуры становится ключевым стратегическим фактором успеха организаций, что требует пересмотра приоритетов управления. Следствием этого является повышение требований к эффективности ИТ-инфраструктуры управления организациями, профессионализма специалистов, выполняющих эти функции.

Одним из наиболее эффективных способов повышения эффективности управления, как показывает российская и международная практика управления, является использование аутсорсинга. Это позволяет аутсорсинговой организации (заказчику) сосредоточиться на ключевых компетенциях, передавая специализированным исполнителям (аутсорсерам) определенные функции, требующие определенных ресурсов. Фундаментальной причиной развития и распространения аутсорсинга является проявление общеэкономического закона разделения труда. Основной причиной перехода к аутсорсингу конкретных организаций является неспособность (учитывая ограничения ресурсов и времени) выполнять функции, передаваемые аутсорсеру с таким же высоким качеством.

ИТ-аутсорсинг, позволяющий эксплуатировать и развивать информационную инфраструктуру управления организациями с достижением рационального баланса результатов и затрат, получил широкое распространение в России и мире. В то же время, методологическая основа для реализации его аутсорсинговых проектов все еще недостаточно развита. В связи с этим целесообразно провести специальное научное исследование, направленное на разрешение этого противоречия между наукой и практикой.

#### Для цитирования в научных исследованиях

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#### Ключевые слова

Информационная инфраструктура, управление организацией, ИТ-аутсорсинг.

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