



KNOWLEDGE TRANSFER IN NETWORK ORGANIZATION. AN EXAMPLE OF THE POLISH-PORTUGUESE NETWORK OF RESEARCHERS (PRELIMINARY PHASE)

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ABSTRACT

The report, based on the review of relevant literature, presents the preliminary phase of implemented project of the Polish-Portuguese network of researchers, and aims at the elaboration of a conceptual model and subsequent assessment of the model through field research. The purpose of this report is to present both the theory of networking and transfer of knowledge, pursued in the international cooperation. This article is an introduction to the sequential phases of knowledge sharing among universities and then applying it to business as a result.

INTRODUCTION

Today, the ties between industry and research are undoubtedly important for both business development and value creation (Ankrah, AL-Tabbaa 2015; Franco, Haase 2015; Kendra et al.; Nomakuchi, Takahashi 2015). Although in some countries such ties are still rare - the strongest can be found in the USA, Germany or Finland, nevertheless, both enterprises and R&D units frequently realize the important role of cooperation in order to be able to present differentiated products and services and to build new competitive advantages.

The report is based on the review of literature and shows the preliminary results of ongoing project, implemented by researchers. It shows how the initial phase of coop-

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eration among three independent research units can result in the creation of well-functioning knowledge management and network organization. The purpose of this report is to present both the theory of networking and transfer of knowledge, pursued under Polish-Portuguese cooperation.

INTRODUCTION TO THE PROJECT OF TRANSFER OF KNOWLEDGE BETWEEN POLAND AND PORTUGAL

The project, started in February 2015, entitled, “Conditionings of Knowledge Transfers and Innovative Activity of Enterprises (acronym COTRANS)” involved three participating universities, namely, Department of Management at University of Gdansk, Department of Finance and Management at Torun School of Banking and School of Management and Technology of Felgueiras at Porto Polytechnic.

The purpose of the project is to expand on a conceptual model based on literature review and subsequently assess the model through research in the field. The expected results include scientific value added, since the value will contribute to the literature in terms of not only expanding the knowledge but also innovation. From a global perspective, the project will enhance the cooperation among higher education institutions and enterprises. At the same time, it may also increase the cooperation with and among business stakeholders.

It is extremely important to take a global, international approach in this matter. Extending knowledge transfer to the sphere of services and research on an international scale may bring many advantages and develop new, innovative solutions. Innovation, in turn, is the driving force leading to development of objectives, facilitating the renovation of industrial structures and favoring the emergence of new economic sectors.

The aim of the project is also to develop a knowledge transfer model or the identification and classification of factors intensifying or inhibiting knowledge and innovation transfer among enterprises and external sources of knowledge such as universities and R&D institutions. Achieving the above objective is possible thanks to the realization of the specific topics listed below:

- identification of third-party sources of information;
- identification of enhancers and inhibitors of knowledge transfer and innovation among companies and R&D institutions;
- analysis of the existing models of transfer in Portugal and Poland – a comparative study;
- development of a reference model for innovation and knowledge transfer.

There are different approaches focusing on the universities (Berbegal-Mirabent, Lafuente, Solé 2013; Hewitt-Dundas 2013; Kalar, Antoncic 2013) companies (Berbegal-Mirabent, Sánchez García, Ribeiro-Soriano 2015; Bouncken, Kraus 2013; Xias, Jin) and business cooperation (Nomakuchi, Takahashi 2013).

It also possible to identify different issues studied in the literature regarding university and industry cooperation, such as academic efficiency, knowledge value chain, and innovation activities, just to name a few.

In order to develop a study of these concepts, a team of Portuguese and Polish researchers is cooperating to identify external knowledge sources in companies, identify and enumerate the factors intensifying and inhibiting knowledge and innovation transfer among universities and enterprises, to analyze the existing transfer models in Portugal and Poland (a comparative study) and develop a reference model for innovation and knowledge transfer.

THE ESSENCE OF KNOWLEDGE TRANSFER BETWEEN POLAND AND PORTUGAL

The core of knowledge transfer that started in February 2015, is the process of sharing knowledge between two culturally, climatically and economically different countries. This transfer is ongoing among three participants or more - people, organizational units, companies or organizations.

According to scientific literature, knowledge sharing is a people-to-people process (Ryu, Ho, Han 2003), where a mutual exchange of knowledge occurs among individuals (Truch et al 2002). Thus it is a two-way process.

According to van den Hooff and de Ridder (van den Hooff, de Ridder 2004), knowledge transfer involves either actively communicating to others what one knows or actively consulting others in order to learn what they know. When organizations or employees within an organization identify knowledge that is critical to them, they can use knowledge transfer mechanisms to acquire the knowledge. They can then constantly improve it and share it with others who need it, in the most effective manner. They also can exploit it creatively or innovatively to add value as a normal part of their work (Liyanage et al 2009).

According to Nonaka, Takeuchi (1991), knowledge sharing is a critical stage in the process of knowledge transfer. According to some, knowledge management and knowledge transfer are processes that are undertaken largely to create a knowledge sharing culture, foster collaboration and communication, and so in turn enhance organizational innovation (Liebowitz 2002). Knowledge sharing in organizations mostly involves the exchange of knowledge at the individual level; however, knowledge transfer in organizations goes beyond this. It includes transfer of knowledge at higher levels, such as group, product line, department, or division (Argote, Ingram 2000).

According to Liyanage (2009), "knowledge transfer is about identifying (accessible) knowledge that already exists, acquiring it and subsequently applying this knowledge to develop new ideas or enhance the existing ideas to make a process/action faster, better or safer than they would have otherwise been. So, basically, knowledge transfer is not only about exploiting accessible resources, i.e., knowledge, but also about how to acquire and absorb it well to make things more efficient and effective."

The unambiguous wording of the concept of knowledge transfer is not easy. This process is completely dependent on knowledge. For this reason, it is difficult to consider the essence of knowledge transfer apart from understanding the term of knowledge.

In the Polish-Portuguese practice, knowledge sharing takes different forms, which means that knowledge transfer can take place in different ways. A simple way of transferring codified knowledge is transferring the documents in the database via the Inter-

net. Some types of knowledge resulting from experience and associated with people's skills can be difficult to communicate.

This kind of projects allows creating economy based on knowledge in a broad view, where transfer of knowledge is the main source of international competitiveness. From a global perspective, it can be seen in the static and dynamic perspective. The static perspective assumes that for each company the most critical area of knowledge is technology. This kind of knowledge is characterized by high objectivity - its meaning is usually easy to define and store using symbols and words. In the transfer of technology, the properties of knowledge and the cost of the entire operation are key factors to be taken into account. Cooperation in the transfer of knowledge among business entities in the static perspective is usually referred to as technology transfer. It is the communication of information necessary to enable one entity to duplicate the work of another party. This exists in two forms - of a technical nature (engineering, scientific knowledge, standards) and procedures (including legal procedures, confidentiality agreements, patents, licenses).¹

In terms of the dynamic perspective, one can say it occurs when the transfer of knowledge involves communication of tacit knowledge. In this case, in addition to knowledge, there are also other factors important for the success of the process. The key is the relationship among the research units involved in the whole process.

Transferred knowledge requires adaptation to the conditions of functioning of the recipient, who must devote resources to its assimilation and adaptation. Modification and further development of knowledge often constitute an integral part of the transfer, associated with the transmission of tacit knowledge. Transfer of this kind of knowledge is not an easy process (Song J, Almeida P, Wu 2003). In this case, knowledge is difficult to obtain from those who possess it. It consists of experiences and skills, the source of which is in the minds of the employees of the organization. Knowledge of this kind is a dynamic and variable phenomenon, where transmission requires creating streams of knowledge. Its transfer requires a "transmitting of ordered and interpreted bundles of information"². Effective transfer of knowledge would result in the successful creation of new knowledge model only when several conditions are met. It requires organizational culture oriented on the use of knowledge, which "should be based on the organizational structure and incentive systems" (Probst, Raub, Romhardt 2002).

The participants of ongoing project need to be aware of the circumstances of the transfer of knowledge, which should be accompanied by an atmosphere of trust and open exchange of views. The existence of the transfer of knowledge requires the proper motivation and attitude of its participants. It is a team activity requiring commitment and proper preparation on both sides of the process (Mikuła, Pietruszka-Ortyl, Potocki 2002). To keep the activity and good atmosphere going, two meetings, the first at Porto Technical University and the second in Poland, both in Gdansk and Torun, were scheduled. The meeting in Felgueiras (the town in Portugal where Faculty of Management is

¹ *Innowacje i transfer wiedzy, Słownik*, Polska Agencja Rozwoju Przedsiębiorczości, Warszawa 2005, p. 168.

² *Formy i metody powiązań nauki i biznesu* [in:] *Transfer wiedzy z nauki do biznesu: doświadczenia regionu Mazowsze*, Weresa, M. A. (ed.), Oficyna Wydawnicza Szkoły Głównej Handlowej, Instytut Gospodarki Światowej, Warszawa 2007, p. 34.

located) took place in May 2015. The team meeting was combined with a scientific conference, where the first results of cooperation were presented.³

A characteristic feature of all the processes related to knowledge is that they cannot take place without knowledge transfer. For this reason, transfer is an important component of knowledge management in every modern organization, facilitating the transfer of capacity to solve problems from one place to another (Długosz 2011). It distributes knowledge and enables the appropriate allocation and use of resources. It allows the creative use of information by enabling the flow of knowledge between units operating in the knowledge-based economy. Transfer of knowledge enables the transfer of technical knowledge and technology, which is especially important for small and medium-sized enterprises which do not always have sufficient funds, thus enabling investment in research. The subject of a transfer can also be organizational knowledge how to manage and use resources.

Transfer of knowledge provides active support, implementation and use of innovative and technological processes supporting the functioning of the education system and developing science. We understand it as a link between science and business, providing a platform for a joint search for innovative solutions and dissemination of knowledge in society. In many cases the transfer of knowledge is related to interpersonal communication and involves the transfer of knowledge between individual employees and organizational units.

IDEA OF NETWORK ORGANIZATION – THEORETICAL VIEW

A behavioral view treats networks as a pattern of social relations over a set of persons, positions, groups, or organizations (Sailer (1978). This definition emphasizes structure and different levels of analysis. Meanwhile, a strategic view finds them to be “long term purposeful arrangements among distinct but related for-profit organizations that allow those firms to gain or sustain competitive advantage,” (Jarillo (1998) a perspective which recognizes goal-directed processes and economic competition. The third definition incorporates cooperation of many organizations that have individual and common objectives and where their members can transfer their unique competences like the ability to value creation understood in terms such as knowledge resources and access to the market (Koza, Lewin 1999). Independently from various definitions, some characteristic features are shared across the board, such as, for example (Błażak 2010),

- the occurrence of transfer of resources among network operators,
- the diversity of connections among network participants,
- limited dimension of the integration of the bodies that form the network organization,
- the creation and strengthening of information channels within the network.

In the project cited, all of the above points have been fulfilled: its main aim has been a transfer of knowledge, the diversity of participants concerning socio-cultural, political, legal, economic and technological differences, the distance between partners

³ Dziadkiewicz A., Nieżurawska J., *Effective Employee in XXI Century* [in:] International Days, Escola Superior de Tecnologia e Gestão de Felgueiras – Politécnico do Porto, Felgueiras, Portugalia.

that have been forced to maintain the contact online and creation of information channels within the network.

The essence of network organization is to obtain a synergy effect possible only when the coordination between partners is strong. Given the possible opportunism, network membership also requires a high degree of trust or commitment between parties (Morgan, Hunt 1994; Perrow 1993; Powell 1990; Sabel 1991). The main task of a coordinator, also called a strategic partner, leader or broker, is to control the flow of tangible and intangible assets between independent entities to ensure the satisfaction of recipient's expectations (Jarillo 1995) or to create value added, such as knowledge.

The characteristic point of network organization is to pursue the common goals within the network while setting the implementation of autonomous purposes by individual entities, striving to specialize within the network and investing in relationships and the large role of internal communication such as the information culture, which guarantees freedom of movement of knowledge and information in the vertical, horizontal, formal and informal system (Staszewska 2007). The three design elements - co-specialized assets, joint control, and collective purpose - distinguish the network organizations from centralized organizations, inflexible hierarchies, casual associations, haphazard societies and mass markets (Axelrod 1984).

Additionally, the network organization is also characterized by (Staszewska 2007)

- geographical spread,
- high flexibility,
- configuration based on network relationships,
- cooperative character,
- extensive communication system.

A network organization maintains permeable boundaries either internally among business units or externally with other entities (Applegate, Cash, Mills 1988; Doz, Prahalad 1991; Jarvenpaa, Ives 1994; Nola, Croson 1995; Rockart, Short 1991; Snow, Miles, Coleman 1991). Its type and specifics translate into a variety of knowledge management strategy.

DETERMINANTS OF KNOWLEDGE IN NETWORK ORGANIZATION

The choice of a certain model of knowledge transfer depends on the choice of factors, especially two, which are of primary importance:

- the type of network organization (the primary determinant),
- the kind of knowledge (the secondary determinant).

The type of organization is determined by the parameters of network construction and the kind of knowledge - by the parameters of knowledge management (see Figure 1). In implemented project, there is a university body as a type of organization and two-way knowledge, both academic and professional, because of different professions of participants.

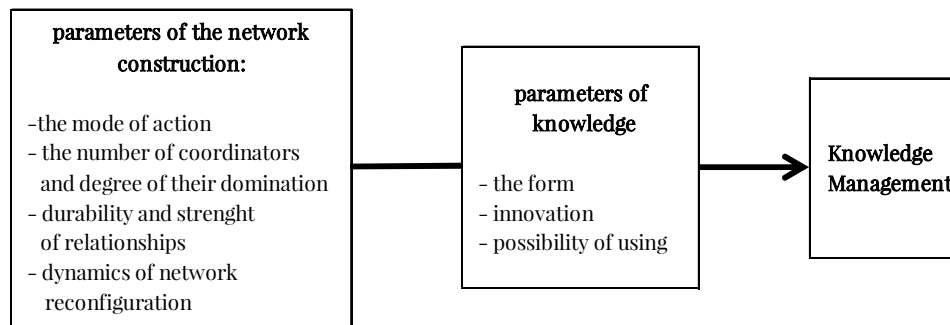


Figure 1. Determinants of knowledge in network organization

Source: A. Sopińska (Editor), *Determinanty zarządzania wiedzą w organizacjach sieciowych* [in:] *Współczesne przedsiębiorstwo. Teoria i praktyka*, Oficyna Wydawnicza Szkoła Główna Handlowa w Warszawie, Warsaw 2012, p. 128.

Literature (Bryson, Wood, Kneble 1993) provides examples of different networks based on the first parameter (the mode of action):

- demand networks, relating to affiliation with customers,
- supply networks, relating to cooperative relations used in the process of providing products and services,
- support networks, relating to support system between partners.

The Polish-Portuguese project includes a support network, relating to the support system among three partners.

Looking at the number of coordinators and their domination areas, we have the following (Child J., Faulkner 1998):

- a dominated network, where each organization/unit is governed by one coordinator;
- an equal partners' network – where no dominant partner is present and everybody develops common connections to achieve common goals and cooperates with one another – the presented project has created an equal partners' network.

The same parameter can form the basis for selection of the network company as “the star” type, Peer-to-Peer network and sub-suppliers' network.

The next parameter of construction is the durability and strength of relationships, where we have the following (Brilman 2002):

- integrated networks (scattered units which legally and financially belong to the same group);
- federated networks (corporate or private individuals tending to implement common needs);
- contract networks (based on franchising or concessions among statutorily independent partners);
- direct relations networks – popular in political, religious or scientific sphere, also used in the Polish-Portuguese project.

Looking at the dynamics of network reconfiguration, we see both static and dynamic networks. The first group is based on durable connections between partners,

where one is dominant. The second is created by unstable relations between partners (the lack of domination) and contemporary networks organization (focused on the implementation of short-term and specific market opportunities).

All the parameters of network construction influence the type of certain network organization. According to this construction, each project can form a model of knowledge transfer. As a result, network structure is primarily the first determinant of certain transfer of knowledge model. The type of knowledge is the secondary determinant and it is determined by development, processing, implementation and protection. The most important parameters of knowledge are its form, innovation level and the possibility of usage.

The form of knowledge is divided into tacit and formal (accessed) (Polanyi 1962). The first is the kind of knowledge that is difficult to transfer to another person by means of writing it down or verbalizing. With the tacit knowledge, people are often unaware of the knowledge they possess or how it can be valuable to others. Effective transfer of tacit knowledge generally requires extensive personal contacts, regular interaction (Goffi., Koners 2003) and trust. This kind of knowledge can only be revealed through practice in a particular context and transmitted through social networks (Schmidt, Hunter 1993). To some extent it is "captured" when the knowledge holder joins a network or a community of practice (Goffi., Koners 2003).

The formal knowledge, in contrast to tacit, is highlighted by speech, documents, schemes and symbols. Its character is secondary, indirect and its identification and codification is easy. The level of innovation and possibilities of using it allows assigning knowledge resources in network organizations to one of the four categories of knowledge: unique (extraordinary), key, universal and irrelevant.

The first two – unique and key – are characterized by a high level of innovation. They differ in the potential use. Taking the key resources into account, we can admit they can be used in different ways by a network organization, but using their unique knowledge can be limited. The universal and irrelevant knowledge point to a low level of innovation, but the possibilities of using universal knowledge are extensive. The irrelevant knowledge is rarely used.

Making a decision about entering the research exchange program between Poland and Portugal, the project authors decided on additional goals that can be realized in the future, after the project is completed. This additional goal involves the creation of a new network organization, responsible for a permanent knowledge transfer among foreign scientific units, common benchmarking, mentoring and teaching each other about new tools and methods of teaching. Thus the support network is formed thanks to the first step, namely, the implementation of Polish-Portuguese project of exchanging the researches. Because the project is managed by two countries, there are two brokers (coordinators) from Poland and Portugal. Within Poland, there are two separate bodies: University of Gdansk and Torun School of Banking forming an equal partnership network, thus there is a mixed network – an intermediate body between dominated and clear equal partners' network (see Figure 2).

This is a Peer-to--Peer network. Bearing in mind durability and strength, a direct relations network exists, here which is dynamic (the coordinator of two parties have assumed the further development of network by cooperation with a new institution, which can bring new, fresh knowledge resources).

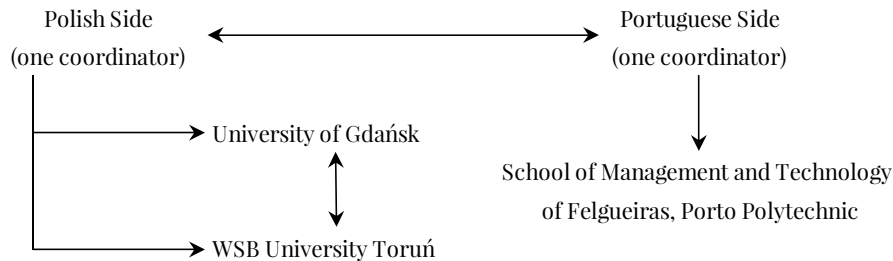


Figure 2. Mixed network construction in the Polish-Portuguese project
Source: own work.

SUMMARY

Transfer of knowledge occurs when one party's knowledge is acquired by the other parties through interaction of personnel or exchange of patents, assets or services. Thanks to this process, the acquisition, dissemination and exploitation of knowledge is possible.

When embarking upon the project, entitled "Conditionings of Knowledge Transfers and Innovative Activity of Enterprises," researchers assumed a model of knowledge transfer as the final value added. Meanwhile, it turned out that numerous possibilities exist, which can be created and developed within the scientific cooperation. Therefore, we can conclude that the transfer of knowledge is a dynamic phenomenon. It creates knowledge in the organization and can be considered to be the basis for implementing the complex process of continuous learning.

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