

INNOVATIVENESS OF AN ENTERPRISE IN THE CONTEXT OF TECHNOLOGY GLOBALISATION

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Abstract: This paper presents epistemological discussion about the issues of the management of development of enterprise innovativeness. The aim of the studies is to raise awareness of the complexity, interdisciplinarity and enhancement of innovativeness of enterprises. In this respect, the paper refers to the basics of innovation process modelling, identifying an integrating approach and networking approach, including the concept of fractal correlations. Indicating the tendencies in the development of the space of global technologies, the paper highlights the importance of global networks of cross-organisational cooperation, global knowledge platform, free diffusion of knowledge and technology, segments of an intelligent market and pro-consumer behaviour.

Key words: innovativeness, integral model, network model, globalisation, techno-globalism

Introduction

The issues of innovation implementation from the perspective of the phenomenon of globalisation are regarded as one of key factors in the development of technological competitiveness of enterprises, „In the global economic environment, a number of important changes have taken place. First, the technology intensity of products and services has increased significantly, making technology a key factor of competitiveness” (United Nations, 2006). The perspective of innovation activity intensification facilitates a change of how modern business is perceived, making it necessary to redefine the structure and environment for performed management processes. Moreover, there is a strong need to improve management systems by modelling internal structures. Meanwhile, efforts taken to reconfigure the social and technical system of enterprises facilitate creation of such internal potential of an organisation that enables an enterprise to develop and allows it to build and use external networks. Thus, for ensuring the achievement of an enterprise's objectives, dynamics of global environment and development of global cross-organisational networks, it seems necessary to reorganise the internal social and technical system.

Undoubtedly, a modern vision of business processes management is based on a new dimension of the sphere of knowledge and technology dissemination, social, economic and technological phenomena as well as market and consumer behaviour. The scope of necessary changes in organisations is increasingly shifting from the three-dimensional reference plane, i.e. products, technology and organisation, towards a configuration complemented by, among other things,

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networked systems and management culture. In this respect, an organisation becomes an open system, which is functioning in a very complex and diversified global environment. Turbulence of the global environment complicates a clear-cut perception of an enterprise as an entity focused on achieving internal organisational goals by generating and using only its internal technical and organisational potential. In the management practice, strategic, tactical and operational goals are more and more often achieved by using the potential created at the level of global cross-organisational networks. The level and character of the resources of global cross-organisational networks are becoming a key determinant of an increase in innovativeness and competitiveness of an enterprise on the global market. In this respect, literature on the subject stresses that organisational structures built to support innovation are directly related with such strategic objectives as:

- innovation stimulation, protection and initiation through developing and improving competences at the level of internal structures of an enterprise in the form of awareness, abilities and skills,
- innovation strengthening through developing and improving competences at the level of external relation structures (Anthony et. al., 2010; Sroka, 2015).

The aim of the paper is to raise awareness of the complexity, interdisciplinarity and enhancement of innovativeness in enterprise. The epistemological discussion presented in the paper aimed at identifying the basis for innovativeness development from the perspective of the characterisation of models of the process of innovation development and implementation constituted a reference basis for the modern phenomenon of techno-globalism. Taking into account differentiation at the level of subject and object related architectures of the innovation process; an attempt was made to identify key stimulants of enterprise innovativeness in the context of managerial practice.

Innovativeness of an Enterprise – Selected Approaches

Management of implementation of innovations, in particular radical and break-through ones, requires a particular organisational effort from an enterprise. It seems highly important that an organisation is able to generate and multiply its innovation potential, which is necessary during implementing the innovation process (Tabor, 2007; Haryanto et. al., 2015). However, from the perspective of the development of an enterprise's innovativeness, we observe a need to use not only the internal innovation potential, but also, more and more often, knowledge and skills resources from external sources (Tabor, 2006; Segarra-Blasco et. al., 2008). The external global environment, characterised, among other things, by dynamism, networking, openness, cross-organisational cooperation, and free diffusion of knowledge and skills, constitutes a platform for performing the processes of innovation development and implementation, and determines the efficiency and effectiveness of these processes. Thus, on the one hand, the characteristics of the global environment, including, among other things, the state of technics and technology, level of industry competitiveness, character of integration or principles

of cooperation between organisations, and, on the other hand, customer needs and requirements can be perceived as basic stimulants of innovative activity. A retrospective view of the models of innovation processes reflects certain differentiation in the area of a detailed description of these stimulants (Tab. 1).

Table 1. Five generation of innovation process models (*Davenport et. al., 2006*)

| Generation | | Key features |
|------------|----------|---|
| I / II | 1960's + | simple linear models – need pull, technology push |
| III | 1970's + | coupling model, recognizing interaction between different elements and feedback loops between them |
| IV | 1990's + | parallel model, integration within the firm, upstream with key suppliers and downstream with demanding and active customers, emphasis on linkages and alliances |
| V | 2000 + | systems integration and extensive networking, flexible and customized response, continuous experimentation and testing |

A detailed characterisation of the different generations of innovation processes reveals basic differences in a detailed description of the character of the impact of the different factors stimulating innovativeness of enterprises.

Moreover, activity, involvement and joint participation of the entities of the innovation process at the stage of generating an idea and developing, implementing and commercialising solutions shows a heterogeneous character. Thus, the existing differentiation in the area of a detailed description of stimulants of an enterprise innovativeness refers both to the object and subject related architectures of the innovation process.

The endogenous dimension of the innovation process concentrates organisational effort of enterprises on intensification of the internal innovation potential. It may seem that linear models do not fully fit the picture of the modern global net economy. In the linear approach to innovations, the attention of an organisation is focused only on the need to maintain continuity in the implementation of the different phases of the process, with the necessity to identify the social needs and the current state of technics and technology. Meanwhile, acknowledgement of the existence of certain interactions between the different elements of the innovation process management underlay the formulation of a feedback based approach. Identification and analysis of feedbacks enabled modification of the object related architecture of the innovation process, enriching it with the element of mutual operation of a complex set of factors determining the effectiveness and efficiency of the process. The development of a systemic integration contributed to further modification of the subject and object related architectures of the innovation process towards expansion of free networks. Flexibility, openness, constant improvement or cross-organisational cooperation are the basic attributes of an enterprise focused on the development and implementation of innovations, especially break-through ones. Thus, analysis of the issues of modelling and management of an innovation process from the perspective of a retrospective view

leads to distinguishing two key approaches to the issue of an enterprise innovativeness, i.e. integrating approach and network approach.

Integrating Approach

The integrating approach to innovativeness is related with the need for full concentration, and coordination, of an enterprise on undertaking such organising activities that determine the acquisition of key internal competences, especially in such areas, as: knowledge generation; technology development, research and development activity and improvement of social potential. Acquisition of key competences in the above-mentioned areas requires a thorough reconfiguration of the existing organisational system.

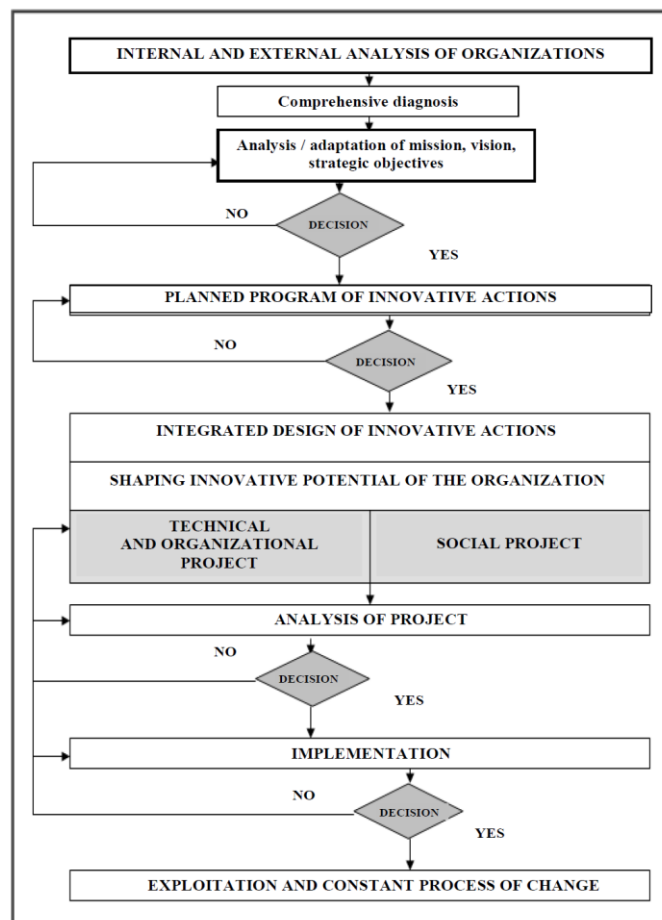


Figure 1. Integral model of management of innovation implementation (Pachura, 2009)

Reconfiguration of an enterprise's organisational system by implementing changes in the area of the structure and functions is more and more often performed using modern information technology. It can be concluded that „the implementation of opportunities created by ICT strongly affects the existing process patterns eventually changing them” (Durlík et. al., 2014). Thus, the use of information technologies facilitates improvement of an enterprise and development of key competences from the perspective of the development of innovativeness (Sroka, 2014). Modelling of the process of innovation implementation management in the integrating approach requires that the need for unification at the level of planning innovation activities is taken into account. The methodology of G. Nadler's perfect pattern can serve as methodological basis while developing the model. Using this methodology, the implementation procedure comprises the following 6 basic stages (Fig. 1) (more on this in: Pachura, 2009):

- internal and external analysis of an organisation,
- programme of planned innovation activities,
- integral designing of innovation activities,
- project analysis,
- implementation,
- exploitation and a permanent process of changes.

The management process of implementing innovations, according to the integrating approach, starts with a detailed examination of the internal and external environments of an enterprise. An analysis of resources, competences and skills conducted for this purpose allows an organisation to identify its internal potential. Identification of sectoral conditions refers to the external environment, but its aim is mainly to find possibilities of using market opportunities and minimise external threats using the internal potential of an enterprise. Synchronisation of possibilities of the internal potential with the existing external chances in some way determines the character of the innovation activity and impacts the level of its effectiveness and efficiency. It also shapes the subject related architecture of the innovation process, basically equating it with the management process and organisational structure of an enterprise. Thus, a comprehensive diagnosis along with identification and description of basic parameters of a strategy, i.e. mission, vision and strategic objectives, allows an enterprise to thoroughly analyse its internal situation and its place in its external environment. Against this background, possibilities of carrying out innovation activity are identified. In terms of an efficient management of a programme of innovation activities, it is crucial to define: innovation objectives, the form of innovation activities, the level of benefits and costs, as well as necessary resources. Ensuring integrity at the stage of planning by taking into account the technical-organisational and social projects enables development of a comprehensive concept of innovation and enriches the existing innovation potential of an enterprise. It should be, however, stressed that the process of management of implementation of innovations, preceded by technical, economic and social analysis, like the other stages of an integral model

of innovation implementation, takes place in an environment of innovation structures existing within an organisation. The final stage of the implementation, i.e. exploitation and a permanent process of changes focuses mainly on enriching the internal innovative potential through intensification and use of the flows of knowledge and skills at the level of networks within an organisation.

Network Approach

In the face of modern challenges of the global economy, what is particularly important in the network approach to the issue of innovativeness is the change in perceiving an enterprise as an organisational system. An enterprise, which from a closed system becomes an open one, extends its network of internal relationships to include external cross-organisational relationships (Świadek, 2015). From the perspective of the management of development of innovativeness, this fact undoubtedly implies the necessity of a radical reconfiguration of the existing business model, in particular in the context of the development of innovation potential and capability of creating innovative behaviour. „At the moment, firms concentrate on areas of competence entrusting the remaining non-strategic operations to external units on the basis of outsourcing. As a result they need to remodel their internal and external structures. During this process, the internal structure is divided into small business units, while the external structure is integrated into correlative networks” (Durlík et. al., 2014).

The basics of the interpretation of a business model show that its fundamental attributes include: complexity of the system structure, variety of relationships between the constituents, multiplicity of impacts of the different elements and time horizon (Afuah et. al., 2003).

Thus, a business model management of an enterprise in the network approach not only requires reconfiguration in the area of the quantitative and qualitative structure of the system, but the existing standards of cooperation, knowledge transfer, social capital development etc. also become remodelled. For describing a process of creating an enterprise's capability of intensifying innovative behaviour in the network approach, it is necessary to take into account the structure of a network with the following characteristics: homogeneity, irregularity, randomness and unpredictability. These characteristics determine the character of cross-organisational cooperation focused on value creation. In the network approach, value is created as a result of unification of resources, competences and skills at the level of networks of cooperating entities and intensification of dynamic cause and effect relationships between them. Cross-organisational cooperation takes form of co-competition characterised by a varying degree of complexity and changing volume of cross-organisational relationships.

Looking for possibilities of modelling the management process of implementing innovations from the perspective of the network approach, it is necessary to stress the need for maintaining spatial and functional integration with the global environment. Thus, the process of developing an enterprise's innovation potential

takes place at the level of global cooperation network. It is therefore reasonable to enrich the integral model of innovation implementation with the following system elements (Fig. 2): network strategy, network ecosystem and system of correlation of the streams of knowledge and skills flow.

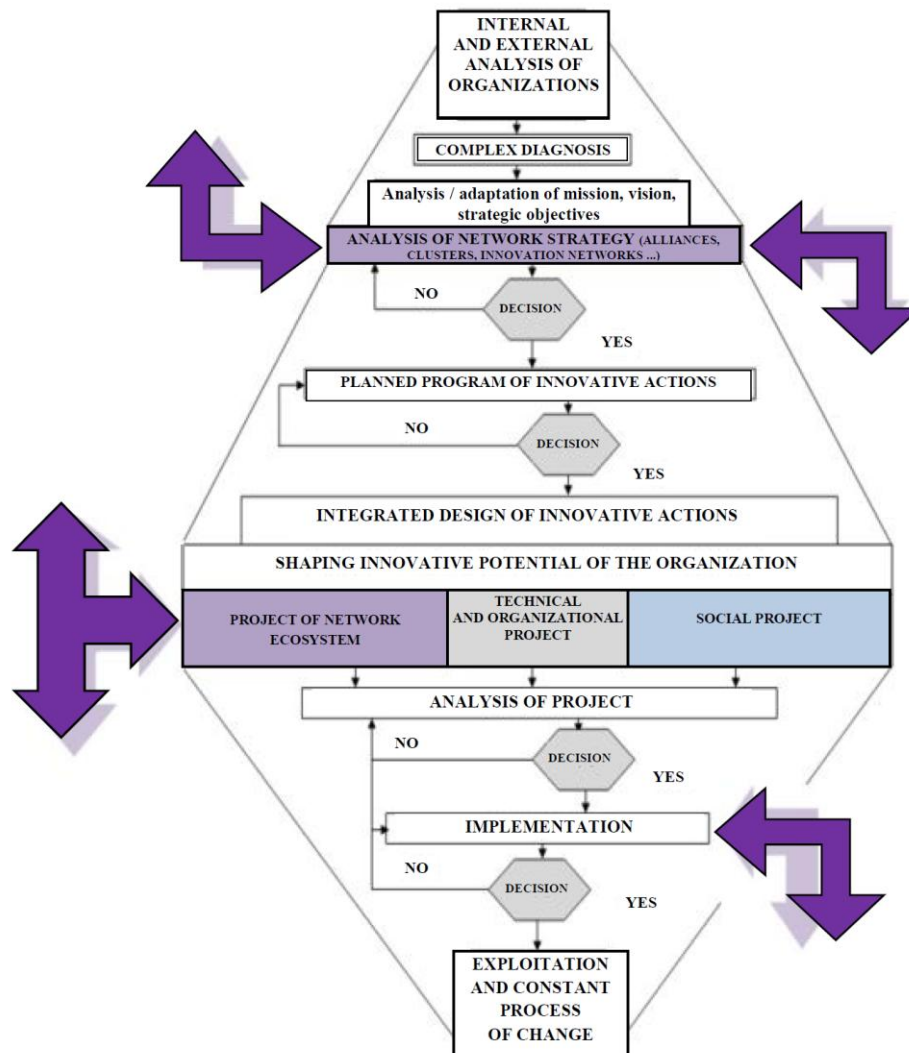


Figure 2. The model of fractal interdependence for management of implementation of innovations

By relating the proposed model (Fig. 2) to free networks, global dimension of technology, knowledge diffusion and the phenomenon of cooperation a basis can be created for an attempt to develop a form of fractal correlations.

Results of literature studies in the area of the theory of the development of global technologies, creation of network structures and fractal geometry constituted the basis for developing a model of fractal correlations (Bider et. al., 2012).

Management of Innovativeness of an Enterprise in Face of Techno-globalism

The characterisation of cross-organisational network invites a search for possibilities of further intensification of innovativeness through using the properties of the modern global market, in particular free diffusion of knowledge and technology. Globalisation means a "dynamic phenomenon, a process occurring in various areas of human activity..." (Stankiewicz, 2002). Knowledge and technology resources are created and used at the global level as a result of development of strong networks, which in turn constitutes a basis for techno-globalism. A special role in this respect is attributed to supranational corporations, minimising at the same time the share of the state (Edgerton, 2007). The management of the innovativeness development in face of the phenomenon of techno-globalism is based on global networks of cross-organisational cooperation, in particular in the area of knowledge (Reddy, 2000; Tabor, 2006). We can thus conclude that enterprise innovativeness is part of an integrated system of mutual networks and competition between the links of the global platform of knowledge. Changes in the global environment, which are increasingly complex, turbulent and unpredictable, require an organisation to have a special ability to react in a flexible way. Free networks are accompanied by flexible activity, adjustment to customer needs and continuous improvement (Davenport et. al., 2006). The issues of innovativeness in the context of the phenomenon of techno-globalism are closely connected with such aspects as: knowledge platform, segments of an intelligent market and social sphere. Cooperation at the level of the above-mentioned areas determines processes of global diffusion of knowledge and contributes to internationalisation of innovativeness. Thereby, it describes the basics of the development of the space of global technologies (Fig. 3).

The graphical interpretation of technologies in the global system with respect to an enterprise innovativeness, as presented in the research objectives, enables identification of the vectors of knowledge and technology flow in a global network. These flows are multi-directional and multifaceted, which encourages the use of information technologies. It should be stressed that "the use of modern information technologies forces an enterprise to catch up with the progress, leads to the use of modern equipment, software and procedures, contributing at the same time to deep, internal transformations in an organisation that facilitate its development" (Gierszewska, 2006). Thus, the development of an enterprise innovativeness takes place in an environment of cross-organisational cooperation network. Meanwhile, the innovation potential of the network is shaped through intensification and use of the impact of the vectors of knowledge and technology flow at the level of global networks with the support of information technologies.

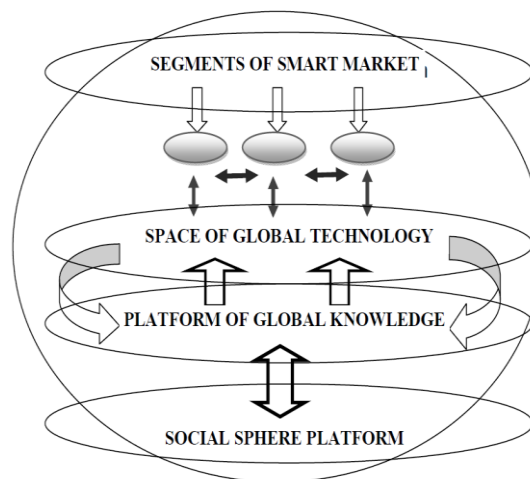


Figure 3. Technology in the global system

Summary

Literature on the subject of management theory and practice comprehensively addresses the issues of innovativeness and its importance for creating a competitive advantage of modern enterprises. From the perspective of such attributes as: free diffusion of knowledge and technology, widespread occurrence of social and economic phenomena, the share of intelligent markets, unification of customer preferences or standardisation of the quality level, we can conclude that innovation is subject to globalisation. The epistemological discussion presented in this paper concentrated on distinguishing two key approaches to the issues of the development of innovativeness of enterprises, i.e. integrating and network approaches.

In the integrating approach, as a result of the linkage of the technical and organisational project with the social one, the development of innovativeness takes place in an environment of innovation structures existing within an organisation. The innovation potential develops through intensification of the flows of knowledge and skills at the level of networks within an organisation.

The development of enterprise innovativeness in the network approach takes place as a result of the existence of cross-organisational networks, which determines the character of the environment of innovations. The intensification and use of the flows of knowledge and skills at the level of external networks enriches the innovation potential.

The attempt to interpret innovativeness from the perspective of the phenomenon of techno-globalism encourages identification of the importance of the vectors of the flow of knowledge and technology in the global network. The multi-directional and multifaceted character of these flows organises the environment

of the cross-organisational network of cooperation. Moreover, of importance is also the development of intelligent markets and pro-consumer behaviour, which enriches the architecture of the innovation process. The discussion presented in this paper does not fully cover the issues addressed herein, but it encourages further scientific studies.

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INNOWACYJNOŚĆ PRZEDSIĘBIORSTWA W KONTEKŚCIE GLOBALIZACJI TECHNOLOGII

Streszczenie: Opracowanie przedstawia rozważania teoriopoznawcze nad problematyką rozwoju innowacyjności przedsiębiorstwa. Celem badań jest próba zwrócenia uwagi na złożoność, interdyscyplinarność i dynamizację innowacyjności przedsiębiorstw. Odwołano się do podstaw modelowania procesu innowacyjnego, identyfikując podejście integrujące i sieciowe, w tym koncepcję współzależności fraktalnych. Podkreślono znaczenie globalnych sieci współpracy, globalnej platformy wiedzy, dyfuzji wiedzy i technologii, segmenty rynku inteligentnego i zachowania prosumenckie.

Słowa kluczowe: innowacyjność, model integralny, model sieciowy, globalizacja, technoglobalizm

創新企業的 在科技全球化背景下

摘要：本文介紹了有關企業創新發展的管理問題認識論的討論。這些研究的目的是提高企業創新的複雜性，跨學科和增強意識。在這方面，本文指的是創新流程建模的基礎知識，識別積分方式和網絡方式，包括分形相關的概念。表明趨勢在全球技術的發展的空間，該文件強調了跨組織合作，全球知識平台，知識和技術的自由擴散的全球網絡的重要性，一個聰明的市場和維護消費者權益的行為的部分。

關鍵詞：創新性，整體模型，網絡模型，全球化，技術全球