

NETWORK STRUCTURE OF FINANCIAL MARKETS IN CONDITIONS OF POST-INDUSTRIAL SOCIETY FORMATION

The article examines changes in the structure of financial markets during the late 20-th and 21-th centuries, in particular the transition from traditional centralized hierarchical structure to decentralized network structure under the influence of information technologies. In the article, the role of different factors in formation of network structure of the financial markets is explained

Such a model of classic capitalism occasionally referred to as “Keynesian model” used to dominate in the Western economics in the mid of 20-th century. This model in its orientation had conduced to centralized regulation of interest rates and taxes, and, being mostly mechanistic by its nature, had generally been disposed towards linear hierarchical structures of organization.

In conditions of mass production, the organizations and enterprises were made up under the linear principle which claims for subordination of lower levels to higher ones. In compliance with linear structures, a related system of directive management had been created, usually called as Taylorism, or Fordism as well.

In the 1970s, the Keynesian model, which was very efficient in the mid of 20-th century, had been felt to drain away. This was affected by many factors, by mostly such of them as intensification of economic globalization processes and invigoration of trends, the latter being generally qualified as post-industrial.

As a result of an overall restructuring achieved in the 1980s, an economy of new type had emerged, under the name of global capitalism.¹ The “new economy”, while favoring capitalism by its nature, nonetheless goes basically in contrast with Keynesian model of capitalism. Being structured by global network of financial flows, and embedded with information technologies and telecommunication networks, the new economy works as a whole on a worldwide scale and in real-time mode.

Although single enterprises and organizations still reside locally, the trade relations, primarily between and within financial markets, have become both international and global.

¹ The main trends of new type economy had spawned in the USA, mainly concerning the activities of information technology and financial market enterprises. This is connected to concentration of capital and information technology enterprises in Silicon Valley (California).

In the economy of global capitalism, the more and more authority is gained by so-called *network enterprises*² which enjoy a high flexibility that is required to adapt to alterations in market conditions and which are able to employ vital innovations.³

An expansion of enterprises with network organizational principle is induced by the crises within large corporations as well as by transition from mass production to a flexible reduced-in-mass production, the latter being subject to other principles of management initially observed in Japanese companies and thus named “Toyotism”.

With regard to modern enterprises, the type itself of their organization has been changing gradually over time, since no longer a linear hierarchical principle, but now horizontal network principle is overmastering their organization. Furthermore, the network pattern has become an essential characteristic related to global capitalist economy, being the main condition for successful application of technological innovations, as well as for flexibility and ability to adapt to varying market circumstances.

Generally, the organizational structure (as an aggregation of relations between its elements) may fit into one of three types. The first is *degenerate structure* in which the relations between its members are merely absent. The second is *linear structure* where some member of the structure is subordinated to only one member of a higher hierarchical level (immediate superior). The third is *matrix structure* that implies both subordination of one member to at least two members belonging to different hierarchical levels (double subordination and distributed control) and also relations between members of the same level.

These three structural types reflect static properties of organization, while, in timeline description of dynamic structure, the network structure is more appropriate, where relations (or ties – in sociology, or links - in technical language) between all its actors are potentially possible. Some of these relations are actualized to accomplish a specified task, while other relations take place with carrying out new tasks. Therefore, both linear hierarchical relations (direct subordination) and matrix relations (double subordination and distributed control)⁴ can unfold in network structures as transient arrangements.

² They are called network enterprises not by reason that the companies carrying out their business via the Internet are taken into account but because of their network structure of organization.

³ The most typical example of a company set up under network principle is Cisco Systems headquartered in California, which level of market capitalization had achieved unprecedented level of 555 billion US dollars as to March 2002 (the month of the company’s highest prosperity). Largely shared opinion regards the success of Cisco Systems as related to an opportune incorporation of the network organization principle. Besides Cisco System, among large companies, that had infused network organizational principle, are corporations such as Nokia, Hewlett-Packard, IBM, Sun Microsystems, Oracle, and many other names. (Castells M. The Internet galaxy: reflections on the Internet, business, and society. – Oxford: Oxford University Press, 2001. – P. 68–69).

⁴ Novikov D.A. Network structures and organizational systems. – Moscow: Institute of Control Sciences RAS, 2003. p.4.

As Ukrainian researcher G.V. Nazarova observes in her monograph dedicated to organizational structures of corporate management, the main trend in the present day development of large companies is decentralization of management and control. This process is consistently connected with gradual transition from linear functional to matrix structures of management and control, and from the latter – to network organizations which become more and more widespread as the most reliable way for enterprises to survive in conditions of competition. Exactly network organizations combine in themselves the competition and cooperation due to informal work coordination, exchange of ideas between firms-partners, creation of shared organizational systems and processes. System of values for network organization is based on mutual trust and cooperation, partnering relationships, and partial waiver of personal benefits for the sake of development of the whole network.

Unlike linear hierarchical structure, the network structure is a cluster-like aggregation of interrelated nodes which can be either equivalent (decentralized network structures, for example, in a workgroup of financial analysts with equal rights), or nonequivalent (centralized network structures, as, for example, a vast branch network of a large bank internationally working).

Network organization of companies (and of economic relations between them) could be named organic in contrast with the mechanistic linear model, since network structures, being fractal by their nature, are widely found in natural world.⁵

Beginning with the studies of network structures in the living matter (in particular, saying about neural networks in context of cybernetics)⁶, the research in this field then had spread out to social and economic phenomena.⁷ The idea about a growing importance of network structures in economy had become well-known after the works of Manuel Castells, the author of network society concept.

Essentially, the matter in question refers to post-industrial society, however it should be remarked that Castells' concept by its breadth goes beyond the framework laid out by the theory of post-industrial society which had been presented in the 1970s, and which had left a prognosis about emergence of a society and an economy distinct from classic industrial capitalism but which, however, did not examine the essential nature of a new type of society and economy in such a profound way as Castells did when these phenomena came into reality in the mid of the 1990s.

⁵ H. Inaoka et al compare the structure of economic relations and financial flows between banks with fractal structure of river basins with a large number of delta branches. (H. Inaoka et al., An analysis of network structures formed by financial institutions. 2004, p. 23).

⁶ These studies had been continued in the quantum neural networks theory which is not far away from holistic ideas of the late 20-th century. For details see Perus M. et al. A Natural Quantum Neural-Like Network // NeuroQuantology. – 2005. – V. 3. – P. 151–163. (www.neuroquantology.com/2005/03/151.163.pdf).

⁷ A review of early works on networks is given in: Economides N., 1993, Network Economics with Application to Finance. pp. 94–97.

Castells defines five principles of network structure, as follows:

- scalability (a network easily expands or contracts itself, depending on situation or chosen business strategy);
- interactivity (on-line communication in real time with suppliers and consumers of products);
- flexibility of management (preservation of control over a business project independently from network's size);
- branding (management concerning symbolic value of a company's brand);
- orientation towards consumer.⁸

If one will analyze the appearance of network structures in economic activities of present-day companies, he or she will find that these structures have rather appeared spontaneously in the process of market adaptation than they have been created deliberately. As an example of network structure, based on high technologies and spontaneously arisen and developed (what doesn't prevent it from large use in business domain), we can point to the Internet.

The main distinction of network structures against linear hierarchical structures is due to the fact (as emphasized by F. Capra, one of the theorists who applied system approach to social and economical phenomena⁹) that network structures are *emergent*, *self-emergent*, more precisely – *spontaneously emergent*, in contrast with intentionally constructed mechanistic structures.

The trend of network structuring swelled in the bosom of financial markets became evident in the 1990s.¹⁰ This was related to several, i.e. social, economic, political and technological, factors.

Firstly, the rising standard of living of citizens in economically developed countries had trained to an advent of a multitude of individual investors entering the financial markets and who strove to invest their savings through insurance companies, pension and mutual funds. This phenomenon usually is called *democratization* of financial markets, and it had been accompanied by *liberalization*, i.e. relaxation of many legal restrictions.

Secondly, the great importance for changes of financial markets' structure is tied to the processes of *globalization*, especially amplified in the 1990s due to changes in international political situation that led to an inception of global network of financial flows.

Thirdly, it was the development of information technologies that had resulted in expansion of the Internet and had created technological facility for the global network of financial flows to operate as well as to set up interactive cohesions between market makers and market participants.

⁸ Castells M. The Internet galaxy: reflections on the Internet, business, and society. – Oxford: Oxford University Press, 2001. – P. 76–77.

⁹ Capra F. The Hidden Connections, 2004. – Ch. 5.

¹⁰ H. Inaoka (2004), R. Burt (2000).

It is likely to consider as crucial the latter factor by which the trend of network structuring in the financial markets had begun to prevail. Specifically, H. Inaoka et al (2004) demonstrate this by means of detailed statistical analysis using the database of the Bank of Japan.¹¹

The network structuring of an economy as a whole and of financial markets in particular, had reduced costs due to substantial removal of, or bypassing, intermediaries in supply and/or retail chain. Instead of going through linear hierarchical distribution channels passing intermediate hierarchical structures, enterprises may now service every customer directly, for example via the Internet. As a result, network logic gets closer suppliers and customers, individualizes services and reduces costs what drives prices down and increases supply. In the long run, creative network background has direct and indirect impact on social and economical processes stimulating not only tangible but also intangible developments and feedbacks, known partially as network effects but not limited with them. Network structuring in the financial markets may be primarily related to the cardinal simplification of access for a multitude of final consumers, in this case - of individual investors, to new financial services.

The influence of network background can be seen in the processes of disintermediation (withdrawal of funds from intermediary financial institutions, such as banks, in order to invest them directly in instruments yielding a higher return) and securitization (process of creating financial instruments by combining other financial assets and then marketing them to investors).

In the case of securitization, network impetus motivates intermediaries to go on with more and more sophisticated forms of asset management. The diversification of financial services market had led to growth of new financial market intermediaries, who move closer to individual investors. New challenges, such as innovative schemes of investment offered for investors, provision of a variety of management styles to deal with investment process, and alternatives in reinvestment of funds chosen by financial intermediaries, – all them had augmented the role of institutional investors.

The application of information technologies in banking business had coincided in time with growing role of network structures.¹² The network framework had also benefited from the shift of capital towards virtual form, less depending on production of goods and services, what had made easier introduction into financial transactions for increasing number of potential individual investors who were distant from financial markets in the industrial age when capital was primarily embodied in the means of production but now they are able to invest being disengaged with a given industry.

¹¹ H. Inaoka et al (2004).

¹² In particular, due to transactions conducted via the Internet, considerable increase in speed of capital relocation to investment targets, and augmentation of transaction profitability in the financial market, had been achieved.

In the late of 20-th century, the diversity of capital market instruments, accompanied with general liberalization of the market, had been rising at eminent rates, introducing both tangibly backed instruments as well as synthetics. In particular, the volume of transactions with financial derivatives had been increasing drastically in the last two decades.

The role of institutional investors, such as investment funds, insurance companies, and pension funds, characterized by network model of behavior, had arisen in importance. The growth in popularity of non-governmental pension funds is related to availability of direct citizen's participation in coordination of his or her retirement savings through a personal pension scheme (type of account, the style of its management, differentiation of contributions, the option to invest retirement savings, and control of investment process).

On the whole, in the last two decades the system of financial markets gradually evolved from traditional prevalence of banks (which was typical in the industrial age) to new trend phenomena, emphasizing "vibrant capital markets as a source of funding and risk mitigation".¹³

The trend of transition to network structures overriding hierarchical ones is seen clearly enough in the case of financial sector of post-Soviet countries, and, in particular, in the case of Ukraine, where this transition had been achieved not by slow change as in the West but throughout a short period of time during past 15 years after dissolution of the USSR.

Although the restructuring (exactly to say – an emergence of new organizational forms and their gradual evolution) of financial systems is common tendency in the late 20-th and 21-th centuries, and while the introduction of network structures could be seen as alternative variant of economic activities, this process had its distinctive aspects in the post-Soviet space.

On the one hand, the transition from linear hierarchical to network structures had created new opportunities for development of the Ukrainian market. On the other hand, many control functions of economic system had been weakened, and the transition to network structures had been perceived as a contraction of control, although in reality control functions during network structuring had simply shifted towards democratic and liberal values.

Together with democratization and liberalization of post-Soviet financial markets, the development of information technologies had also favored in making them available for transactions which earlier could be performed only by qualified professional organizations.

¹³ Casey J.P., Lannoo K. Europe's hidden capital markets
(www.icma-group.org/content/surveys/previous.Par.0011.ParDownloadFile.tmp/ehcm.pdf)

As far as the global trend to introduce network structures had coincided in time with the fast process of formation of liberal democratic values in the post-Soviet countries, this often had led to an inappropriate emplacement of control functions that resulted in loss of adaptivity of many enterprises.

It was not instantly seen that the advantage of network structures is in its ease to form temporal relations to accomplish separate tasks. Network structure was thought as merely an aggregation of branches or subsidiaries, a kind of multilevel marketing system, but not as a principally new type of enterprise's organization.

In the case of the Ukrainian financial market, the network organizational principle has been manifested by a rise in importance of small organizations as well as of subsidiaries of large companies (small by number of employees or collaborators) what is required for fast and flexible adaptation to varying market conditions, as well as to get closer suppliers of services to their consumers.

The possibility of establishment of such companies and local subsidiaries of financial institutions had become possible only due to application of information technologies, telecommunication and local computer networks that had granted fast information traffic and the ability to coordinate the work of such local units and sub-units.

Small local and regional subdivisions of financial institutions (banks, insurance companies, investment funds) are distributed uniformly enough on the territory. This enables to achieve two objectives. Firstly, the suppliers of financial services are closer to consumers of these services thus increasing number of clients. Secondly, the services acquire partially personalized character¹⁴ and this subjective factor favors to good reliance between services supplier and clients.

The tendency in personalization of services, and in particular of financial services, may be considered as one distinctive characteristic of network organizational structure. Another approach (it may be named depersonalized, in other words – impersonal), related to mass production and consumption peculiar to industrial age, is no more attractive for the Ukrainian clients.

By virtue of network organizational driver involving Ukrainian suppliers of financial services, the potential Ukrainian individual investors are directly interacting with big number of financial intermediaries, having the possibility to choose those of them who are more appropriate by assortment of offered financial services or other benefits and by regional proximity of intermediary to potential individual investor as well.

Thus, the application of information technologies along with democratization and liberalization of financial services market, accompanied by processes of disintermediation and securitization, expansion of innovative financial instruments and their derivatives, grown importance of financial markets, closer relationships between

¹⁴ Clients are acquainted in person with employees of financial services supplier's local branch since such employees can be two or three. Employees also know in person the most important clients.

individual and institutional investors, etc., etc. - all of them, in the long run, are manifestations of gradual replacement of linear hierarchical structures in economic relations by network structures, what is reflected in the shift where financial investment in securities had become the most attractive kind of investment today.

Network structures, being organic by their nature in contrast with mechanistic linear structures, offer favorable advantages in achievement of greater freedom and spontaneity in organization of an activity and in taking decisions. This leads in increasing of flexibility and adaptivity of an enterprise to varying market conditions.

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