

The Wielkopolska Innovative Platform (WPI) as a modern medium of communication between science and business in healthcare

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Abstract: According to literature data not many scientific studies exist about the influence of innovations on the hospital performance also in Poland, therefore the aim of this paper was to study assessed the use of databases collected on Wielkopolska Innovative Platform (WPI), an innovative internet tool realised since 2009 by the Department of Business Activity and Agriculture (WDGR) of the Town Council of the City of Poznań in cooperation with scientific institutes, research centres and universities, for healthcare services using knowledge discovery in databases analysis. The study was preceded by snowball sampling analysis of literature data also complement the Triple Helix concept of University-Industry-Government relations in Knowledge Society introduced by Etzkowitz and other authors. The major result of the research has shown that Wielkopolska Innovation Platform is a successful medium and communication platform between science, business and government used in healthcare. WPI strengthens the market ability and sharing of scientific achievements in healthcare into practical productive forces and thereby contributes to local economy.

Keywords: Triple-helix model, Healthcare, Knowledge commercialization, Academic entrepreneurship

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1. Introduction

Globally healthcare systems are experiencing the challenging of improving the quality of care and decreasing the risk of adverse events (Kohn 1999). Healthcare organizations strive to deliver better health and better care at lower costs, they need to identify the new ways to understand healthcare information and introduce new methods of healthcare delivery (Sanfilippo et al. 2015). According to Dzau et al. (2013) in healthcare, there is a need for technological innovation that foster increased access, quality and affordability.

Many of the innovations necessary may come from entrepreneurial universities that deliver knowledge meeting market needs. Therefore, knowledge translation is the synthesis, dissemination, exchange and ethically sound application of information to improve health, provide more effective health services and products, and strengthen the health care system (Straus et al. 2013). Moreover, the World Health Report (2013) calls for more products created through partnership between universities, government and private sector.

However, based on Phillips and Garman (2006) entrepreneurship in healthcare has received little attention, perhaps in part because of barriers inherent in the structure and culture of healthcare organizations. Eliminating barriers can help promote entrepreneurial activities to drive continuing innovation and identify new sources of revenue.

To encourage the commercial translation of healthcare discoveries, public policies increasingly seek to stimulate the university-industry cooperation. Kaluzny and Obrien (2015) emphasize likely that both clinicians and patients will be also influenced by the role of government and the commercialization of healthcare.

What's more, enterprise have little communication with scientific institutions, leading the research results cannot meet the needs of the market and also the ability of research achievements into practical use (Jiang et al. 2010). Therefore, the quality of service need to be improved and according to Xu et al. (2015) the science and technology service needs the support information of technology infrastructure.

According to Heurich and Vignali (2015) not many scientific studies exist about the influence of innovations on the hospital performance in the German healthcare sector. The same applies to healthcare in Poland, that is why based on the current status of the development of the science and business cooperation in healthcare, this paper proposes constructively an elaborate

the Internet Platform called Wielkopolska Innovative Platform (WPI) introduced by the Town Council of the City of Poznań in cooperation with scientific universities and institutions too.

The first part of the paper focuses on the literature review in the field of research commercialization in healthcare as well as on triple helix model describing cooperation between university, business and government. Next, the research methodology is presented and in the following section the role of WPI as a practical tool in scientific research commercialization is discussed.

2. Literature review

A variety of data sources indicate that cooperation between universities and industry in healthcare is pervasive and of great importance to industry. Simply providing evidence from clinical research (such as through publications in journals or presentations at scientific meetings) is necessary but not sufficient for the provision of optimal care or decision making (Straus et al. 2013).

The transfer and commercialization of the findings of life-sciences research has demonstrable benefits for healthcare, the productivity of university researchers and their institutions, and local economic development (Cambell et al. 2004). Studies carried out by Mackintosh et al. (2005) concerning the global commercialization of health care indicate the need for the involvement of local government institutions in the creation of a high-quality, globally universal healthcare system.

Branscomb et al. (1999) document how biomedical discoveries account for the majority of reported inventions and licensed technologies at Japanese and American universities. Recently, Chattarjee and Sankaran (2015) studied a specialized higher education institution in India which is involved in the research and commercialization of biomedical innovations. They found that the effectiveness of their research commercialization efforts appeared to depend on organizational identities, while their efforts directed towards public or private merchandises appeared to co-vary with how organizational identities were oriented.

In the United States, universities, together with Academic Health Centers (AHC), have initiated the idea of establishing interdisciplinary teams of researchers to solve scientific

problems. An example of this is the creation of an academic incubator for scientists, doctors, lawyers, economists and students working on the genome and researching matters of public health by the Institute for Genome Sciences & Policy and the Duke Global Health Institute at Duke (Dzau et al. 2013).

In turn, the Stanford University has launched the Bio-X initiative, which includes the Biodesign programme for the development of new technologies in healthcare, among others. The programme fosters interdisciplinary research in natural sciences, involving specialists in medicine, physics, computer science, chemistry and engineering. Bio-X proved to be particularly effective in the development of medical devices and the use of fundamental research in patient care, as well as commercialization (Stanford University 2013).

Chang et al. (2015) examined university and industry collaboration practices in the context of the innovative, entrepreneurial and translational research environment at the Buffalo Niagara Medical Campus (BNMC) and at the University at Buffalo–State University of New York. The findings highlight the importance of funding opportunities and networks in translation of university expertise to clinically and commercial innovations.

In Poland, the efficiency and sustainability of health systems and their ability to respond to challenges of demographic change and scientific and technological development are among the most pressing issues needing adaptation and innovation (Report on Innovativeness in Health Sector in Poland in 2012).

However, according to many reports, such as the European Commission Innovation Union Scoreboard 2015 report, World Bank Knowledge Economy Index, Global Innovation Index, Economist Intelligence Unit's innovation ranking and Global Creativity Index Poland occupy one of the last positions in the rankings of innovation and research commercialization in Europe. A key role in this phenomenon plays a low interest in innovation activities and the commercialization of research, which place Poland not only one of the last places among the members of the OECD and the EU, but also far behind most countries in Central Europe located at a similar level of economy development (Orłowski 2013).

One of significant reinforcement elements of Polish innovation, according to the Global Effectiveness Report 2014-2015 is focusing on our innovation ecosystem in close collaboration with the private sector to enable a sustainable growth path for the country (Schwab 2014). This calls for strong public and private leadership, a clear vision and effective and ongoing

communication to build trust between all parties. In turn OECD Science, Technology and Industry Outlook 2014 report emphasizes a need to improve cooperation between the regions, state authorities and other entities that bring innovation, with a particular emphasis on the role of research institutions in Poland (OECD 2014).

Wandel (2016) who analyse the most important assumptions of European Union Strategy, juxtaposes goals and instruments of “Europe 2020” highlights the importance of Innovation Union flagship initiative. It enhance joint programming with regions and development of strategic research agenda focused on different challenges such as health and aging to build “bio-economy in 2020” (European Commission 2010).

The National Development Strategy 2020 of the Ministry of Regional Development points to the need to involve local authorities in the formulation and implementation of innovation policies. At the same time it is necessary for the local public administration authorities to assume the role of a leader who integrates the local academic, scientific and business communities, as well as coordinates the activities of entities within the regional innovation systems (Ministerstwo Rozwoju Regionalnego 2012). The need for cooperation between science and business also highlights Regional Development Strategy of the Voivodeship of Wielkopolska until 2020 (Urząd Marszałkowski Województwa Wielkopolskiego 2012) as well as Strategic Plan for The Development of City of Poznan (Wydział Rozwoju Miasta 2013). Moreover, the Regional Strategy of Innovation for the Wielkopolska Region for 2015-2020 emphasize the importance of networking between actors of the innovation system as a key success factor of innovation processes in the region (Urząd Marszałkowski Województwa Wielkopolskiego 2015).

3. Triple Helix Model

World practice proves that one of the most effective schemes for the self-organization and evolving of national innovation systems through university and academic science, economics and industry is the successful use of the Triple Helix Model (THM) (Dudin et al., 2015).

THM is defined as the interaction among university, industry, and government is the key to innovation and growth in knowledge-based economy. The university mainly generate knowledge and bring new ideas, industry remains as key actor as the locus of production, while

government is the source of contractual relations that guarantee stable interaction and exchange (Etzkowitz 2008).

According to Leydesdorff (2005), the role of universities is to position themselves on regional and global markets. The evaluation of the possibility to internalise research should be left to the industry. Meanwhile, governments should mainly decide on investment opportunities, strategy related to the use of technology or interventions at a structural level. Such a policy can be effective, provided an on-going analysis of trends in new technologies is carried out (Leydesdorff 2005).

The main processes that have to take place in an effective THM model of cooperation between science, business and government institutions, as presented in Figure 1, include:

1. Internal changes in each of the sectors that enable to strengthen the relations between entrepreneurs and assume the task of promoting economic development by universities.
2. Increasing cross-sectoral impacts, i.e. governments should amend the law on the protection of intellectual property in order to permit the transfer of individual copyrights or government rights to universities.
3. Creating trilateral networks and linkages instead of bilateral or inter-industry agreements.
4. Fostering the recursion effect in each sector (Etzkowitz and Leydesdorff 2000; Etzkowitz et al. 2000).

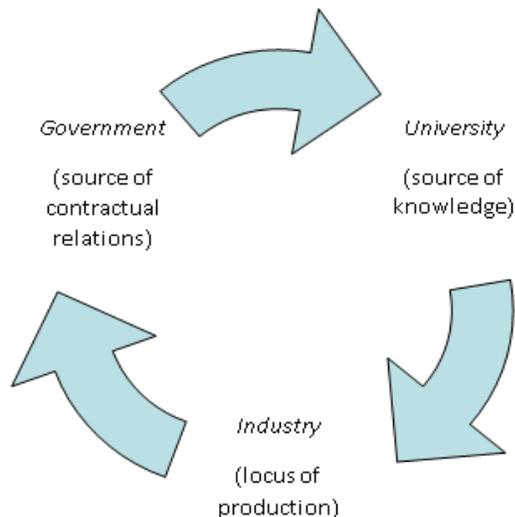


Figure 1. The Tripe Helix Model shapes national innovation system

Source: authors' own elaboration based on (e.g., Etzkowitz and Leydesdorff 2000; Etzkowitz et al. 2000).

In current literature also meets concept of Quadruple and Quintuple Innovation Helices moving from three to four or five degrees by adding “media-based and culture-based public ” as well as the “Civil Society” and then the “Environment” with varying degrees of complexity and dimensionality (Carayannis, Cambell 2009; 2010). However, Leydesdorff (2012) suggests that “fourth or fifth dimension would require substantive specification, operationalization in terms of potentially relevant data, and sometimes the further development of relevant indicators”.

Bojar and Machnik-Słomka (2014) accent that THM can be adapted in the process of realization of complex projects and should be carried out with the active involvement of a wide range of stakeholders in a network environment. However, this requires unanimity and cooperation in taking action at different levels by different groups of stakeholders.

Some authors adapted Triple Helix Model in medical innovation e.g. Petersen et al. (2016) focusing on supply, demand and technological capabilities, while Lee et al. (2015) highlighting the importance of networks in joint university-industry medical research.

4. Wielkopolska Innovative Platform (WPI)

The amendment of the Law on Higher Education of 11 July 2014 enables universities and research institutes in Poland to develop their own systems of commercialization of research results.

In this field particular importance is gained by the project of WPI which has been realised since 2009 by the Department of Business Activity and Agriculture (WDGR) of the Town Council of the City of Poznań with scientific institutions and universities. Its main objective was to create linkages between science and the economy through the promotion of the achievements of scientific institutions, as well as the integration and exchange of information between scientific research centres and businesses based in Wielkopolska. These measures have primarily aimed to commercialize the results of research activities carried out in Poznań (Szulczewska-Remi 2015). Wielkopolska Innovative Platform is an online platform (www.wpi.poznan.pl), which constitutes a communication medium and a database of offers made by research centres for business, created by seven public and one private university in Poznań, as well as six scientific institutions:

Eugeniusz Piasecki University of Physical Education, Poznań University of Technology, University of Fine Arts in Poznań, Poznań University of Economics and Business, Adam Mickiewicz University in Poznań, Poznań University of Medical Sciences, Poznań University of Life Sciences, Collegium da Vinci.

Partners of the project include also six scientific-research institutes, among which are Institute of Bioorganic Chemistry Polish Academy of Sciences – Poznań Supercomputing and Networking Centre, Institute of Logistics and Warehousing, Metal Forming Institute, Institute of Natural Fibres and Medical Plants, Institute of Plant Genetics Polish Academy of Sciences and prof. Waław Dąbrowski Institute of Agricultural and Food Biochemistry). In this form, the WPI became not only a forum for the exchange of experiences, but also an interdisciplinary centre of knowledge and technology transfer.

A network of academic promoters of entrepreneurship, appointed by the rectors of the various universities, has been established as one of the project activities. Their task was primarily to perform an on-going monitoring of research and development activities carried out by academic centres, and to expand the WPI database with offers of the highest potential for commercialization. In addition, they participated in meetings with entrepreneurs, organised trainings, exhibitions and entrepreneurship fairs.

5. Methodology

The research methodology proceeded in two stages. To develop a comprehensive overview of academic research on public measures to support university knowledge transfer, a detailed literature review covering the available electronic databases such as Google Scholar, Scopus and the holdings of the library of the Poznań University of Economics and Business as well as Poznań University of Medical Sciences were incorporated. Articles for the review were selected by snowball sampling method of English and Polish-language writings using the keywords “triple-helix model”, “knowledge commercialization” and “academic entrepreneurship” as well as a combination of terms. The inclusion criteria were studies that focused on healthcare sector. The literature search generated 96 papers that were retrieved for more detailed evaluation. “Constrained snowball sampling (limiting the percentage of articles

collected at each level) was presented as a feasible and effective alternative that allows for robust citation analysis” (Leacy, Beatty 2012). This made it possible to gather information and to formulate the research problem (Lisiński 2016).

In the second stage of the study knowledge discovery in databases method was applied for Wielkopolska Innovative Platform data preparation, data selection for exploration, data cleansing, defining additional subject knowledge as well as interpretation of results and exploration and visualization (Morzy 1999). More than 570 offers in Polish and nearly 200 in English have been collected over the period of six years. All offers have been grouped according to the following criteria:

- Analytical and measurement services – 226 offers,
- Research services – 320 offers,
- Research results (including licenses and patents) – 352 offers

It is worth noting that since 2012 there have been more than 600 inquiries from the business sector and almost 250,000 visits to the website.

Given the current literature, in the second stage of the study, of the total number of 550 offers, in the years 2009-2015, 69 offers fulfilling the criteria according to the scheme have been selected (Figure 2).

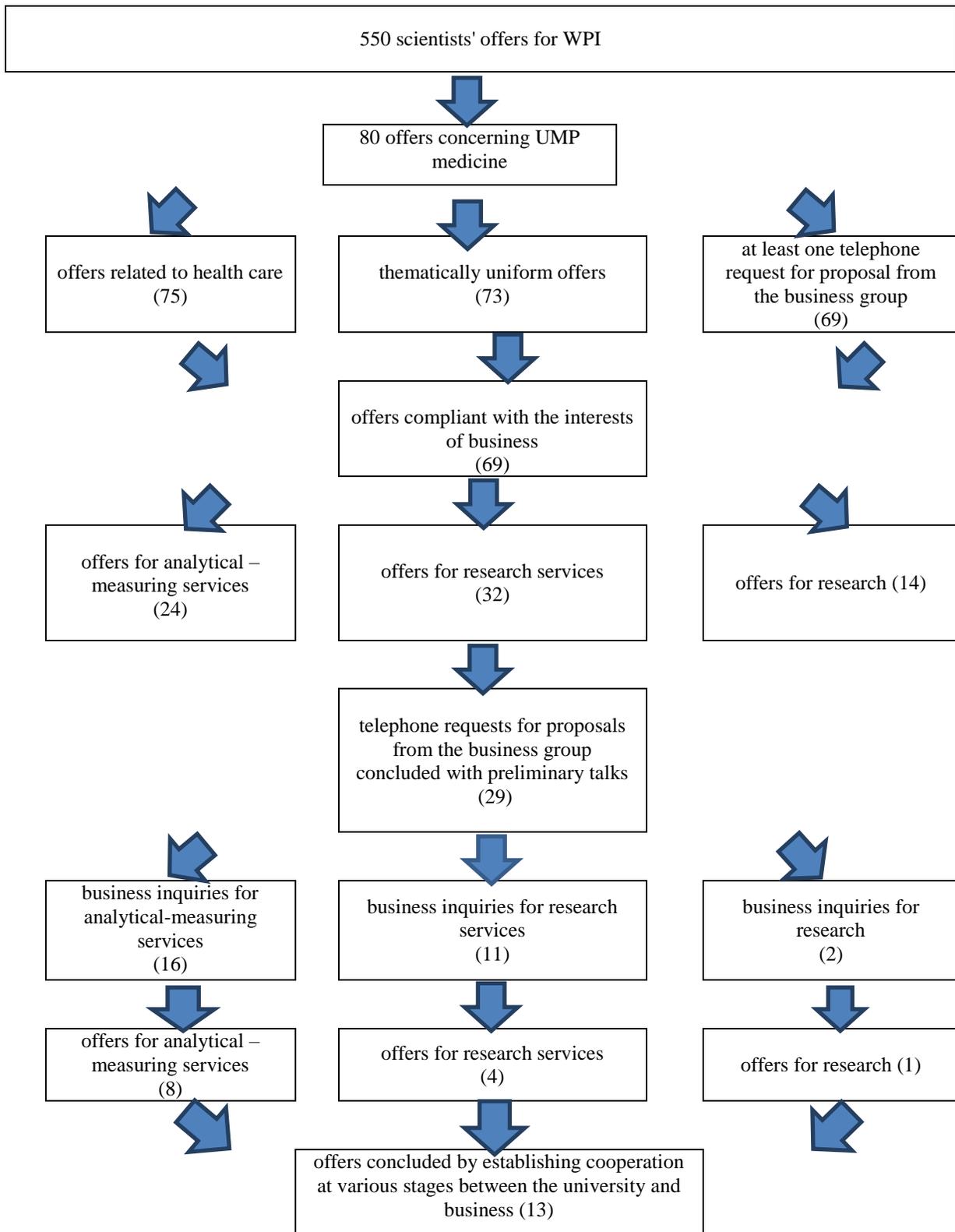


Figure 2. The scheme of research methodology. Own study based on survey.

6. Results and discussion

According to the report "Potential and Barriers of Polish Innovation" developed by Bukowski et al. (2012), one of the most important measures in the state innovation policy should include mediation in establishing cooperation and contacts by promoting participation in networks. As mentioned by Ławicka (2014), it is important to create an atmosphere conducive to the exchange of knowledge between university and business in Poland. In practice, these measures include the creation of communication platforms aimed at establishing direct relations between innovators, setting up databases (search engines) that allow easy access to information about the research sector and the private sector. These activities should be complemented by an overview of trends and new research directions, or databases containing patents.

This paper introduces the concept of THM used in healthcare as an example of university-industry-government (Triple Helix) interactions in Wielkopolska region. According to Ranga and Etzkowitz (2013) "among the components of Tripe Helix systems stands out: 1. R&D and non-R&D innovators; 2. "single-sphere" and "multi-sphere" (hybrid) institutions; and 3. individual and institutional innovators. These components depend primarily on technology transfer, collaboration and conflict moderation, collaborative leadership, substitutions and networking". Realizing the THM in practice Wielkopolska Innovative Platform was introduced. The basic tool of WPI is an internet platform made of database of offers, which collects information about scientific research as well as analytical and measurement services provided that can be applied in various sectors of the economy. Thus it was possible to create the greatest Polish database of research works results of Poznań universities and research institutes.

Of the total number of 550 offers, in the years 2009-2015, 69 offers fulfilling the criteria according to the scheme presented in figure 2 have been selected. The number of selected healthcare offers (part concerned the so-called mixed groups a/b a/b and b/c) is approx. 13% of the total number of offers (12.55%).

Out of 69 healthcare offers, approx. 37% are analytical and measuring services; approx. 48% are offers for research services, and only approx. 21% are research results.

In terms of the proposed scientist – businessman cooperation 29 full inquiries from the business sphere concerning particular offer groups have been submitted including:

a) approx. 55% of inquiries (16) concerned analytical – measuring services ,

b) approx. 38% of inquiries (11) concerned research services.

c) and only 7% of inquiries (2) were research results.

Less than 20% (13 offers) of cooperation offers have been finalised at different stages of cooperation (from holding business discussions at the management level to finalizing the research, largely declared confidential due to their nature, e.g. Isolation of selected compounds of plant origin, Testing the quality of life in patients with chronic diseases (eg. Hypertension), Directional pharmacological test, Mini-meta-analyzes for companies, Tests storage for food industry, The study of microbiology pharmaceutical, Storage studies, The study of substances of natural origin).

The distribution of the specifics of cooperation is presented below:

a) analytical – measuring services - approx. 61% (8),

b) research services - approx. 31% (4),

c) research results - approx. 8% (1).

The effectiveness of inquiries in the scientist – businessman relation is as follows:

a) analytical – measuring services - 50% (8 offers completed out of 16 successful inquiries),

b) research services – approx. 36% (4 offers completed out of 11 successful inquiries),

c) research results – 50% (1 offer completed out of 2 successful inquiries).

7. Conclusions

Research conducted by Dudin et al. (2015) showed new understanding of the role of three crucial institutional entities (the government, business, and science) that leads to reconsider and look for new model solutions on the formation of national innovation systems as environments that ensure sustainable national social-economic development.

As indicated by Sawhney et al. (2005), the process of collaborative innovation — a key process in value co-creation can be mainly impacted by the power of Internet. In this case, Internet is used as a platform for customer engagement, including interactivity, enhanced reach, persistence, speed, and flexibility, and suggest that firms can use these capabilities to engage customers in collaborative product innovation through a variety of Internet-based mechanisms.

In the presented study the Wielkopolska Innovation Platform was applied a successful medium and communication platform between science, business and government in healthcare. It has managed to implement 13 commercial projects (mainly analytical- measuring services, research services and research results), contributing to local economy.

Similar observations were noted by Maciejczak et al. (2007), who used triple helix concept in creating tools for the public sector. The results also complement research conducted by Jankowska and Pietrzykowski (2013) carried out in Wielkopolska Region, who has provided an insight into the treats that hinder the fostering of innovativeness through economic cooperation within networks as well as by Straus et el. (2009 and 2011) providing a model for the application of research and knowledge translation process in health care. The paper also responds to the research conducted by Krawczyk-Sołtys (2015) about importance of information and knowledge absorption from both internal and external sources using information technologies in Polish Public Hospitals. According to the authors, it is a prerequisite for the success of building knowledge economy in this region and opens up new opportunities for tightening cooperation between university, government and industry.

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Wielkopolska Platforma Innowacyjna (WPI) jako nowoczesne medium komunikacji pomiędzy nauką i biznesem w opiece zdrowotnej

Streszczenie:

Według danych literaturowych niewiele badań naukowych poświęcono wpływowi innowacji na wydajność szpitali, w tym polskich. Stąd też celem niniejszej pracy było zbadanie możliwości wykorzystania danych zgromadzonych w Wielkopolskiej Platformie Innowacyjnej (WPI), innowacyjnego narzędzia internetowego wdrożonego od 2009 roku przez Wydział Działalności Gospodarczej i Rolnictwa (WDGR) Urzędu Miasta Poznania we współpracy z instytutami naukowymi, ośrodkami badawczymi i uniwersytetami w opiece zdrowotnej. Badania uzupełniają również opisywaną przez Etzkowitz'a i innych autorów pozycję literaturową w zakresie koncepcji potrójnej helisy, czyli relacji uczelni, biznesu i instytucji samorządowych w społeczeństwie wiedzy. Przeprowadzone badania pokazały, że Wielkopolska Platforma Innowacji jest skutecznym medium i platformą komunikacji pomiędzy nauką, gospodarką oraz samorządami stosowaną w opiece zdrowotnej. WPI wzmacnia zdolność praktycznego wykorzystania i wymiany osiągnięć naukowych w służbie zdrowia, a tym samym przyczynia się do rozwoju lokalnej gospodarki.

Słowa kluczowe: Model potrójnej helisy, opieka zdrowotna, komercjalizacja wiedzy, przedsiębiorczość akademicka
JEL: H75, I23, L26