

ICEST 2022**III International Conference on Economic and Social Trends for Sustainability of Modern Society****COORDINATION MECHANISMS IN NETWORK INTERACTIONS
IN THE CONTEXT OF DIGITAL TRANSFORMATION**

Svetlana Simagina (a), Darya Yuskaeva (b)*

*Corresponding author

(a) Department of Applied Informatics, Povolzhskiy State University of Telecommunications and Informatics, Doctor of Economics, Samara, Russia, simaginasve@gmail.com

(b) Department of Applied Informatics of the Povolzhskiy State University of Telecommunications and Informatics, Samara, Russia, dariadaniowa@mail.ru

Abstract

The analysis of scientific approaches to the definition management functions - coordination and their generalization in a digital business transformation. The greatest attention is paid to: theories of administration - intra-company network; supply chain management - process methods in management theory; the author's approach - the management of network and inter-network unstable interaction, which considers coordination based on process management, both intra-company and in the network of external relations, taking into account the influence of self-organization. In the conceptualization of the authors, it is proposed to regulate the instability of interaction in the network of relations between organizations. At the same time, the special role of information resources for coordinating joint actions, in particular to adapt to frequent changing external conditions for the development and implementation of solutions. The author's concept considers coordination in a network organizational structure, presented in the form of a dynamic (temporary) network, in which the participants of the business process are nodes, and one of the participants acts as a single center coordinating interaction.

2357-1330 © 2022 Published by European Publisher.

Keywords: Coordination, network and inter-network structures, digital transformation, management



The Author(s) 2022. This article is licensed under a Creative Commons Attribution-NonCommercial-NoDerivatives 4.0 International License (<https://creativecommons.org/licenses/by-nc-nd/4.0/>).

1. Introduction

The modern economy is moving to a new qualitative level - the level of the digital economy. This is due to the fact that the development of information technology leads to the emergence of new business models focused primarily on the organization of interaction with consumers, as well as between other participants in business processes (Borovkov, 2019). In the context of digital transformation, which is one of the goals for the development of the economy of the Russian Federation for the period up to 2030, ecosystem business models based on a single digital platform should be widely used (Potapova et al., 2021). The term ecosystem, which has become common today, was first used by Moore in 1993: "... an economic community based on a foundation that is made up of interacting organizations and individuals, organisms of the entrepreneurial world ..." (p. 75).

Most researchers, including the authors of the article, consider the ecosystem as a network and inter-network organizational structure that has a single digital platform (Simagina, 2008).

2. Problem Statement

The main function of the digital platform (integrated information business environment) is to ensure mutually beneficial interaction between participants in business processes or economic entities (Vail & Warner, 2019).

A further increase in the number of digital platforms, including global ones, data control with their help leads to increased inequality and competition, including in the global economy, and as a result, to economic instability, instability of market conditions and, as a result, instability of interaction in the network of relations between organizations.

Approaches to coordination mechanisms in the context of digital transformation of business processes.

These trends contribute to a change not only in business models and processes, but also in the methods and management tools used. The focus of the informational approach to network organizations is still the coordination of the actions of their participants, therefore, we will dwell on this management function in the development of ICT resources and increase the instability in the network of relations between organizations.

3. Research Questions

In management theory, the main functions of management include coordination to achieve consistency of all elements of the internal organizational structure of the organization, as a rule, a vertical hierarchy. In the network structure that appears as a result of the digital transformation of the subject area, it is also necessary to coordinate horizontal relations between organizations that are part of the network formed taking into account self-organization. The last factor becomes the most important due to the fact that in the context of digital transformation, interaction becomes more unstable.

4. Purpose of the Study

The purpose is to study the mechanisms of the function of the coordinating relations of network interaction in the context of digital transformation.

5. Research Methods

Table 1 gives an interpretation of the key management factor - coordination in terms of various methods of managing network organizations. Coordination mechanisms are considered on the example of an intra-company network, a supply chain and a dynamic network of relationships. Let us consider in detail the second and third (author's) mechanisms, since the first one has been studied quite well and forms mainly coordination in the intra-company network, taking into account the reaction to changes in the external environment from participants who are in a relationship of connectivity and interdependence.

Table 1. Mechanisms for coordination: goals, functions, forms of organizational structure and other generalizations

Control functions according to A. Fayol	European Logistics Association: “Supply chain management is an integral business approach that implements the basic principles of supply chain management....” (Krylatkov & Prilutskaya, 2018, p. 109).	Author's concept
Theory of administration	Supply chain management concept	Management of network and inter-network unstable interaction The goal is to ensure efficiency as a ratio between the costs of building and maintaining relationships and the benefits of using them.
The goal is to identify universal principles of management, following which the organization will achieve success.	The goal is to minimize total costs in the supply chain and maximize value for the end customer (Sergeev, 2015).	Organization - management of a network and inter-network dynamic structure in the form of relationships with business process participants, based on market mechanisms.
Organization - a function of the management body of the organization, the essence of which is the creation of the very management structure of the organization, i.e. ensuring the necessary level of formalization, attracting resources to the organization and creating the conditions necessary for its normal operation.	Organization - management of streaming processes based on certain rules.	Management - coordination of actions of participants in the business process of the digital ecosystem of a digital enterprise in a single unstable subject area with network and inter-network interaction and self-organization based on a digital platform.
Management - leading the organization to its goal, extracting the maximum opportunities from all the resources at its disposal.	Supply chain management is the systematic, strategic coordination of traditional business functions within a particular company and in the supply chain to improve the long-term performance of both each individual company and the supply chain as a whole (Krylatkov & Prilutskaya, 2018).	An endless variety of relationship networks
Variety of forms of organization	Sustainable supply chain	Scope - digital enterprise ecosystem as a network of relationships with business process participants.
Scope - intra-company management.	Scope - provision and maintenance of products (full life cycle).	Primary development of methods and techniques for network and inter-network management of unstable interaction of a digital enterprise.
Primary development of regulation and procedural support for collective activities with operational division of the process.	Primary development of methods and techniques for managing key business processes inside and outside the organization based on the process approach.	

Allocation of management as a separate type of activity of the organization and a separate type of employees.

Identification of the material flow as an integrating control element. This management concept is based on the implementation of the synergistic triad: integration - coordination – optimization (Sergeev, 2015).

Substantiation of the methodology for managing unstable network and inter-network interaction of a digital enterprise.

Speaking about the second mechanism of coordination - supply chain management, it should be noted that its choice is not accidental. It is associated with the general trend in the use of process methods in management. In the academic definition, supply chain management is defined as

the systematic, strategic coordination of traditional business functions and tactics for their implementation, both within a particular company and within business relationships within the supply chain, in order to improve the performance of individual companies and the supply chain as a whole (Sergeev, 2015, p. 19).

This theoretical approach is based on the implementation of the synergistic triad: integration - coordination - optimization.

It should be noted that most authors consider integration or an integral flow to be the key factor in supply chain management, investing in these definitions an “integral approach to business” (Voronova & Berezhnaya, 2019). Logistics management in this case coordinates interaction with other functional areas of management, including the solution of certain strategic tasks.

The constant change in the subject area of management is characterized by intensive technological changes, globalization and accelerated changes in customer needs and the introduction of new products to the market. The main task of digital transformation at the moment is the timely delivery of products to the consumer. In this situation, enterprises are moving to the formation of their supply chains through purposeful design, minimizing spontaneous order. In this case, the influence of self-organization on the management process, as a rule, is not taken into account. Although initially supply chains were mainly determined by the chain reaction of self-organization of intercompany economic relations as a whole, self-organization at the level of individual business processes is not considered (Puzanova, 2020).

When using the concept of supply chain management, it is assumed that it is possible to build an integral management information space. Part of such integrated information support has already found its application, other information systems require development or are used less widely. In this case, we are dealing with the so-called technological model of digital management, when the basis for digital transformation is the solution of management problems related to the introduction of information technologies into business processes and individual management subsystems (Mikhnenko, 2020).

The author's concept considers coordination in a network organizational structure, represented as a dynamic (temporary) network, in which the participants in the business process are nodes, and one of the participants acts as a single center coordinating the interaction (Matveeva, 2017). A distinctive characteristic of such a participant, which determines its dominant position in the center of the network structure, as a rule, is the presence of backbone resources. These should include not only finance, intangible assets, organizational capital, but also sources of digital competitive advantage (content, databases, platforms, digital customer experience, etc.).

It should be noted that one of the main characteristics of the object of study - the network organizational structure, is its formation under the influence of self-organization, which determines the temporary nature of relations in the network (Matveeva, 2017). This circumstance shifts the focus of management to the coordination of horizontal links, which, on the one hand, allows you to flexibly adapt to changes in the external environment, but at the same time leads to the need to develop new coordination mechanisms.

6. Findings

As such a mechanism, the authors propose mutual coordination of interests in a network of relationships. To do this, an integral indicator of the effectiveness of interaction in the formed time structure is introduced, which characterizes the degree of instability of relations in a given dynamic network. To do this, the main trends in the development of the characteristics of the subject area are diagnosed, taking into account the characteristics of each considered network structure and interaction in it, based on the commonality of the tasks and interests being solved. For example, one of these areas today is the digitalization of management, and interaction is determined through digital competitive advantage. Further, the characteristics of the main traditional business functions of intra-company management are grouped into clusters for each of the diagnosed areas of development of the area of interaction between participants in the network of relations (Simagina, 2008). The integral indicator itself is formed on the basis of the choice of representative principles for each cluster. The choice of representative principles is carried out using one of the methods of scientific induction - the method of residuals.

The result in this case is considered as a combination of intra-company management and coordination of horizontal relationships in a dynamic network for the duration of a particular business process (Popov, 2021).

Modern studies of network and inter-network interaction note the special role of information resources for coordinating joint actions, in particular, for adapting to frequently changing external conditions for developing and implementing decisions (Popov, 2021). The author's management concept already contains elements of optimizing digital management in the form of representative principles in the direction of relationship virtualization. It remains to combine them within a single digital platform (joint databases, integrated planning systems integrated with real-time execution) and its other elements. Such an approach will make it possible to coordinate the interaction of business process participants, taking into account the triad of requirements of the modern global market (Time-to-Decision, Time-to-Execution, Time-to-Market), reduce the response time to ongoing changes in the subject area and take into account self-organization.

To optimize management processes in functional areas of interaction based on a digital platform, it is proposed to use previously developed models and coordination mechanisms in the context of unstable interaction between organizations (Gavrilova et al., 2021).

7. Conclusion

The considered mechanisms of the key management factor - coordination from the point of view of various methods of managing network organizations show that in the conditions of the digital economy, not only business processes, but also the management methods and tools used by business should be transformed. The main direction of the search for new and modernization of existing management methods and tools, in our opinion, should be based on the model of optimizing digital management.

Some elements of the latter are reflected in the concept of managing the unstable interaction of organizations, which, with further development, will be able to ensure the coordination of the main organizational structures (ecosystems) in the context of digital business transformation.

References

- Borovkov, A. B. (2019). *Rukovodstvo po cifrovoj transformacii proizvodstvennyh predpriyatiij* [Guidelines for the digital transformation of manufacturing enterprises]. <https://inlnk.ru/68ZLMA>
- Gavrilova A., Matveeva E., & Simagina S. (2021). Management of Energy Supply of Production as a Factor of Sustainable Development of Machine-building Enterprises. In *Proceedings of the International Scientific and Practical Conference on Sustainable Development of Regional Infrastructure*, 833-839. <https://doi.org/10.5220/0010610308330839>
- Krylatkov, P. P., & Prilutskaya, M. A. (2018). *Upravlenie cep'yu postavok (SCM)* [Supply chain management (SCM)]. Ural University Publishing House. un-ta. <https://inlnk.ru/20NAXO>
- Matveeva, E. A. (2017). Functional management of the economic activity of industrial systems. *Journal MATEC Web of Conferences*, 129. <https://doi.org/10.1051/matecconf/201712904007>
- Mikhnenko, P. A. (2020). Cifrovoj menedzhment: modeli razvitiya koncepcii [Digital management: models of concept development]. *Innovations in Management*, 3(25), 30-39. http://innmanagement.ru/?page_id=2707#open1
- Moore, J. F. (1993). Predators and Prey: A New Ecology of Competition. *Harvard Business Review*, 71(3), 75-83. <https://inlnk.ru/84658v>
- Popov, E. V. (2021). *Mezhfirmennye vzaimodejstviya* [Intercompany interactions]. Yurayt Publishing House. <https://inlnk.ru/Pm5p3N>
- Potapova, E. G., Poteeva, P. M., & Shklyaruk, M. S. (2021). *Strategiya cifrovoj transformacii: napisat', chtoby vypolnit'* [Digital Transformation Strategy: Write to Execute]. RANEPA. <https://inlnk.ru/ZZgn4X>
- Puzanova, I. A. (2020). Voprosy vnedreniya tekhnologij integrirovannogo planirovaniya i upravleniya cepyami postavok v Rossii [Implementation of technologies for integrated planning and supply chain management in Russia]. *Modern economy: problems and solutions*, 12, 101-111. <https://doi.org/10.17308/meps.2020.12/2496>
- Sergeev, V. I. (2015). *Upravlenie cepochkami postavok* [Supply chain management]. Yurayt Publishing House. <https://inlnk.ru/1PnYm9>
- Simagina, S. G. (2008). Network and interworking management at unstable interaction between organizations: theory, methodology, practice. *Bulletin of the Moscow University of the Ministry of Internal Affairs of Russia*, 4, 35-38. <https://inlnk.ru/0QXj4k>
- Vail, P., & Warner, S. (2019). Cifrovaya transformaciya biznesa: izmenenie biznes-modeli dlya organizacii novogo pokoleniya [Digital Business Transformation: Changing the Business Model for the Next Generation Organization]. Alpina Publisher. <https://znanium.com/catalog/product/1077903>
- Voronova, D. Y., & Berezhnaya, L. Yu. (2019). *Upravlenie cepyami postavok* [Supply chain management]. Orenburg: OSU. <https://inlnk.ru/dnYZX2>