

Influence of Modern Technologies on the Enterprise Management Structure (Experience of Russia)

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Abstract

The paper examines current scientific discussions on the formation of modern trends in the development of organizational structures on performing management functions. A scientific discussion on the impact of digital technologies on transformation of the enterprise management structure, experimenting with the development and introduction of new management structures is a most studied and in demand in recent years and at least in the next decade. The problems of cost reduction due to the digitalization of management, as well as the fields of enterprise activity in which digital trends are gaining increasing importance are discussed. In this regard, the matrix of demand for elements of the human resource productivity in the quantity to quality ratio has been developed. The main modern directions of improving organizational management structures are considered. The analysis of the degree of managerial functions centralization in holding structures is given; the factors of managerial functions centralization are revealed; the advantages of decentralized and centralized management are described, and the costs that must be taken into account when deciding on the distribution of functions between the parent company and the holding's subsidiaries are given. The features of network and virtual structures are shown. The tendency of development of virtual structures is defined. The purpose of the research is to analyze the influence of modern technologies on the structure of enterprise management and, accordingly, to identify and describe the development tendencies of the most successful organizational structures, to make possible variants of the demand for the elements of the human resource productivity.

Keywords: Management; Organizational structure; Workforce; Digital technologies; Costs; Holding structures; Network structures; Virtual structures.



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1. Introduction

The urgency of the issue on a qualitative transition to a new technological structure remains acute and requires a multifaceted consideration, and a comprehensive solution. Digital technologies have marked a new era for enterprise development. Technological development and the emergence of alternative digital currencies save time, increase labor productivity and to solve old problems in a new and effective way, forcing enterprises to go on experiments to find optimal organizational structures. In the course of these experiments, a wide variety of combinations of known kinds and types of structures that are adapted by organizations to the specific conditions of their functioning are often used. Enterprises begin to digitize information about assets, technologies, technical information and integrate their mobile devices. At the first stages, the aim is organization of enterprise management, and at the subsequent stages, replacement of separate organizational structures by virtual ones, for example, mobile applications. The purpose of this paper is to analyze the impact of modern technologies on the structure of enterprise management.

2. Methods

When carrying out the research, statistical methods, methods of strategic management, economic analysis of organizations' activity, as well as such general scientific methods as analysis and synthesis, a systematic approach to studying the external and internal environment of the organization, socio-economic phenomena and processes were used as a tool (Anatolevich *et al.*, 2017).

3. Results

As a result of studying the experience of Russian advanced enterprises and successfully operating foreign firms, it was revealed that a wide variety of combinations of known kinds and types of structures are used by them,

including new virtual structures adapted to specific conditions of their operation. Also, there has been a steady trend of changing the requirements for the qualitative conformity of workers, which is caused by the replacement of niche field of labor with a more creative, diverse work requiring independent managerial decisions. Table 1 shows the result of the analysis of the demand for the elements of productivity of human resources, and the ratio of quantitative and qualitative factors is estimated.

Table-1. The matrix of demand for human resource productivity elements as the quantity / quality ratio (current state)

Elements of human resources	New technologies (IT)	Emotional intelligence	Intelligence	Physical ability to work
	Degree of relevance			
Consciousness resource	High	Partial	High	Partial
Inspiration resource	Partial	High	Partial	Not claimed
Body resource	Not claimed	Partial	Partial	High
Quantity / quality	1/2	1/1	1/2	1/3

The lower structural links are becoming increasingly involved in the management process, the higher hierarchical levels are concentrated on solving the most complex, strategic tasks. Those changes in the content of managerial work require simplification of complex hierarchical structures. At the same time, with the advent of virtual organizational structures, it is possible to identify the requirements for human resources, and their qualitative demonstration (Bagautdinova *et al.*, 2014).

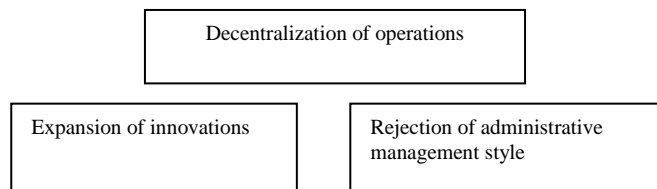
Table-2. The matrix of the demand for the elements of the productivity of human resources with the use of quantity / quality ratio (trend)

Elements of human resources	New technologies (IT)	Emotional intelligence	Intelligence	Physical ability to work
	Degree of relevance			
Consciousness resource	High	High	High	Partial
Inspiration resource	High	High	High	Partial
Body Resource	Partial	Partial	Partial	High
Quantity / quality	1/4	1/2	1/10	1/5

Thus, the possession of new technologies, intelligence, the ability to creatively approach to the solution of problems are the main characteristics of qualitative changes in the requirements for the workforce within the changing organizational structure of management.

The increase in the scale of production and its complication, the use of automated systems for data collecting and processing cause the development of new organizational management structures.

Figure-1. The main modern directions for improving organizational management structures



At the heart of this development is the transition to structures that provide a quick response to changes occurring in production. Let's consider modern tendencies of improving organizational structures of management on figure 1.

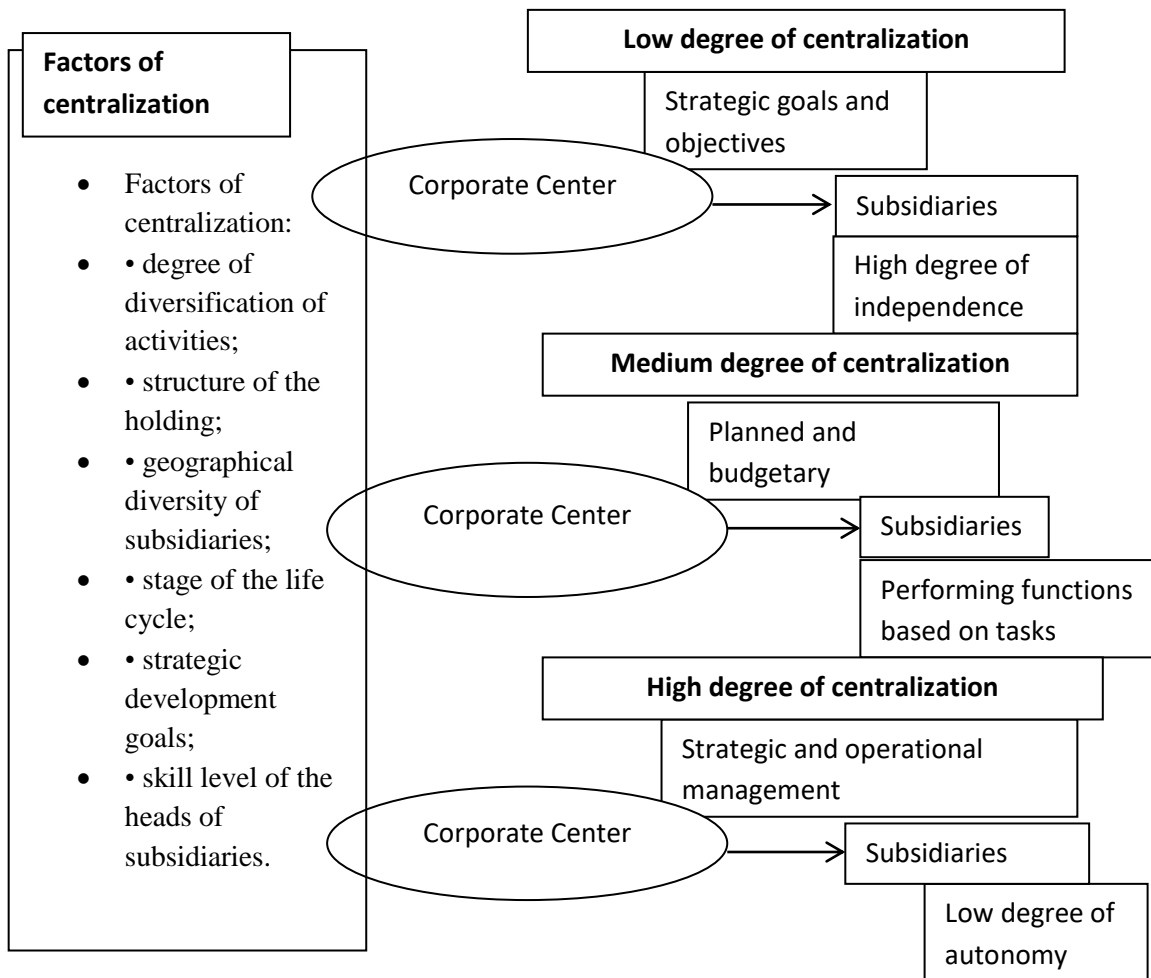
In Russia, holding, network and virtual structures are most dynamically developing. The largest Russian holdings with high revenues are represented in the oil and gas sector: MMC Norilsk Nickel, NOVATEK, Tatneft, Surgutneftegaz, GAZPROM, Rosneft; and Sberbank in the sphere of finance.

It is possible to distinguish three degrees of centralization of managerial functions and characteristic functions of a corporate management center (Fig.1). With a low degree of centralization, the corporate management center performs the functions of general coordination of holding's activities, determines the strategic goals and objectives of holding's development, and also controls the activities of subsidiaries with a high degree of independence.

With a medium degree of centralization, a corporate center implements the strategic management of the holding. Subsidiaries perform the functions of operational management on the basis of planned and budget assignments approved by the corporate center. At the same time, the corporate center develops guidelines, standards and regulations that regulate the activities of enterprises (Байрамова and Халилова, 2015).

With a high degree of centralization, the corporate management center performs the functions of both strategic and operational management of the holding.

Figure-2. Degrees of centralization of management functions



The following factors influence the possibility of centralization of management functions in holding structures: the degree of diversification of the holding's activities; organizational structure of the holding and the number of its members; geographical diversity of separate subdivisions and subsidiaries of the holding; stage of the life cycle and development of the holding; strategic objectives of the holding's development; qualification level of heads of separate subdivisions and subsidiaries of the holding. The centralization of management functions is advisable if the holding's subsidiaries operate within the same industry. Diversification of the holding's activities reduces the ability to concentrate management functions in one center.

A high degree of centralization is characteristic during the formation of a holding structure, when the most stringent control over the activities of its subsidiaries is required. At the next stages of the life cycle, the organizational culture is established, the system of internal standards and regulations is formed, and decentralized management of the holding becomes possible.

The advantages of decentralized and centralized management of holding structures are presented in Table 1.

Table-3. Advantages of decentralized and centralized management of holding structures

Decentralized management	Centralized management
Simplification of the management process in case of complex organizational structure;	Better control and coordination of management functions;
The possibility of making decisions by a manager who is more aware of the problems of the respective organizational unit;	Minimization of errors in the performance of managerial functions in the event of incompetence of heads of organizational units;
Stimulating the initiative of the company's employees;	Simplification of the process of financial document circulation;
Development of competences of young leaders who make their own decisions.	Establishment of unified standards of management accounting.

In some cases, despite the overall centralization of management, it is still more expedient to leave some functions for their implementation by the holding's subsidiaries. In this case, it is necessary to take into account the expenses of the holding company prior to centralization and after the centralization of management functions:

a) Compare the costs associated with wages, the payment of bonuses and insurance payments to centralization and after the centralization of management functions;

- b) Take into account the severance payments and compensations for unused leaves to employees of the closed down divisions of subsidiaries;
- c) Compare the costs of servicing working places before centralization and after the centralization of management functions;
- d) Calculate the costs associated with the selection, hiring and training of new employees: access to the resume database; advertising vacancies; labor costs of a recruiting specialist; manager's labor costs for the interview; audit by a security service of a holding; labor costs for registration of employment; cost of training, etc.

There is a practice when holding companies close down certain departments in the structure of subsidiaries and transfer a part of their functions to departments of nonadjacent appointment. Such reorganization is planned by "Tatneft" company: to close down financial departments in oil and gas production departments and transfer a part of the payment functions to employees of production departments. The centralization of payment functions was carried out earlier by such companies as "Lukoil" and "Gazprom".

However, the drawback of this solution is that employees of such departments do not have the appropriate training and need additional learning to perform new functions. Training will require additional investment and time. In addition, when carrying out functions unusual for the department during the adaptation period, many mistakes can be made that can lead to additional expenses or the time required for their correction.

A negative aspect is also the fact that the need to perform new functions may adversely affect the performance of their own duties of employees. The new functions will not only take a lot of staff time, but also prevent other employees from concentrating on the main tasks of the department itself.

In this case, the merits of maintaining functional departments in subsidiaries are the following: the appropriate qualifications of employees; no need for retraining; less chance of errors; a narrow specialization that allows each employee to focus on their own functions; no need to adapt employees to new functions and, as a consequence, reduce stress levels; reduction in the number of employees being retired.

In addition, the appearance of new technologies in the era of digital transformation, such as the use of neural networks in control, biometrics, Smart Metrics and many others, will influence the possibility of centralizing management in our view (Podgornaya et al., 2015).

Network structures are also the most successful in a modern dynamic environment. They represent a complex of organizations which conclude contracts on any type of economic activity. The most prominent representatives in Russia are: Avon, Faberlic, Amway, Oriflame, TianDe, Herbalife, Mary Kay, Vorwerk, Natura Cosmetics, Siberian Health, Agel, Green World, Vitalain, Zepter International, Siel. Table 3 shows the distinguishing features of network structures.

Table-4. Distinctive features of network structures

Distinctive features of network structures		
Use collective assets of several firms	Orientation to market mechanisms (demand, supply and competition)	The use of the dignity of various organizational structures
The products have no analogues	The company pays partners up to 60% of the turnover	The rating of products among consumers and reviews convince any skeptic

The effectiveness of networked organizations is guaranteed by low employment and a rational cost structure, since the need for management personnel is reduced, there is no need for support staff and administration.

Virtual structures are becoming increasingly popular: their activities rely on information technologies with widely distributed management links.

Table-5. Distinctive features of virtual structures.

Distinctive features of virtual structures		
Unified goal and values	Support for synchronization of operations and directivity	Independence of participants
Voluntary partnership	The flexibility of the structure having many leaders	Multilevelness: simultaneous operations between departments, organizations and consumers
Wide application of Internet technologies, modern financial accounting and payment systems	Lack of infrastructure	A large number of partners in the delivery, storage and distribution of cargoes and goods

Virtual structures continue to evolve, sometimes they copy already existing units, replace some structures, or are created as a fully functioning enterprise (Grudina, 2016).

4. Discussion

Holdings are the most conservative among the organizational structures considered. The decision to centralize or decentralize managerial functions should be accompanied by a thorough analysis of the relevant aspects of the holding company's activities. The specific features of the holding should be taken into account: types of activities, organizational structure, the geographical location of subsidiaries, the life cycle stage, a system of strategic goals and

objectives. It is necessary to calculate and predict the costs associated with the reorganization of the holding's organizational structure, and the possibility of applying modern digital management technologies. The company's management will be able to make an effective decision to optimize the degree of centralization of management functions only taking into account the individual characteristics and current management practices in the holding structure (Manyika *et al.*, 2013). Network structures are actively starting to introduce elements of virtual structures.

5. Summary

The main trend in improving the organizational structures of modern enterprises in Russia is that each subsequent structure becomes more simple and flexible in comparison with earlier ones. This imposes its demands on the quality of the workforce. Possession of new technologies, intelligence, and the ability to creatively approach to the solution of problems are the main characteristics of qualitative changes in the requirements for the workforce, within the changing organizational structure of management.

Digitalization provides cost reduction, production optimization and product quality improvement. It helps to reduce the response time to customer requests and market needs. Solutions for a digital enterprise are available (Tahavieva and Nigmatullina, 2017), today and are suitable for any company, regardless of its size and scope. New products must be delivered to the market in the shortest possible time and meet the individual needs of customers. Rapidly changing markets require more flexibility and more efficient use of resources and energy, and all this without sacrificing quality, and in some cases even with its increase. Digital business management allows them to respond faster to customer requests and market needs, which opens new opportunities for development.

Virtual structures continue to evolve, sometimes they copy already existing units, replace some structures, or are created as a fully functioning enterprise (Anatolevich *et al.*, 2017).

6. Conclusion

Proceeding from the foregoing, it can be concluded that the modern development of organizational structures is characterized by a broad delegation of authority to the lower structural levels and the replacement of administrative methods of managing economic methods, up to the intrafirm purchase and sale of intermediate labor results and the formation of internal competition in the enterprise. Changing the organizational structure, the emergence of virtual structures can reduce costs and most efficiently operate modern enterprises.

Thus, digital technologies have a transforming effect on the development of enterprises, their organizational structure, dictating the requirements, qualifications and directions of development of the workforce.

Acknowledgements

The work is carried out according to the Russian Government Program of Competitive Growth of Kazan Federal University.

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