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THE PARADIGM OF THE NETWORK AND THE CONCEPT OF VIRTUAL ORGANIZATIONS

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ABSTRACT

The variability of the business environment creates the need for a continuous search for development opportunities for companies to increase their chances of survival in the face of growing uncertainty, increasing competition, more complex requirements, and growing customers' expectations. A dominant trend in the area of management is becoming the paradigm of the network and the concept of virtual organizations. These are often quite abstract, incomprehensible or even mysterious bodies. Moreover, in the literature, there is no single, uniform approach to the implementation of its principles, but one can find different models and interpretations of this type of organization. The aim of this work is to identify the context of these changes, and based on selected models of virtual organizations, indicate key parameters of this concept.

KEYWORDS: virtual organizations; network; dynamic configurations; information systems.

I. INTRODUCTION

Contemporary progressiveness, the ever-changing conditions under which businesses run, associated with increasing competition, globalization, as well as changing customer expectations, requires the search for new forms and methods of managing organizations. This is particularly true of commercial organizations, for which the achievement of business objectives is the basis of operations. For this reason, organizations are simplifying their management systems, moving away from functional management to process management. It should be noted that the virtual organization is in line with the idea of the organization of the future being able to react to the preferences of consumers for specific products quicker, and with more flexibility. This translates into the fact that a growing number of organizations are placed into the broadly defined area of e-commerce.

A manifestation of e-commerce is the process of virtualizing enterprises, resulting in the transfer of all or part of a business into virtual space, and maintaining relations with business partners through ICT solutions. Virtual organizations offer dynamic forms of cooperation, are often geographically dispersed, and share their resources to complete a specific job. They are integrated into a unified whole through various types of information systems.

Proper use of ICT contributes to the efficiency and competitiveness of various types of business organizations on a global, dynamic and demanding market. Computerization of business processes occurring in the digital economy affects the virtualization and transformation of the enterprise, enabling the creation of new multi-actor business ventures such as virtual organizations.

II. RESEARCH METHODOLOGY

There is still insufficient knowledge about virtual organizations. An important issue is the lack of information in scientific circles on how to manage a virtual organization in order to bring measurable economic results and succeed in being friendly and helpful to customers. The author of this publication has set a target to fill, at least partially, this gap.

The aim of the work to present the main aspects of virtual organizations. The work is thus an attempt to show the conditions and market requirements that have caused the creation and popularity of virtual organizations. The work also presents a model of a virtual organization. Models, despite their many differences, their allusions in many areas, and their high abstractness, do designate a certain manner and direction of thinking about the organization and management of companies.

The theoretical output referenced to in this work includes Polish and foreign, mostly English-language literature, concerning business management mechanisms in the area of modern information technologies. The use of foreign

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literature was necessary because of the dearth of Polish studies. This enriched the arguments and discussion of new aspects, and allowed the showing of the research problem in a broader perspective.

III. THE MAIN ASPECTS OF THE FUNCTIONING OF VIRTUAL ORGANIZATIONS

Virtual organizations, as business entities, do not formally exist. This means they are not subject to registering at registers, they do not have one common location, administration, or building, although they do act as actual economic organizations (Grudzewski, Hejduk 2002, p. 40). No clear or formal management center exists in virtual organizations, and the relationship between partners is characterized by high autonomy.

A virtual organization is created and functions mainly to fulfill a particular economic (business) aim. The formation of a virtual organization allows for the integration of many valuable resources (i.e. human, information, material and financial assets) and allows partners to jointly fulfill an order from the market, something they could not accomplish on their own.

Within the structure of a virtual organization, the two roles that can be distinguished are those of the integrator (who is responsible for initiating and controlling the activities of the virtual organization) and cooperating entities (the set of partners with valuable and complementary resources). The task of the integrator is the selection and consolidation of specialized entities in order to cooperate on efficiently achieving the target of the virtual organization, which is the fulfillment of a client's order. Changing customer preferences and needs for a particular product or service can affect the structure of the virtual organization and the evolution of its processes. Once a client's order is filled, the result is usually the termination of the virtual organization, and each of the constituent entities returns to his earlier activity (Lavie, Haunschild & Khanna, 2012, pp. 1453-1469).

Virtual organizations are therefore not static and institutionalized structures, which are characteristic of the traditional form of organizations. They are dynamic configurations, dependent on current needs and objectives. The virtual form of organizing business, based primarily on communication and information network connections (Jurga 2010, p. 22), is characterized by high flexibility resulting directly from the characteristics of virtual organizations. Among these are (Jurga 2010, p. 23-24):

- Its geographical reach. Information technology enables cooperation among various economic entities, regardless of their physical location. Therefore, virtual organizations may consist of geographically dispersed partners,
- The key competencies of the participants. In a virtual organization, selection of partners is done with regard to their abilities, which guarantees realization of the intended project,
- The reconfigurable network of partners. Configuration of virtual organization partners is smooth and elastic. Identification of a market opportunity is an incentive to quickly connect to partners and adapt the structure of the organization to the requirements of a given project,
- The temporary nature of the organization. The life cycle of a virtual organization is designated by the execution of a particular project undertaken in order to exploit market opportunities,
- The union of independent entities. Virtual organizations are formed by organizational units, among which there is no legal and organizational dependence.
- Trust. Cooperating units often resign from signing detailed contracts for greater flexibility,
- Focus on the client. Selection of partners and how they link in a virtual organization is subordinate to meeting customer needs when achieving business goals.

The formation, operation and termination of virtual organizations should be treated a process arranged in a set life cycle. Phases of the life cycle of virtual organizations include identification, creation, operation, decomposition and hibernation. The impetus for creating a virtual organization is identified market opportunity. In the identification phase, the sub-processes occurring include the tracking of the current situation in different segments of the environment, the scope of activities of competitors and the search for market niches (Gupta & Lehmann, 2005, pp. 34-43).

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The next phase is to form a virtual organization, in which different sub-processes are implemented, and there is a general search to identify partners with appropriate competencies. Upon completion of the processes related to the design and formation of the virtual organization, it enters the operational phase. This consists of a number of processes related to the management of operating activities

After the completion of the project, the virtual organization goes into its decay phase. The process of decomposition of the virtual organization is implemented. This results in the winding down of activities and entering a state of hibernation, in anticipation of a new market opportunity, or reconfiguration of the organization for a new task.

IV. VIRTUAL ORGANIZATION - MODEL APPROACH

In his model, C. Scholz (Scholz, 2000, pp. 5-15) distinguishes between three dimensions of virtual organizations: differentiation as a strategic dimension, soft integration as an organizational dimension, and virtual implementation as a technological dimension.

Differentiation is based on the importance of key competencies in setting up this type of organization, and bringing together partners that have the skills to providing unique benefits. Key competencies are related to the overall systematic concept of modularity, allowing for decomposition and recombination of partnerships, helping to increase the number of possible configurations of the system with a specific set of feeds, increasing its flexibility. Differentiation can be carried out by analyzing the company portfolio and focusing on selected areas that are attractive in the opinion of potential partners of the virtual organization

Soft integration, as an organizational dimension of virtual organizations, refers to the enhancement of cooperation between the elements of the system, and measures the extent to which the principles of the combined system architecture allow for or restrict the integration of individual elements. Integration in the organizational context is understood as interdependence, i.e. the degree of interaction between cooperating partners. This applies to both sides of the feeds, and the exchange of materials and information. It is not a mere joining of parts, but a specific type of integration according to a specific set of rules. Attention is drawn to the need to meet two important conditions: firstly, independent core competencies must combine into one unit, allowing for the optimization of the entire value chain and secondly, the provision of "one face to the customer". By integrating the entire value chain, soft integration is therefore capable of providing customers with products as fast as possible, at the lowest cost and highest value.

The arguments presented by C. Scholz leads to the conclusion that the desired mechanisms of integration are not of a structural character. Rather, they relate to so-called soft factors, such as: a common destiny (shared success or failure), shared vision, shared goals, honesty, trust, and a virtual reality culture, requiring reliance on shared values and willingness to work without contracts for an indefinite period of time. C. Scholz believes that introducing such aspects of integration into the study of management will pose a challenge to the theory of organization.

The proper way to achieve both key differentiation as well as soft integration is through information technology. Information technology also permits the development of a modular system. The key to understanding the virtual forms of organization is the concept of cyberspace, which refers to the medium through which operations can be realized. Therefore, the third element of the model is virtual implementation, which constitutes the technological dimension

N. Venkatraman and J. Henderson (Venkatraman, Henderson, 1998, pp. 33-48) do not treat virtual organizations as a particular structure, but interpret virtuality as a strategic characteristic which relates to all organizations. They see it as a strategy outlined by the prism of three interdependent dimensions:

- interaction with clients (virtual meetings)
- resource configuration (virtual sources of resources)
- leverage of knowledge (virtual competence).

Interaction with clients concerns new challenges and opportunities that arise as a result of modern technology. Technology provides two-way remote communication between the company and customers. Customers can remotely

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experience products and services, participate in their personalization, and create and develop a consumer community on platforms designed to acquire and disseminate information.

The dimension of virtual resources highlights the possibility of integration within business relationships, providing structure and management of dynamic relationships within the network aimed at gathering and coordinating the resources needed to deliver value to customers. Companies can gain possession of critical resources from the market so that they can work effectively by combining complementary skills and focusing on key competencies.

The last dimension concerns the possibility of merging and using knowledge inside and outside the organization, making it the driver of value creation and the determinant of the effectiveness of the organization. Creating conditions for the formation of virtual communities is a mechanism for the collection, validation and recognition of knowledge and experience, and is considered an important resource for the entire organization. Involving experts from multiple locations allows for interpretation of unforeseen events. At the same time, the challenge is to reward and motivate "distributed" experts as sources of knowledge.

Each of the three dimensions is incorporated in the presented model through three stages - the first stage concerns the task forces (customer service, payment, etc.); the second concerns the organizational level (coordination of activities aimed at creating an above-average value); and the third focuses on inter-organizational networks, and the design and impact of a number of interdependent communities to achieve innovation and growth (Czarniewski, 2014, pp. 9-13).

The authors emphasize that none of the dimensions can provide the potential for a virtual organization on its own. Only their interdependence creates a new business model. A central and essential element of this model is information technology. The power of technology and the emergence of the Internet support this new business model, showing that it is not a modified approach rooted in the industrial era, but something completely new. Knowledge plays a key role here, having an advantage over material resources. This strategic approach focuses on a unique way of creating, nurturing and developing key intellectual resources based on knowledge, while material resources are generated through a complex network of relationships. It should also be mentioned that in addition to information technology, another stimulant of the model is trust. Both of these factors affect the extent and intensity of the implementation of activities at any given stage.

J. Gristock (Gristock, 1998) uses the three dimensions of virtualization in his approach. It is assumed that modern information technologies extend the capabilities of the organization, allowing it to overcome the barriers of space and time, and the boundaries of the organization. At the same time, it points to time, space and work as features for the analysis of virtual organizations. Virtualization may mean any combination of dispersion in geography or time, and the belonging to various community organizations. We cannot therefore speak of a proper structure of virtual organizations, but of many potential combinations thereof.

Virtual organizations are multi-faceted. Despite the outlined differences in identifying the dimensions of virtualization, there is consensus for the need of coherent and comprehensive evolution of the whole organization. Virtualization of any area in isolation does not lead to the achievement of satisfactory results. Actions in this area should take into account the necessary interaction between the various dimensions.

V. COMPETING ON THE VIRTUAL REALITY NETWORK

Network effect occurs most frequently in the case of products and services related to the Internet or saturated ICT; it is rarely associated with conventional products (Wang, Chen & Xie, 2010). The products using network effect include various kinds of products for communication (telephone, fax, instant messaging), locations enabling interactions between users (online auctions, forums, social networking sites), and products that use a certain standard (software, storage media, cassettes, photographic plates).

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Products delivered to customers by using the network effect include non-network values (values independent of the network, resulting from the use of the product without interaction with other users) and the network (based on interactions with other users and creating a network effect).

In the case of products and services designed for communication, interaction and resource sharing with other users, the value provided by the company will dominate the network (Czarniewski, 2014, pp. 79-87). Within this category of products and services are instant messaging, social networking, file sharing sites, etc. The products characterized by diversified levels of value include blogs (non-network values are generated by the author, network values in the form of comments by the readers of the blog), text editing programs (non-network value - the ability to edit the text, network value - compatibility resulting from a standard) and cellular phones (network value – the ability to communicate with others, non-network values - alarm clock, calendar, camera, etc.).

In some Internet ventures, non-network values dominate. These include online stores, where the sale of a product is carried out without the participation of other customers; and information services, in which the content is created by the editors of the site, the network value being the comments posted by users (Seo, 2013, pp. 1542-1560).

Determination of the ratio between the network and non-network value is quite subjective due to the nature of customer value. For some Internet users, the comments on blogs and news sites, as well as product reviews posted on the websites of online stores, can have dominating value.

Given the dynamic nature of the relationship between the company and the customer in the event of a network effect, companies do not often talk about their customer portfolio, but of their customer network. In this context, Bob Metcalfe's law is often cited, according to which the value of the network is proportional to the square of the number of users (Briscoe, Odlyzko & Tilly, 2006). This law states that the doubling in the number of users of the network will increase the value of the network by four. Metcalfe's law was formulated to assess the value of a telecommunications network, but is also used in other systems for data exchange, including web pages belonging to the category of social media. Critics of Metcalfe voice that the law grants an equal value to each network user, which is an over-simplification. The value of one network user depends mainly on the stage of development of the network itself.

In the initial stages of the network, the acquisition of users is much more difficult than when the network reaches a critical mass, which is the appropriate size and quality that provides further functioning and spontaneous growth (Ball, 2004). Therefore, users acquired earlier are worth more for the organization than users acquired later on. Similar relationships exist in the case of marketing products which do not use the network effect. Pioneer customers are usually worth more to the company than customer-followers, because in addition to the purchasing of products, these first customers are an important marketing resource, informing their friends about the product.

According to C. Shapiro and H. R. Varian, in markets where there are network effects, pioneer companies can count on the benefits of being first on the market, rewarded by the rapid acquisition of a large number of customers (i.e. customer base), which will make subsequent market entry of competitors much more difficult (Shapiro & Varian, 1998, p. 168). Each organization should therefore strive to reach a critical mass, because it may create a serious entry barrier for potential competitors.

In such a situation, two things occur: the effect of *lock-in*, which serves as an obstruction to customers leaving the company due to the lack of satisfactory alternatives, as well as the effect of *lock-out*, which excludes competitors from the market. This leads to a situation where switching costs increase due to the large number of people using the solution, and consequently, the solution becomes the market standard.

VI. CONCLUSION

1. Virtual organizations seem to be, in many cases, the only economically viable form of business. The multidimensional nature of virtualization indicates that we cannot identify a proper form of virtual

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organization, on the contrary, we should expect many varieties of its exemplification and many possible paths of development.

2. The main problem in the management of virtual organizations is integration and coordination of business processes. Traditional methods and tools used to design business processes do not fully support the needs of a virtual organization. This is due to the fact that the design of a virtual organization requires a more complex design of business processes than in the case of traditional organizations. The subject is important because the virtual form of business is becoming more visible, and there is no documented methods and research in the field of modeling of business processes in virtual organizations.
3. Modern information technologies contribute to overcoming physical barriers such as time and space, and greatly reduce transaction costs. The use of technology allows the company to move a part of their activities into virtual space and make their operations more dynamic. Virtual organizations are often treated as network organizations that intensively use modern technologies, which affects their reaction time in specific areas of business.
4. Virtual organizations are treated as a new type or arrangement of organization and a modern and dynamic management model. Virtual organizations are attributed with the ability to develop (individual, specific, difficult to imitate systems – solutions) organizational transactions, based on outstanding organizational abilities, and are regarded as the most developed form of intelligent organization.

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