

# Network Forms of Organization as Management Innovation

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**Abstract**—In the article, the authors analyzed the problems of networkization (theoretical category, and development factors), sectoral situations in the formation of partnerships and networks in the field of higher education, extrapolation of positive effects and promising development scenarios was carried out. The networking of the education system has principles of voluntary cooperation and social significance. The article examines the positive network effects of the parties' interaction with the aim of developing and strengthening the position of competitiveness at the international level. The levels are described (preparatory - the exchange of resources; initial - joint actions to develop individual elements of educational programs and scientific research; in-depth - the network implementation of individual modules of educational programs; advanced - network learning) and models (horizontal interactions, partner network, resource centers) of network interaction in education based on horizontal interactions and voluntary partnerships. The effective externalities of networkization in the field of education are generalized (network partnership leads to an increase in the scale of production; expansion of the network motivates potential consumers and thereby increases its usefulness; creates the potential for increasing the share of value added with an increase in production volumes and reducing unit costs. The necessity of forming an institutional field (regulatory and legal factors, regulations and standards, etc.) is shown, which is studied fragmentarily and does not reflect the conditions of network interaction.

**Keywords**—*network business, co-production, consumer value, educational organizations, partner network, externalities.*

## I. INTRODUCTION

The modern practice of the functioning of world markets and the activities of market entities, complicated by the conditions of significant restrictions of the COVID-19 pandemic, has required fundamental changes and restructuring of many internal and external business processes of companies. The informatization of production processes and the provision of products and services has made the boundaries of businesses more permeable and in some cases conditional. The production of consumer values for clients emerged in various fields of activity, industries, submarkets. This fact gave rise to the network effects of partnerships (both

positive and negative), and also required the development of a new management methodology in networked forms of business.

The purpose of this article is to reveal the main theoretical and empirical prerequisites for the netting of relations between the subjects of the market system and to consider the main directions of the development of these relations in the field of education using the example of Russian universities.

The main objectives of this study are:

- the formulation of the problem of netting as a theoretical category and the determination of the factors of its development;
- analysis of the industry situation on the formation of partnerships and networks among Russian universities in the crisis conditions of the COVID-19 pandemic;
- extrapolation of positive effects and description of promising scenarios for strengthening network forms of organizing activities in the industry.

## II. METHODOLOGY

The methodology and research methods are based on a monographic analysis of scientific literature, the study of the points of view of the journalistic and expert communities on the issues under consideration and the study of materials from specific cases, containing the information about educational organizations' experience. The methods of detailing and generalization, expert assessments and surveys were used.

The theoretical concept of the authors' position is based on the views of outstanding Russian scientists V.I. Vernadsky [1] and N.N. Moiseeva [2]. They talk about the similarities of the processes of development of material and biological objects. This means the fundamental possibility of the emergence in the economic world, among economic subjects of interconnection and interaction based on natural attraction to each other. It can be explained by the fact that the result of such relations is a decrease in transaction costs, which means an increase in the profitability of business results [3]. In the economic space of the partnership of companies with their production and marketing technologies, modern

communication tools, it is the level and quality of information interactions that determine the freedom of exchange, the availability of consumer value flows, the benefits and losses of the business. In this way, netting is a path to noospheric space, which is an environment of existence in a broad sense, an environment, a holistic form of being [2].

The phenomenon of interfirm network relations, which has become so widespread in recent years, attracts numerous researchers trying to explain the reasons for its emergence and growth. A generalizing picture of the development of theoretical views on interfirm networks as a new phenomenon of business organization should be analyzed from the point of view of Russian authors in recent years. So, O.A. Tretyak [4] paid attention, first of all, to the effects of building network relationships in the marketing processes of companies. V.S. Katkalo wrote that the network can be represented in the form of a «net», having different density in different places. Where the density of the «net» is higher, economic integrations of various types are formed – «hard» (holdings, concerns, conglomerates), «soft» (associations, unions, alliances) [5].

Another very interesting interpretation of the network was the date by the Russian author of books on management A.N. Prokhorov: the net is like a bunch of grapes, in his figurative expression [6]. Each individual berry retains its internal structure, and only the stalk, through its elite (top management – author), is attached to the network management system. A bunch of grapes is a visual model of a network control system. Power in it is built on the principle of a bunch of grapes – from top to bottom and in clusters (whole closed groups). Although there are certain informational and other connections between them, the integrity of each individual group is clearly expressed. That is, being embedded in a network allows an organization to use socialized resources and innovations (knowledge flow), maintaining legal independence and socio-cultural uniqueness.

At the same time, one of the most difficult issues in substantiating the nature of network relations is the question of the boundaries and barriers of netting. After all, the network forms of organization of economic systems are based on modern communications and information technologies. Because of this they acquire the ability to generate, incorporate and disseminate knowledge, use them to increase the consumer value of their products and attractiveness to the market. The high information level that accompanies relations and integrates business processes allows combining information flows of individual economic entities. However, only trust relationships reinforces this with social interactions and create a single powerful information «field». Explaining the phenomenon of trust and its role as the basis of networking is one of the unsolved parts of the general problem.

### III. RESULTS AND DISCUSSION

Eventually, the network is based on the coordination of the activities of individual cluster structures (integrated enterprises, franchising firms, individual companies) by a developed set of formal and informal tools (standards, communication channels, information systems, etc.), which allows regulating the processes of creating and providing consumer values for customers, optimizing the ratio of price and quality of goods.

Networked forms of organization of activities demonstrate their economic advantages over traditional ones due to the localization of transactions. In traditional market structures,

the formation of the economic landscape takes place by building relationships based on the optimal location of production points, taking into account minimizing costs and maximizing profits, a short-term planning period prevails. In the network realities, the institutional (in terms of culture, standards, leadership, and other institutions) closeness of the participants becomes an essential condition, which makes it possible to count on maximizing profits in the long term. Socio-economic relations of their market become long-term, trusting and uninterrupted. Spatial characteristics (architectonics, configuration, concentration) become secondary. The obvious markers of their manifestation is the emergence of marketing relationship, where the «philosophy of sales» is replaced by the «philosophy of long-term contractual relations». In addition tactical management tools appear that allow you to build joint platforms for managing costs, quality standards, and personnel motivation on the basis of trusting relationships, relationship with customers and so on.

Such relationships allow us to speak about the emergence of co-production effects - mutual penetration of network participants into each other's business processes, which creates new utility for companies, industries, various groups of stakeholders and generates both positive and negative externalities. In turn, the synergy of companies' activities allows increasing consumer value for customers, giving it new properties. The more space covers the area of influence of the network, the greater the consumer value and the stronger the impact. Innovation or value created in this space is transforming the economic sphere.

As an example, let us consider the practice of introducing online technologies and forms of education based on them. Nowadays they have become a large part of the educational and scientific processes at universities throughout the world. The development of mass online education, the emergence of massive open online courses, an abundance of information in open sources lead to the loss of monopoly by universities on the results of intellectual activity. The target audience of such products can be millions of people, anywhere in the world. The resulting network effect of knowledge flow, on the one hand, makes products available to millions of people in a very wide market. On the other hand, it contains the potential to satisfy the need for personalized learning, because it makes it possible to adapt education taking into account the interests of a particular student. Furthermore, online technologies in force majeure conditions associated with force majeure circumstances (it was most clearly manifested during the COVID-19 coronavirus pandemic) is becoming the only possible form of building all business processes in the sphere of education.

Netting is a promising development path for the entire Russian economy and, in particular, for educational organizations that are subjects of the market for public goods. Due to this, their activity as independent business entities requires great flexibility and ability to cooperate within the industry environment with various stakeholders, on which the quality and standard of living of people depends. Therefore, the aims of educational organizations are primarily tasks to create public goods in such a volume and quality that ensure their availability to all segments of consumers and acceptability from the standpoint of the requirements of many customers (government, employers, households, individuals). To ensure such a balance of interests, it is necessary to build

business processes for creating benefits based on horizontal interactions and voluntary cooperation. Organizational structures created according to the unitary and holding type (U-form and X-form) are less effective in the market of public goods, since they are based on closeness and hinder the diffusion of innovations [7].

TABLE I. LEVELS AND MODELS OF NETWORKING IN EDUCATION

Level	Model	Form	Feasibility	Conditions
Preparatory – resource exchange	Horizontal interactions	Free of charge / reimbursable Online / offline	Mutual aid when resources are scarce	Formal agreements
Initial – joint actions to develop individual elements of educational programs and scientific research	Horizontal interactions	Academic mobility of teachers and students	Establishment of competence centers in universities for selected areas	Formal agreements
In-depth – network implementation of individual modules of educational programs	Partner network	Academic mobility of students and teachers	Creation of individual trajectories	Coordinated curricula in terms of individual training modules
Advanced – network learning	Resource centers and partner networks	Academic mobility of students. Virtual mobility	Formation of unique competencies within individual trajectories	Fully coherent curricula

Source: [8]

From the standpoint of network theory, the market for public goods is a collection of independent educational, scientific and industrial organizations that, through close interaction, create long-term ties with consumers of public goods, suppliers, partners. Formally, educational networks are nodes (links) and links between them, which determine some of the rules for their work in the industry under consideration. Economically, it looks like this: nodes in the network are universities and other organizations, and connections are interaction between them (informational, personnel, financial, resource, social). Links can disintegrate, new ones can be created, due to the dynamics of the market – in segments where the demand is higher and the profitability of the resources used is higher, cooperative ties grow. Where there is no effect, the network becomes less frequent. These ties are characterized by the presence of mutual trust, allow to reduce transaction costs and create the basis for joint efficient use of resources. A kind of crowdsourcing models are emerging in the network. These models are based on the attraction of external resources (funds, people, ideas, etc.) for the implementation of business processes – the introduction of innovations, product development, their creation, marketing and distribution [9]. These opportunities are especially relevant in the context of the global digitalization of the economy, all spheres of public life.

At the same time, being part of one network, educational organizations continue to compete for more advantageous

positions in the served segment and for access to resources and information.

Positive externalities of netting in education are generated by the following reasons:

- network partnership of universities and other educational organizations leads to an increase in the scale of production (an increase in the volume and types of educational products);
- expansion of the network motivates potential consumers to connect to it and to thereby increases its usefulness (increased motivation to use educational products throughout life);
- leads to the dominance of information products as results of activities (corresponds to the characteristics of the digital economy, information society);
- creates the potential for increasing the share of added value with a growth of production volumes and reducing unit costs (contributes to a rise in the availability of public goods for all members of society).

In our opinion, the effect of consumer motivation and their involvement in lifelong learning through participation in network programs is the mostly measurable quantity. There are several reasons for this: the possibility of diversity in choosing a teacher; gaining access to the content, which people are interested in; domination of information products in teaching and so on. Let us consider a case on the influence of the online-learning on the results and progress of students. Here you can see the data on the development of a set of disciplines in a network format by students of two universities – NRU «BelSU» and NRU «Higher School of Economics».

TABLE II. DATA ON THE PROGRESS OF STUDENT GROUPS OF TWO UNIVERSITIES (AVERAGE SCORE)

Groups	The traditional form of learning		The network form of learning
	1st term	2nd term	
Group A	4,1	3,7	2,9
Group B	4,25	3,8	4,92
Group C	4,24	3,9	4,6
Group D	3,8	4,1	4,3

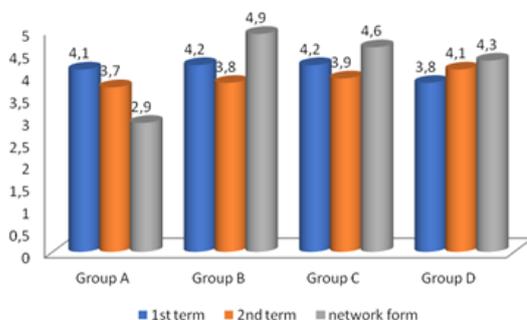


Fig. 1. Comparative analysis of student performance in the traditional and network format

With the soft integration of educational organizations in a network form, formal ties can arise based on information, resource dependence, property ties. However, informal social and institutional ties play a much greater role in this. Informal

ties play a special role in the functioning of the educational network, because they act as a component of the social environment and of the result of non-market interaction of subjects in the market of public goods.

Currently, in Russia, the practice of formation and development of educational networks is obvious: for example, the already familiar network forms of implementing educational programs of higher education, as well as relatively new initiatives to create educational complexes as a form of social partnership, including organizations at all levels of the educational system - from preschool to high school.

#### IV. CONCLUSIONS.

Thus, the study of the processes and results of netting in the sphere of education is a complex theoretical and applied problem. On the one hand, networks have a number of common prerequisites and principles of origin, among which the economic advantages of voluntary, trust-based cooperation dominate. On the other hand, educational network forms contain in their nature the features of social benefits, the production and provision of which is determined not so much by economic effects as by social significance. Netting in the sphere of education allows to reduce the costs of production of goods and increases their availability for different segments of the population and segments of the education market. This, in turn, increases the attractiveness and value of the educational benefit in the eyes of consumers, strengthening the trends of lifelong education, improving professional competencies on a continuous basis. Understanding the problems and opportunities of networks will make it possible to form a list of possible priority areas for the development of the Russian education sector, «growth points», the support of which will be implemented through joint efforts of government and business institutions. The implementation of the network effects of the interaction of the parties interested in the development of this socially significant industry will allow to overcome the negative and consolidate the positive tendencies of social development and to maintain competitiveness in the world market.

In this way, network forms of organizing educational activities in Russia are becoming more and more common, because they allow solving multiple problems of various educational organizations associated with a lack of personnel, research and other resources to focus on providing

opportunities for individual educational trajectories. Individual trajectories are the path to training personnel who have unique competencies, which is the most relevant trend in the digital economy of the 21st century. Network interactions make it possible to train not only a competent specialist, but also to align levels of partner universities through their interaction with stronger network partners. The objective prerequisites of networks are theoretically confirmed, the effects of networks are obvious and achievable, however, in the applied aspect, the modern practice of the functioning of the public sector in Russia, including the education sector, requires an appropriate institutional field (regulatory legal factors, regulations and standards and so on), which is still fragmentary and does not reflect the conditions of network interaction.

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