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SOCIAL CAPITAL OF AN INNOVATIVE RESEARCH ORGANISATION (CASE STUDY)

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INTRODUCTION

The role of innovation in the development of the modern world is not questioned at all. Innovations, especially technological innovations, are the engine of change, significantly influencing the mechanisms of the functioning of many economic sectors and the enterprises operating in them. What is more, the experience of the last several months (SARS-CoV2 epidemic) clearly shows that the functioning of many important areas of social and economic life is possible almost exclusively thanks to the constant technological progress that has taken place over the years in many different areas, especially in electronics and telecommunications.

Technological progress in many industries has for years been closely linked to the potential for its commercial exploitation. Hence, the growing role of scientific studies related to the area of commercialisation of science and technology, which arouses wide interest among theorists of several different

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disciplines of social sciences (including management and quality sciences, economics and finance, sociology and law) because of its considerable interdisciplinarity and basically unlimited potential for industry applications. What lies at the root of almost every innovation is an important managerial decision regarding the further development of a given technology. This clearly involves a great deal of analysis, both quantitative and qualitative, with varying degrees of formalisation, to support the process of making such a decision.

Despite significant progress in the identification of tools and techniques to support the innovation decision-making process, there are still many research gaps in this area that require further exploration. One of them is the role of social capital in the innovation decision-making process. Despite the fact that the concept of social capital is well recognised in the literature, highlighting its importance in the innovation decision-making process is much less explored from the theoretical perspective. On the other hand, the practical aspect of the issue is almost absent in the literature.

The aim of the article is to present the role of social capital in the creation of innovation on the basis of the case study of one of the Polish research institutes. The case study method was implemented as exemplification and confirmation of theoretical research results conducted in favour of this study.

With the above in mind, the main purpose of the article is to indicate the importance and role of social capital in the process of innovation decision-making based on the results of research and analysis devoted to the issue of information users' behaviour in the innovation process. The article has a review-practical character; it is, on the one hand, a kind of summary of many years of work and theoretical research conducted by its authors[1], as well as an indication of the importance of the practical aspects of the addressed issues exemplified by the commercialisation processes of one of the most technologically advanced Polish research institutes, which is known, inter alia, for its achievements related to graphene technologies of the Warsaw Institute of Technology of Electronic Materials (ITME)[2]. Therefore, the research thesis of the article, directly related to the indicated practical example, is to show that social capital is one of the key factors determining the effectiveness of commercialisation activities exemplified by the analysed research institute.

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1 A. Żołnierski, *Informacja w dobrym towarzystwie – internalizacja informacji a kapitał społeczny*, INE PAN, Warszawa 2021.

2 ITME became part of the Łukasiewicz Research Network (ŁUKASIEWICZ-ITME) in 1 April 2019, in 1 October 2020 the Institute merged with another unit to form Łukasiewicz – Institute of Microelectronics and Photonics (Ł-IMIF).

Taking into account the structure and scope of the article, the basic research tool used is a critical analysis of the literature on the subject, including materials in the form of books and articles in Polish and English. It should be noted that due to the wide interdisciplinary nature of the issues discussed in the article, including considerations of, inter alia, management science, economics, sociology and law, as well as the limited volume of the article, the authors of the study had to set relatively strict limits in the selection of literature subject to further analysis (which is always a subjective decision). An additional research tool used is a decision-making case study, based on the authors' experience of cooperation in innovation decision-making in the above-mentioned unit[3].

Social capital and innovation

Taking effective commercialisation actions requires the right decisions, and these decisions must be based on adequate information. Maintaining a transactional perspective in analysing the impact of information on a business organisation, social capital provides a kind of information *vehicle* – an environment in which the spread of information and the acquisition of information at the right time and place becomes more effective.

The issues of social capital are increasingly emerging in the context of economics and are increasingly being incorporated into micro-level analyses as well. The concept of social capital, first used by Hanifan more than a century ago to describe the importance of neighbourhood cooperation and shared commitment to schools in rural areas[4], has been interpreted and given a wealth of meaning. The most influential authors who shaped the concept of social capital include Bourdieu, Coleman, Putnam, Fukuyama and Gary Becker. From the point of view of further considerations, it is important to emphasise that social capital plays an active role in the knowledge management process, and the extent of influence on this process depends on the type of social capital. While bridging capital allows more efficient

[3] Two authors were/are employees of the Commercialisation Department of ITME/ŁUKASIEWICZ-ITME (one of them employed since the beginning of the establishment of such a unit in the structure of the Institute), while the third one was the Director of ITME/ŁUKASIEWICZ-ITME.

[4] L. J. Hanifan, *The Rural School Community Center*, Annals of the American Academy of Political and Social Science, 67, 1916.

distribution and acquisition of information, binding capital limits the flow of knowledge to one's own group[5].

The personal, friendly and collegial nature of these relationships indicates greater importance of social capital of innovators, thus making greater use of informal relationships. From the innovation process management point of view, it is also important that social capital also influences the self-organisation of research teams[6].

Nowadays, innovation research goes far beyond the area defined at the microeconomics/management level and reflects the whole range of issues of capacity building and development for innovation creation. Already Pavit defines innovation as the core of the process related to the renewal of what the organisation offers, which results from conscious, manageable organised activities[7]. Other definitions are also used in the literature. For example, Freeman's definition states that innovation is the first commercial introduction (application) of a new product, process, system or device[8]. Kotler, on the other hand, emphasises that the term refers to virtually any service, goods or idea that is perceived as new by the recipient[9]. Freeman highlights the fact that innovation in industry not only includes the "technical" design, manufacture or management, but also the marketing activities of the new (or improved) product[10].

The analysis of the importance of social capital for innovation is primarily situated in the context of the innovation process, in the context of the organisation's ability to acquire the information necessary for this process. Factors influencing the creation of innovation are often related to the nature and quality and the way of establishing and maintaining contacts with the environment and the ability to acquire information and create knowledge in the organisation. The process of innovation management, multilateral

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5 J. Hui, C. Yijia, *The Research on How Social Capital Facilitates Knowledge Sharing between Individuals*, [in:] L. Jiang (Ed.), Proceedings of the 2011 International Conference on Informatics, Cybernetics, and Computer Engineering (ICCE2011), November 19–20, 2011, Melbourne, Australia.

6 A. F. De Toni, G. Biotto, C. Battistella, *Organizational Design Drivers to Enable Emergent Creativity in Web-Based Communities*, Learning Organization, 2012, v19 n4, pp. 337–351.

7 J. Tidd, J. Bessant, K. Pavit, *Managing Innovation. Integrating technological, Market and Organizational Change*, John Willey & Sons, Chichester, 1998.

8 Ch. Freeman, *The Economics of Industrial Innovation*, Frances Pinter, London 1982, p. 7.

9 Ph. Kotler, *Marketing – analiza, planowanie, wdrażanie i kontrola*, Gebethner i S-ka, Warszawa 1994, p. 322

10 Ch. Freeman, op cit., p. 24.

interactions between the company, customers, suppliers and the R&D sphere, as well as between enterprises themselves, can have a significant impact on both the formation of the innovative potential of the economic entity and its practical ability to create innovations. The pace of change, both in building new knowledge in the scientific sector and in the innovations introduced, is increasing. Innovation itself, or the innovation process, has ceased to be the domain of a single scientific discipline, and research on innovation is increasingly becoming an element of interdisciplinary research projects. Problems related to innovation, in fact, concern a wide range of issues in the field of social, economic or technical issues[11]. Thus, innovation is not only a "technical" project, which is the production or management, but also activities in the field of marketing of a new (or improved) product; creativity, forward thinking and forms of communication between the sender and the recipient of the innovation message. The search for new solutions for the creation of innovations includes a search in the close and wider environment and within the company; and turning to the environment in the process of innovation creation makes the physical boundaries of the company blur, and its area of activity approaches asymptotically to all potential and new sources of information (know-how), both in terms of R&D necessary for the creation of innovations and methods of distribution of innovative products and services. In general, it is important to emphasise the fact that the impact of social capital on innovation is significant, which is confirmed by both organisational and macroeconomic studies[12].

Innovation processes – the essential components

The information needs of an enterprise are a set of contents necessary for decision-making in fulfilling the mission and achieving the goals of the enterprise in an effective way. Information needs arise as a result of changes occurring both in the organisation's environment and within it. They depend directly on many personal characteristics of managers and employees who use information. Complex information needs are only partially routine ones in nature and are often based on vague, poorly structured questions. This is often clearly identifiable in the innovation process when complex information

[11] J. Fagerberg, *Innovation: A Guide to the Literature*, University of Oslo, 2003.

[12] Y. Suseno, C. Standing, R. Kiani-Mavi, P. Jackson, *National innovation performance: the role of human capital and social capital*, The European Journal of Social Sciences. Sep2020, Vol. 33, Issue 3, pp. 296–310.

from many different sources is required. Information needs are based on a variety of procedures and data[13]. There is an increased demand for soft information too, due to the fact that complex needs cannot be accurately estimated in advance and are difficult to plan and evaluate[14].

Knowledge management is essential as the first stage of innovation creation; hence information itself becomes one of the most important determinants of innovation decisions. Knowledge possessed by individuals has a social dimension. The creation of knowledge is never disconnected from the environment/society in which it is created, if only in the context of education or even access to physical resources used by the individual during the process of education and socialisation[15]. An example of the importance of socialisation for individuals making decisions on the basis of knowledge provided by information systems can be seen in the change introduced in the United States Air Force in 2000, when, in addition to formal information management systems, scientific and technical expert panels (S&T Summits) were introduced that included individuals from the highest command. The purpose of the meetings was to improve the flow of information and to inform operational-level leadership about future S&T opportunities. Raising the level of knowledge among mid-level commanders also became an important goal[16].

Landry and his team, based on survey data from nearly half a thousand manufacturing companies, determined the importance of social capital in the innovation process. They found that it takes the form of a two-stage decision-making process: the decision to introduce an innovation (stage I) and its scope (stage II). Already in the case of the first stage it was proved that different forms of social capital influence the decision itself, even the increase in the value of social capital is the most significant variable increasing the probability of innovation. In the second stage, social capital becomes – next to the technology used in the company – the variable of decisive importance

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13 G. Rejikumar, A. Aswathy Asokan, V. Raja Sreedharan, *Impact of data-driven decision-making in Lean Six Sigma: an empirical analysis*, Total Quality Management & Business Excellence, 31:3–4, 2020, 279–296.

14 R. Skyrius, V. Bujauskas, *A Study on Complex information needs and business activities*, Informing Science: the International Journal of an Emerging Transdiscipline, Vol. 13, 2010, p. 3.

15 G. Carchedi, *On the Production of Knowledge*, [in:] Paul Zarembka (ed.), *The Capitalist State and its Economy; Democracy in Socialism*, Research in Political Economy, volume 22, Elsevier Ltd., Amsterdam – Boston – Heidelberg 2005, pp. 273–274.

16 Air Force Science and Technology Board, Effectiveness of Air Force, Science and Technology Program Changes, Air Force Science and Technology Board, National Academy of Sciences, Washington 2003, p. 36.

for the decision on the degree of innovation[17]. On the other hand, it is known that an innovator is usually a person with above-average social capital, able to effectively use informal contacts and effectively manage the information necessary in the innovation process through them[18].

Social capital influences decisions not only in the organisation, but also in personal[19], or household decision-making[20]. Another important factor, interdependent on social capital and important for decision-making in the innovation process, is organisational culture. It determines the processes of information management, acquisition and flow, and therefore the decision-making process for the creation and diffusion of innovations. Technical innovations themselves make highly technology-oriented markets less price elastic, and price ceases to be the main determinant of the decision-making process[21].

A company introducing innovations usually has an advantage over other entities that offer their products or services on the market. The durability of the advantage, due to the introduced innovation, usually results from the introduced breakthrough technological change; the essence of this advantage is the potential possibility of other market participants gaining. The economic practice allows for the description of the sources of innovation (by identifying the sources of information as determinants of innovation decisions) from the perspective of the enterprise itself and the active role of the staff. In Poland, microenterprises are dominated by determinants that often result from the personal preferences of company managers – their knowledge, experience, and ability to correctly assess the potential for absorption of created solutions. In Juchniewicz and Grzybowska's research, about ¾ of the respondents indicated that the owners are the main initiators of innovations. As innovations in the smallest companies are rather incremental, many ideas have their sources in the solutions of competitors. Owners and managers of the smallest companies do not see the potential of using institutional sources of innovation, including the scientific environment of enterprises. The

17 R. Landry, N. Amara, M. Lamari, *Does social capital determine innovation? To what extent?*, Technological Forecasting and Social Change, Vol. 69, Issue 7, pp. 681–701.

18 A. Żołnierski, *op cit.*, p. 232.

19 A. Cirman, S. Mandič, J. Zorić, *Decisions to Renovate: Identifying Key Determinants in Central and Eastern European Post-socialist Countries*, Urban Studies (Sage Publications, Ltd.). Dec2013, Vol. 50, Issue 16, pp. 3378–3393.

20 D. Yi, Y. Huang, G.-Z. Fan, *Social Capital and Housing Affordability: Evidence from China*, Emerging Markets Finance & Trade. 2016, Vol. 52, Issue 8, pp. 1728–1743.

21 L. Leydesdorff, *The triple helix: an evolutionary model of innovations*, Research Policy 29/2000, pp. 243–255.

deficit of social capital and resulting reluctance (sometimes even inability) to cooperate is clearly visible[22]. In medium-sized and large enterprises, in the process of making decisions on the introduction of innovations, the role of direct relations between managers is on the decrease, and the importance of the application of the results of the R&D work conducted is increasing. The application of research results has an increasing impact on the development of entire sectors.

Determinants of innovation decisions – social capital perspective

Developing creative solutions requires social capital and sensitivity to the environment. Decisions related to the process of solving complex design problems require the collaboration of many people with complementary skills. Systems that facilitate collaboration must be designed to facilitate creativity and encourage collaboration, exchange of views, information and ideas. The potential benefits of facilitating decision-making, including the selection of an effective path forward that maximises creativity, are difficult to overestimate. The most important ones include e.g. effective division of labour, supporting development of competences (both individual and team) and generation of new ideas. A proper understanding of the problem to be solved and a sense of common interest are extremely important. Creating conditions for the development of social capital based on new information and communication technologies requires keeping abreast of trends in technology, social changes in terms of social trends and fashions, changes in fundamentals and anticipating the dynamics of political and economic changes. The development of information technology makes us witness the formation of information capitalism[23]. Social capital not only determines how information is acquired, but also the quality of the information itself. The social system itself determines the information system. Optimising the information system must incorporate complex social processes in the organisation that are adaptive in nature and involve social behaviour[24].

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22 M. Juchniewicz, B. Grzybowska, *Innowacyjność mikroprzedsiębiorstw w Polsce*, PARP, Warszawa 2010, pp. 200–201.

23 M. Castells, *The Information Age*, Wiley-Blackwell, Chichester, 2010, p. 377.

24 M. Sitarska, *Charakterystyka systemów informowania kierownictwa*, Prace Naukowe Akademii Ekonomicznej we Wrocławiu. Informatyka ekonomiczna, Akademia Ekonomiczna we Wrocławiu, Wrocław 2007, pp. 69–70.

This perspective is also important for issues at the interface between social issues and technology. New technology and especially new media create conditions for individualised approaches to cooperation[25]. Cooperation and trust are important for innovation for yet another reason; innovation and creativity are associated with risk, and in a situation of trust deficit such as in Poland, concerns arise as to whether costs associated with the introduction of innovations are appropriately allocated to all participants in the process. Hence, social capital is not only related to the issue of reducing transaction costs, but also to a sense of fair risk sharing[26].

An important issue related to social capital in the context of economic processes, including innovation ones, is the institutional and legal environment. It is the public institutions, including primarily the legislative, but also ministries, generally the central administration, that are a key element of the regulator of innovation processes. Currently, to a large extent, these regulations result from the accepted norms and principles, resulting from the documents of the European Union, but specific provisions, both within legal acts and e.g. adopted development strategies, remain in the hands of the Polish administration. In this way, solutions that can both support the development of social capital and innovativeness, as well as hamper it or even contribute to its destruction, are in the hands of the national administration.

Social capital is a key factor that makes the organisational culture and the management style dominant in the organisation, as well as the ability to cooperate and strengthen the effectiveness of innovation decisions. On the one hand, social capital is a kind of catalyst making it possible for innovators (representatives of both the enterprise and science sectors) to effectively acquire information for the innovation process. On the other hand – as the acquisition and processing of information is a process and can be managed from this point of view – it also becomes possible to shape such resources of social capital that allow for more effective use of relations with the environment – primarily in the context of information management.

The turbulent environment makes information a new kind of challenge in doing business. This is due to the fact that information is becoming a factor that guarantees competitive advantage. Nowadays we can talk about the

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25 G. Fischer, E. Scharff, Y. Ye, *Fostering Social Creativity by Increasing Social Capital*, [in:] Marleen Huysman, Volker Wulf (ed.), Social Capital and Information Technology, MIT Press, Cambridge, Massachusetts 2004, pp. 393–394.

26 R. Drozdowski, A. Zakrzewska, K. Puchalska, M. Morchat, D. Mroczkowska, *Wspieranie postaw proinnowacyjnych przez wzmacnianie kreatywności jednostki*, PARP, Warszawa 2010, p. 119.

information era, when an almost unlimited flow of information is noticeable. Technology is increasingly becoming a factor of change[27]. The advantage of many companies is determined, among other things, by what information they have and whether they can use it sufficiently. This is because information with the right structure and content, and prepared "on time", provides management with the ability to make the right strategic and operational decisions.

Decisions in the innovation process are indirectly influenced by participation in social networks, which allows their participants to benefit in various ways; to reach consensus and to make joint, sometimes difficult, decisions. Problem solving becomes easier and runs more smoothly. The effectiveness of the use of social networks in the selection of factors affecting the decision-making process in innovation management is primarily due to the diverse nature of the information provided within each network. The great dissimilarity of information provided by market participants and by specialised institutions is also reflected in the social networks in which individuals and managers participate. This dissimilarity is not only due to the different nature of the information received, but also to the manner and cost of its acquisition and its usefulness. Market participants very often do not provide ready information, but only raw data that need to be processed and analysed in order to become valuable information useful in the decision-making process. On the other hand, 75% of useful information for a company comes from informal sources[28].

Case description

The activity of the commercialisation unit of the Warsaw Institute of Electronic Materials Technology can be an example of the impact of social capital as a determinant of the decision-making process. The origins of ITME go back to the 1970s, when, in the conditions of real socialism at that time, an idea was put forward to create an institution supporting state enterprises of the electronics industry located in Warsaw and its surroundings. The unit was conceived of as a place that was to be one of only a few centres of support

[27] H. A. Innis, *The Bias of Communication*, University of Toronto Press, Toronto, 2008, pp. 55–60.

[28] B. Martinet, Y. M. Marti, *Wywiad gospodarczy. Pozyskiwanie i ochrona informacji*, PWE, Warszawa 1999, p. 41.

for the industry of the Comecon countries. This resulted, inter alia, in the creation of a Polish copy of the Intel processor at ITME in the early 1980s.

The Institute initially functioned as a research and development unit, from 2010 as a research institute, and finally in 2019 it became one of the institutes of the Łukasiewicz Research Network. For years, the key task of ITME has been to conduct development work and industrial research towards supporting the innovation of Polish enterprises through implementation. It is ITME that for years has been known for conducting the most prestigious scientific projects in Polish conditions, including the European Commission's Graphene Flagship programme with a long-term perspective and a budget of 1 billion euros and the Ensemble3 Centre of Excellence project under Horizon 2020. The Institute is located in Warsaw's Bielany district and employs over 200 people. The scope of conducted research includes optical fibres, optoelectronics, composite and ceramic materials, graphene and materials for electronics (epitaxial structures). A relatively large dispersion of conducted research makes it necessary to develop mechanisms to optimise their management strategies[29].

Currently the Institute is headed by a Director appointed by the President of the Łukasiewicz Centre; formerly, before its inclusion in the Łukasiewicz Research Network, by the supervising Minister of Economy. ITME faces key problems, which drain its social capital and affects its innovation potential. Reducing the value of social capital also has a negative impact on innovation decision-making potential.

The key problems include the high average age of the Institute's staff, which is aggravated by the retirement of scientists. This results not only in the loss of competences useful in electronic industries, which currently in Poland are in a residual form or no longer exist at all, but most of all it lowers social capital. Inflation of the value of social capital affects both the ability to use stable internal and external relations and the trust necessary for efficient implementation of research projects. If this phenomenon persists, the likely rebuilding of effective relationships in the future will be in question.

The specific nature of scientific research (especially as specialised as that conducted at the Institute) means that it is essential for its continuation and development to maintain the master-student relationship. In a situation where salaries offered in Polish science are far lower than those offered by

[29] Z. Matyjas, *Strategie zarządzania instytutami badawczymi na przykładzie Instytutu Technologii Materiałów Elektronicznych w Warszawie*, Prace naukowe Uniwersytetu Ekonomicznego we Wrocławiu, 2018, no. 538, pp. 225–233.

industry, especially foreign industry, the generation gap is a growing problem, additionally breaking the bonds of trust and relations forming social capital. Although new concepts are emerging (such as the changes introduced by the Łukasiewicz Research Network Act and its implementing regulations), it is currently difficult to judge whether they will prove to be an effective remedy for the aforementioned problems, which are characteristic of the entire science sector of the former Eastern bloc.

Another problem is the phenomenon of the so-called «brain drain» encompassing young employees caused by higher salaries offered by foreign entities in very narrow scientific specialisations, in which ITME employees operate. This may be a negative side effect of the high level of social capital, as employees having an extensive network of contacts with the scientific community face the temptation to take advantage of the jobs offered to them. The availability of unique, highly specialised, world-class research equipment, which facilitates establishing contacts with researchers from all over the world and the implementation of joint scientific projects, is certainly a positive result of the state's policy towards scientific entities.

The impact of the decreasing value of social capital and the consequences in terms of commercialisation decisions are particularly visible in the case of activities related to the commercialisation of the Institute's solutions. The above-mentioned and described problems influence – through the formation of social capital – the availability and sustainability of the Institute's competences, as well as the manner and scope of commercialisation decisions. This is done by directly influencing the functioning of a specialised unit, whose tasks are primarily focused on introducing the created solutions to the market and bringing the Institute's activity closer to the real economy.

Scientific units analogous to ITME were supposed to stimulate growth of innovativeness of the national economy through the practical implementation of results of basic research conducted, as well as participation in the development and implementation works of economic entities. For this purpose, they established units dedicated to commercialisation, whose tasks included: marketing activities, IP management, reporting (to central and internal bodies), assistance in legal services (NDA, cooperation agreements) and the selection of external partners. Building social capital, understood as holding innumerable meetings during conferences/fairs that gather together representatives of the field, is a fundamental basis for the activity of such units. The information provided about the resources of the unit that have a chance to be commercialised must meet the rigours of scientific accuracy with the simultaneous attractiveness of the choice of the form of communication,

consistent with contemporary marketing practices. Trust understood to be the highest level of knowledge of things and the ability to fulfil commitments, is an essential element that decides about the commencement of talks on the implementation of joint activities between research units and entrepreneurs.

Therefore, an effective commercialisation unit must simultaneously meet two key tasks requiring unique competencies and social capital. Its role is to constantly acquire internal information about the current research work, ongoing projects and detailed knowledge of staff competencies and applied technologies - this is an internal task. On the other hand, its external role is to establish external relations with diverse external stakeholders: other research units and scientists (e.g. for scientific cooperation), potential technology recipients (direct commercialisation role), obtaining market information (such as demand for new research, scientific and research work), as well as cooperation with governmental and local authorities. This role requires not only an excellent understanding of the details of the functioning of the research unit, but also knowledge of a wide range of interdisciplinary issues (in addition to the developed technology also e.g. legal, managerial, economic, social nature).

Discussion and evaluation

The situation of the functioning of the scientific unit as a whole (in this situation ITME) significantly affects the scope and capabilities of the commercialisation unit. In particular, these problems limit the potential for internal collaboration with scientists who are willing to make the effort to create solutions for specific business needs. For example, the degradation of trust negatively affects the ability to prepare new research and development projects, including primarily those based on cooperation with the environment.

There is no doubt that also problems with obtaining and processing information have a negative impact on the potential to build lasting relationships with potential partners from the environment. This, too, is a result of declining social capital. It is worth mentioning here that in the case of any organisation, informal information is important[30], which often determines how decisions are made to a greater extent than the formal message. In practice, also attempts to establish cooperation with foreign

[30] A. Żołnierski, *Znaczenie nieformalnych źródeł informacji w procesach innowacyjnych*, [in:] T. Baczko (ed.), *Raport o innowacyjności gospodarki Polski w 2012 roku*, INE PAN, Warszawa 2013.

investment funds require first of all personal contact, without which it is impossible to discuss commercialisation. Social capital is of considerable importance here also in the context of investor relations in a broad sense[31].

Scientific institutions with low levels of social capital, with sporadic and difficult interactions with external partners, cease to understand the needs of the market and may misdirect scientific development, therefore making poor decisions related to the management of other components of their capital resources. Social capital influences how resources are acquired and the social relationships that allow control of decision-making in the organisational context[32].

Social capital begins to be seen as a key determinant of decisions in the innovation process, influencing the way information is acquired and managed in the process. Social capital itself – its role and importance – is particularly evident in the context of the nature of the information sought, its typology, where informal information happens to be the one that is of considerable importance in creating innovation. The quality of relationships that managers establish affects the ability to analyse information from both formal and informal sources. This occurs through consultation with entities or individuals that support the innovators' interpretive abilities. This is even more important because a frequently indicated barrier to information flow is its ambiguity. Barriers to the flow of informal information raise concerns about the possibility that subsequent intermediaries in the information diffusion process may distort the message. The credibility of information sources is determined primarily by the knowledge of the subject and the reliability and intentions shown by the information source. Innovative enterprises, but also research institutes (ITME type), make advanced use of all types of information sources regardless of the type of innovations they introduce.

Conclusions

One of the most important factors affecting the quality of social capital in the organisation's environment, and therefore its ability to effectively implement the decision-making process, is to build and maintain trust as

[31] H.-L. Chen, M. H.-C. Ho, W.-T. Hsu, *Does board social capital influence chief executive officers' investment decisions in research and development?*, R&D Management. Sep2013, Vol. 43, Issue 4, pp. 381–393.

[32] Z. Wang, R. McNally, H. Lenihan, *The role of social capital and culture on social decision-making constraints: A multilevel investigation*, European Management Journal. Apr2019, Vol. 37, Issue 2, pp. 222–232.

a characteristic of the population. In the context of the Institute of Electronic Materials Technology, this is also influenced by the personnel situation, including natural processes related to retirement, rejuvenation of the staff and breaking the existing contacts with the environment. On the other hand, the macro perspective in this respect indicates the importance of trust not only in the direct context of taking innovative decisions, but in the sense of directly touching the economic processes in which the organisation participates. It is primarily about issues of lowering transaction costs and building beneficial relationships in business, where entrepreneurs can make decisions based on less relativised premises. In this sense, trust, or more specifically social capital, is a kind of "ether" allowing for more efficient information acquisition. This is particularly important from the point of view of innovation. Trust, which is a central element of social capital, is not determined by culture, and culture is not uniform and identical in different economies. Therefore, it is also possible to speak of a state of equilibrium in the absence of trust, when the economy may be in equilibrium in a deficit of social capital. Hence, the conclusion is that individuals can function effectively (from an economic point of view) both in an environment where there is a lack of generalised trust and in one where social capital reaches high values[33].

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[33] P. Francois, *Social Capital and Economic Development*, Routledge, London 2002, pp. 79–80.

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Social capital of an innovative research organisation (case study)

Abstract

The aim of the article is to analyse the importance of social capital as a key factor in transforming information resources into knowledge and the process of commercialization. The study is based on the case study method used to present the Institute of Electronic Materials Technology.

The authors analyse the role of social capital in creating innovation in the organization's environment. Social capital plays a significant role in the context of the necessary information resources, its typology, where informal information turns out to be important in creating innovation.

The credibility of information sources is determined primarily by the knowledge of the subject and the reliability and intentions shown by the information source. Innovative enterprises, but also research institutes (ITME type), make advanced use of all types of information sources regardless of the type of innovations they introduce. Scientific institutions with low levels of social capital, with sporadic and difficult interactions with external partners, cease to understand the needs of the market and may misdirect scientific development, therefore making poor decisions related to the management of other components of their capital resources.

Key words: social capital, innovation, information management, ITME

Kapitał społeczny w innowacyjnej organizacji badawczej (studium przypadku)

Streszczenie

Celem artykułu jest przedstawienie znaczenia kapitału społecznego jako czynnika mającego kluczowe znaczenie w przekształcaniu własnych zasobów informacyjnych w wiedzę w procesie komercjalizacji. Artykuł opiera się na metodzie studium przypadku, za pomocą której przedstawiamy Instytut Technologii Materiałów Elektronicznych.

Analizujemy rolę kapitału społecznego w tworzeniu innowacji w otoczeniu organizacji. Sam kapitał społeczny – jego rola i znaczenie – jest szczególnie widoczny w kontekście charakteru poszukiwanych informacji, jego typologii, gdzie istotna w kreowaniu innowacji okazuje się informacja nieformalna.

Wiarygodność źródeł informacji determinowana jest przede wszystkim znajomością tematu oraz rzetelnością i intencjami, jakie wykazuje źródło informacji. Innowacyjne przedsiębiorstwa, ale także instytuty badawcze (typu ITME) w zaawansowanym stopniu wykorzystują wszelkiego rodzaju źródła informacji, niezależnie od rodzaju wprowadzanych innowacji. Instytucje naukowe o niskim poziomie kapitału społecznego, o sporadycznych

i trudnych kontaktach z partnerami zewnętrznymi przestają rozumieć potrzeby rynku i mogą źle kierować rozwojem nauki, podejmując przez to złe decyzje związane z zarządzaniem innymi składnikami swoich zasobów kapitałowych.

Słowa kluczowe: kapitał społeczny, innowacje, zarządzanie informacją, ITME

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