SOCIETY | REVIEW ARTICLE

Innovation and science dilemmas. Unintended consequences of innovation policy for science. Polish experience

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Abstract: The paper explores the relationship between the European Union’s innovation strategy and the Polish science policy. The research problem is unintended consequences of innovation policy in the field of science, in short, labelled as the science-innovation paradox. This phenomenon is divided into academic entrepreneurship paradox, human resources, financial and absorptive capacity paradox. The theoretical frame for the study is the perspective of new institutionalism and the triple helix concept. The analysis is based on desk research of secondary qualitative and quantitative data included in OECD, UE and national research institutions reports. The author claims that in Poland the academic institutions’ subjection to the rigor of innovation policy does not generate the expected diffusion of scientific knowledge to the business sector. In addition, it weakens the research and financial position of these institutions. It is shown that there are some new public institutions, such as science and technology parks, whose activities are actually a facade. Their functioning involves the state in the international process of building innovative economies but with a negligible impact on developing the scientific

ABOUT THE AUTHOR
Since 2017 I have been working at the University of Białystok at the position of assistant professor in the Institute of Sociology, Department of Sociology of Education and Sociology of Knowledge. With the researchers from the Department, among other Prof. M. Zemlo, we are conducting research from the field of modern sociology of knowledge. The main topics are the innovation studies and sociology of knowledge approach to discourse. As part of this research, I have written the article discussing the issue of the public interest of knowledge and knowledge democratization, among others Post-normal science. The escape of science from truth to quality?, Social Epistemology, no 32 (5)/2018. The article “Innovation and science dilemmas. Unintended consequences of innovation policy for science. Polish experience” is part of this research. I hope this work will increase the academic interest in the cultural determinants of innovation policy and raise the awareness of the necessity to adjust union policy to distinctive features of post-soviet countries.

PUBLIC INTEREST STATEMENT
The article explores the relationship between the European Union’s innovation strategy and the Polish science policy. In this paper, I show that in Poland European Union, innovation policy determines unintended consequences, to which I refer as the science-innovation paradox. This phenomenon is especially observed in the area of academic entrepreneurship, human resources skills and qualifications and the distribution of funds within innovation policy. The issue of science-innovation paradox is significant because the trajectory of innovation in Poland, as one of the representatives of post-Soviet states, differs from the experience of western European Union countries. The tool of national innovation system was designed for the states with economy, politics and culture based on well-grounded capitalism and democracy values. Poland is not the example of such a country. Therefore, in the field of innovation, it requires different policy methods. Currently, regardless the impressive funds invested in innovation policy, there is a clash between the national innovation system and Polish realities.
potential of the state and barely stimulates Poland’s innovation. This science-innovation paradox is determined by the lack of coherence between the rules of the EU innovation policy and the standards of Polish culture and economy. The paper contributes to the debate about the influence of diversified cultural factors on maintaining international organizations’ economic goals.

Subjects: Public Administration & Management; Education - Social Sciences; Education Policy & Politics

Keywords: innovation; science policy; innovation policy; triple helix; national innovation system; academic entrepreneurship

1. Introduction: science between policy and innovation. Theoretical background

As a result of engagement of international organizations, the idea of innovation as a remedy for the problems of countries facing economic recession has been diffused globally. The strategy adopted by the Organization for Economic Cooperation and Development (hereinafter OECD) had its scientific legitimization. It was the concept of European tradition of technology studies, more often referred to as innovation studies, initiated in the late 1970s by British economist Ch. Freeman (1974). In the late 1990s, as the consequence of intensive growth of research programs financed and coordinated by the European Union (hereinafter EU), the diffusion of the innovation idea intensified. At the turn of the twenty-first century, the development of national innovation systems became the member states’ priority task. The motivation for that was the Finnish success story, mainly illustrated with the Nokia concern (Castells & Himanen, 2002). The “Lisbon Strategy” (European Council, 2000) assumed radical economic transformation of the EU, which was expected to defeat the USA and Japan in the innovation competition. The perpetuum mobile of European economic explosion was identified with research carried out in areas of socially useful knowledge. Innovations were planned with the emphasis on structural and procedural modes. Thus, the EU policy focused on the creation of national innovation systems, which were to institutionally enforce the collaboration between the private sector and the research and development (hereinafter R&D) sector through various institutions controlled and coordinated by the state. Consequently, the concept of innovation reinforced the economic and commercial aspects in science policy and was put in the centre of it (Pelkonen, 2008, p. 64). According to M. Gibbons, it was the last stage in the evolution of the scientific policy of the post-war period from the phase of policy for science, through science in the policy arena, to the period of technological innovations policy (Gibbons et al., 1994, p. 158–159). B. Godin comments,

From its very beginning in the 1960’s, science policy has been concerned with funding scientific research, with technological innovation as the expected output … . Over time, the terms used came to reflect this very first goal. What was called science policy in the 1960s became science and technology policy in the 1970s, then innovation policy in the 1990s. (2008, p. 41)

Accordingly, science policy of UE member states is dominated by the agenda of the European Commission, whose credo is summarized by the slogan of “more jobs/more growth” (European Commission, 2006a). Commercialization exerts an impact on the renegotiation of the social contract between the state and the academia.

After remaining a comparatively isolated universe for a long period, both in relations to society and to the rest of the world, with funding guaranteed and a status protected by the respect for their autonomy, European universities have gone through the second half of the 20th century without really calling into question the role of the nature of what they should be contributing to society. (European Commission, 2003, p. 22)

It stems from the analysis of the European Commission’s documents that
universities will be responsible and accountable for their programmes, staff and resources, while the state will be responsible for the strategic orientation of the system as a whole through the framework of general rules, policy objectives, funding mechanisms and incentives. (European Commission, 2006b, p. 5)

The above-mentioned strategic orientation is represented in science and innovation policy systematically executed by the OECD. This is the example of the science policy paradigm captured by Riuvo (1994):

The policy which in spite of national variations, [demonstrates] a high degree of congruence in the core of views and instruments used. This proves at least that there is around the world a science policy community within the academia as well as within the national and international policy making bodies, which functions like any other specific community in the Kuhnian sense, spreading information, publications, memory and culture on views and instruments in the field. (as cited in Salomon, 1996, p. 79)

Due to the provenance of the subject, its analysis will be conducted from the perspective of new institutionalism and the triple helix concept. Indeed, the essence of the research problem may be paraphrased as mutual relations between the state and the institution of science. The new institutionalism perspective highlights the role of the institutions, limited possibility to design them, and inertia in that field.

New institutionalism rejects the model based on thoroughly free market competition between rational individuals, pointing out that the main participants of the exchange of goods and services are not individuals but organizations and institutions.... Moreover, it says that perfect competition is an abstract situation, whereas the costs of any exchange (transaction) are not null and they strictly depend on the institution. The institutional character of causes may be traced both in the case of market failures ... and state failures. (Sadowski, 2014, p. 91)

Basic conceptual categories obviously refer to the institution, in the simplest way defined as “an (observable) pattern of collective action, justified by a corresponding standard” (Czarniawska, 2009, p. 423), and (particularly important with regard to the science-innovation paradox) to institutional logic, namely “principles constituting the core of a strategy of operation and identity legitimized in the respective field” (Sadowski, 2014, p. 97). The intentional actions of creating, maintaining and disrupting institutions can be analyzed within the concept of institutional work as introduced by Lawrance and Suddaby (2006, p. 215). I focus on “embodied, materially mediated arrays of human activity centrally organized around shared practical understanding” (Schatzki, 2001, p. 2). The issue reflects the paradox of embedded, which is crucial for social action theories and embraces the tensions between the free will of an actor and the structures determining his actions (Pawlak, 2011, p. 357). Since I examine the unintended results of institutional work in the area of science innovation policy, I follow A. P. Cortell’s and S. Peterson’s definition of unintended consequences as “those policy, procedural and/or institutional consequences that diverge from the goals sought by the agents who originally established or altered the institution” (Cortell & Peterson, 2001, p. 771).

Interactions between academic institutions, enterprises and government authorities are the subject of the triple helix concept developed by Henry Etzkowitz (Etzkowitz, 2008). The key idea of the triple helix is that these interactions are the source of innovation in knowledge-based economy, where knowledge is created and transmitted both for practical use and for the advancement of the discipline (Etzkowitz, 2008, p. 41). In this concept, similarly to innovation systems, “industry remains a key actor as the locus of production, government as the source of contractual relations that guarantee stable interactions and exchange” (Etzkowitz, 2008, p. 7). The advantage of universities is students, who regularly bring in new ideas as they graduate, in contrast to government and business R&D entities, which lack the flow-through of human capital (Etzkowitz,
An example of triple helix relations is the invention of new types of innovation actors arising from academic research, among others incubators and science parks.

The first step toward the triple helix is reciprocal collaboration among the institutions, in which each one attempts to enhance the role of the other. For instance, as part of the economic strategy of the region, city authorities create a special economic zone for investors. The business sector expands the existing companies or creates new firms. The task of the regional university is to educate students according to labor market demand. Gradually, meeting expectations addressed to, e.g., university requires tools beyond the spectrum of its traditional instruments. Teaching students in accordance with the expectations of employers involves the need for a systematic study of this demand. Consequently, triple helix partners go through the “inner transformation” involving the assimilation of functions primarily served by other institutions. “Taking the role of the other” is the next step to develop the triple helix. The realization of new features should not be diverted from the original, fundamentally assigned targets of universities, firms and governments. Governments continue their regulatory, legislative activities, while acting as public venture units as well. Companies develop their training and R&D activity (Etzkowitz, 2008, p. 33). In contrast to theories which emphasize the role of the government in innovation, for example, Mode 2 by Gibbons (1994), the triple helix concentrates on the university as the source of technology and entrepreneurship. “The ‘capitalization of knowledge’ is the heart of a new mission for the university, linking universities to users of knowledge more tightly and establishing the university as an economic actor in its own right” (Etzkowitz, 2008, p. 27). Therefore, universities are obliged to create and transfer scientific knowledge, but within the innovation system, the results of scientific inquiry will be assessed with regard to their economic utility (McMurtry, 1991).

The basic pillars of the entrepreneurial university are strategic management, legal control over university resources (with the emphasis on the protection of intellectual property), technology transfer and the entrepreneurial ethos among the administrative staff, researchers and students (Etzkowitz, 2008, p. 27). The development of academic entrepreneurship addresses four areas. The first one refers to the increase of the availability of physical infrastructure, such as incubators or science and technology parks (Etzkowitz, 2008, p. 98). The second element relates to the growth of financial resources necessary in the initial phases of project development. The third factor is the diffusion of knowledge (advice and know-how) that is important to make the project go live (Etzkowitz, 2008, p. 98). The last element is the change in social attitudes by deepening the culture of entrepreneurship in the scientific community (Slaughter & Rhoades, 2004). The circulation of individuals in the triple helix is varied. It may involve the flow of workers from one sphere to another (e.g., a former academic begins to work as an entrepreneur), their “double life”, when a person is simultaneously employed in two different areas (e.g., an academic is also an employee in a government institution), and the alternation involving the temporary change of professions carried out in two different spheres (Etzkowitz, 2008, p. 26–27).

The final stage of forming the triple helix is the establishment of complementary trilateral interactions between the universities, companies and governments.

As the number of sources and levels of initiative increase among the triple helix actors, a meta-innovation system is created. A triple helix embedded in a flourishing civil society encourages the emergence of diverse sources of innovation. Creating an organization or network, representing different interests, in order to build support for a regional focus is a key element in such a strategy. Individuals, typically from the triple helix spheres, come together to brainstorm ideas, formulate initiatives and seek out resources to promote regional development initiatives. (Etzkowitz, 2008, p. 11–12)

According to the triple helix model, the partners of cooperation have a considerable level of autonomy. The center of interaction may be on the periphery of each of the spheres, and different institutions may engage in it with different intensities. The concept assumes it is possible to
achieve the equilibrium by applying different rules to the extent that is optimal for the specific environment and its surroundings. “The taking on of a new mission or role may enhance, as well as detract from, old ones. A careful balancing and willingness to experiment is the apparently contradictory, yet only healthy, prescription” (Etzkowitz, 2008, p. 19). While safeguarding the independence of the academia, cooperation of the higher education system with the economic and government systems affects the creation of many hybrid institutions existing on the junction of the three different systems that remain in an ongoing stage of adaptation to the constantly changing environmental conditions (Drori, Mayer, Ramirez, & Schofer, 2003). In the article, it will be explained that the norms of knowledge capitalization in the evolution of Polish academia are subject to negotiations, and so far, no principle has been clearly defined.

2. Science-innovation paradox
The main issue addressed in this section is science-innovation paradox understood by the author as the unintended negative consequences of science and innovation policy. This phenomenon is mainly concerned with not sufficient returns from the innovation strategy neither for the economy nor for the science institutions.

Despite the fact that the science and innovation policy has been in force for over 25 years, conclusions stemming from evaluation studies delivered by the EU do not engender optimism.

At global level, the EU continues to be less innovative than South Korea, the United States and Japan, but performance differences with the last two countries have become smaller.... The EU still has a considerable performance lead over many other countries, including China. However, China is catching up, with a performance growth rate five times that of the EU. (European Commission, 2016, p. 2)

It is worth mentioning that with regard to the USA and Western European countries, N. Stehr wrote in the year 2000 about the productivity paradox (2000). At the end of the twentieth century, in the discourse of social sciences, mainly in the area of economy, the idea of techno-nationalism intensively promoted by the OECD was extremely successful (Nelson & Rosenberg, 1993, p. 3). “Productivity in the long term is almost everything” (Krugman, 1994, p. 13). “Productivity is the source of the wealth of nations” (Castells, 1996, p. 80), proclaimed scientists. This assumption was quickly verified. “You can see the Computer Age everywhere but in the productivity statistics”, commented R. Solow in the New York Times (New York Times July 12,1987). Stehr, explaining the phenomenon of the productivity paradox, points out

In the last two decades economists in particular have been puzzled and even irritated about the apparent lack of measurable productivity gains in goods producing and services industries in OECD countries in response to or in conjunction with the immense investments in recent years in information and communication technologies. It [productivity paradox] results from the disjuncture between the immense economic expectations and promises ... on the one hand, and the apparent lack of sustainable economic payoffs ... on the other hand. (Stehr, 2000, p. 257)

With reference to the observation made by Stehr, the research problem undertaken in this article is the unintended consequences of innovation policy in the field of science in Poland, in short, labelled as the science-innovation paradox. The source literature offers numerous reports on quantitative studies with regard to innovative activity of Polish universities; however, the qualitative perspective is marginalized. In the light of dominance of economic analyses, there are too few studies conducted from the sociological perspective. Apart from works by among others Kwiek (2005, 2006, 2008) which refer to a certain degree to the science-innovation paradox, there is a cognitive gap related to the lack of comprehensive diagnosis of the innovation policy which could explain the status quo, not in a descriptive manner but in a teleological way. The article is an attempt to fill in this gap.
3. Academic entrepreneurship paradox

This part of the paper examines the academic entrepreneurship paradox which refers to inherent contradictions resulting from the influence of science and innovation policy on academic institutions. The main concern is that these entrepreneurial activities could negatively impact academic research (Rosell & Agrawal, 2009). The phenomenon stems from the globally predominant idea of the universities commercialization and is observed in many countries worldwide (Feldman & Desrochers, 2004; Poyago-Theotoky, Beath, & Siegel, 2002).

In respect to the EU, the research reports present the image of universities, which are “not globally competitive ... even though they produce high quality scientific publications” (European Commission, 2003, p. 2). When compared with the average rank achieved in total by the EU countries, the results of Poland appear quite poor. In 2016, Poland ranked 23rd out of 28 countries classified in the ranking of ‘The European Innovation Scoreboard 2016’ (European Commission, 2016). In the statistics of the ‘Global Innovation Index 2016’, out of 141 countries, it ranked 39th, after the Baltic States, Bulgaria and Moldova (Dutta, Lanvin, & Wunsch-Vincent, 2016). In spite of the successive increase of funds allocated for the stimulation of innovative activity, insufficient return of the outlays is observed. As for the efficiency ratio, Poland ranks 71st in the ‘Global Innovation Index 2016’ (Dutta et al., 2016). The analysis of the Polish innovation policy may be divided into two phases: the stage of system transformation and the period of membership in the European Union. The policy in the time of transformation has been severely criticized by many authors (Czerniak, 2013; Jasiński, 2006; Marciniak, 2010; Okoń-Horodyńska, 1998, 2012, 2013). At the end of the 1990s, when innovation was reaching its peak in the EU rhetoric, Poland was intensively catching up after the system transformation. It was in the group of less developed countries of two-speed Europe. Nevertheless, in compliance with the benchmarking principle adopted by the Union, cultural diversity stemming for instance from various historical experiences was not considered to be an argument for implementing differentiated elements of the innovation system, e.g.,, in countries of Central and Eastern Europe.

Upon joining the integration processes, the first strategic documents, new legal acts and programs supporting innovativeness were created. In 2000, the Council of Ministers adopted the document ‘Increasing the Innovativeness of the Polish Economy until 2006’. The ambitious innovation strategy clashed with the reality of Polish scientific policy, which at the time concentrated on adjusting the system of higher education to the EU requirements. It should be noted that at the dawn of the twenty-first century, Poland was experiencing the biggest university educational boom in Europe. Due to the fact that in the context of a sudden increase in the number of students, state universities were not able to admit the sufficient number of candidates, many private universities arose. Even now, private universities outnumber state ones about three times. Academic staff, modest in comparison to the number of students, increased their engagement in didactic activity, often working at several universities at the same time. Research activity was of marginal character, which also stemmed from the specificity of meagre R&D infrastructure universities had at their disposal. At the beginning of the 1990s, the state considerably limited the budget intended for R&D. Due to the sudden privatization of companies running technological activities, many of them were taken over by foreign capital and the Polish technical industry practically ceased to exist. Therefore, research is more typically carried out by public institutes of the Polish Academy of Sciences, which focus on basic research. The majority of private universities actually do not engage in research activity, since from the economic perspective it is not profitable for them.

With Poland signing The Accession Treaty, the innovation policy intensified. In 2005, “The Act on Certain Forms of Supporting the Innovation Activity” (Journal of Laws of 2005 no. 179 item 1484) and “The Act on Higher Education” introducing the term of academic entrepreneurship (Journal of Laws of 2005 no. 164 item 1365) were launched. A year later, the Ministry of Economy published the ‘Strategy for Increasing the Innovativeness of the Economy in Years 2007-2013’.
Years 2007-2013 shall be used for executing social awareness transformation, referring in particular to entrepreneurs and scientists, as a result of which innovations will be perceived as the basis of the competitiveness advantage ... and the most important development chance of Poland. (Ministry of Economy, 2006, p. 6-8)

The following document of the Ministry, ‘The Strategy for Innovativeness and Efficiency of the Economy. Dynamic Poland 2020’, included a similar message:

The strategy of Europe 2020 is based on seven flagship initiatives, out of which the Innovation Union is the closest to the Strategy. Its assumptions are convergent with the goals of the Strategy ... within the scope of building the economy based on knowledge through increasing the scientific potential, creation of the integrated research infrastructure, increasing the level of education and e-skills, increasing the mobility of university staff ... and commercialization of inventions and innovations. (Ministry of Economy, 2013, p. 7)

One of the first recommendations referring to Polish science institutions referred to the development of academic entrepreneurship, defined as

The cooperation [of the university] with the business environment, in particular through the sale or free-of-charge passing of results of R&D works to entrepreneurs as well as popularizing the idea of entrepreneurship in the academic environment, in the form of economic activity separated organizationally and financially. (The Act on Higher Education of 27 July 2005, Journal of Laws of 2005 no. 164 item 1365)

In the source literature, academic entrepreneurship is most often associated with innovativeness, because new technologies are predominantly considered by economists as the factors of economic development (Bąkowski et al., 2005). The forms of the academic entrepreneurship are varied; they cover, i.e., intellectual property management, commercialization of R&D, the flow of knowledge from universities to business, and primarily, activity related to establishing and running companies by researchers with the participation of universities (spin-out type companies) or without the participation of universities (spin-off type companies). The cooperation between universities and enterprises was supposed to take place within the scope of so-called domestic research networks, namely

facilities with large-scale modern research infrastructure, able to bring together the scientific potential of a given country, region, or even the whole Europe ... [which] are becoming more and more important tools intended for ... the creation of long-term competitive advantages of Europe in the area of research, development and innovations. (Ministry of Science and Higher Education, 2013)

Apart from universities, the Polish Academy of Science and R&D institutions, the national network was supposed to consist of technology transfer centres, enterprise incubators, science and technology parks and R&D centres. In this article it is impossible to characterize the activities of all these institutions; hence, I will focus on the analysis of science and technology parks.

Besides the long-lasting tradition of this type of institutions in Western Europe, mainly in Scandinavian countries, in the majority of post-communist states, such parks have come as a novum. Briefly, the parks are institutions in which, due to the concentration of companies of one sector and their supporting R&D centres, the economic and scientific activity is developed. There are two basic categories of parks: scientific ones, created upon the initiative of academic institutions, related to a particular university and oriented at the transfer of R&D knowledge, and technological ones, mainly developed on the initiative of self-government authorities, oriented at soliciting external investors and gathering the research potential in the region. In Poland, the majority of institutions combine the features of a technology and science park; thus, in literature, these terms are used as synonyms. This approach has been also adopted in this study.
In 2000, three technology parks were operating; 4 years later, there were already 12 (Bąkowski & Mażewska, 2015, p. 27). The factor enabling the development of such centres was associated with the access to EU funds, which is reflected by the age structure of park: over 54% of them were created in the years 2006–2014. Currently, the precise number of science and technology parks is not known. It is estimated at between 42 and 83 (Bąkowski & Mażewska, 2015, p. 11). Such discrepancies stem from the ease with which the institutions can be established, transformed and liquidated. In fact, it is not an easy task to determine whether a given park operates. The update of their status run by the Association of Organizers of Innovation and Entrepreneurship Centres in Poland (hereinafter SOOIPP) is based on the voluntary engagement of the Association members. A more comprehensive review is conducted every 2 years. It should be emphasized that the parks have an ad hoc nature (from one EU project to another) and are phased out or activated depending on whether external financing has been obtained. According to the Association, there are approximately 43,000 functioning economic entities and about 42,000 students per park in Poland (Bąkowski & Mażewska, 2015, p. 28). Academic institutions are the second largest investor in companies managing the parks with regard to assets possessed, following self-governmental authorities (Bąkowski & Mażewska, 2015, p. 38). With the implementation of financial support from domestic and regional funds, 12 parks have modern research laboratories, which they use for the provision of research services for external entities (52% of the parks), as well as rent out to tenants (50%). Forty-eight per cent of the parks do not have any laboratories (Bąkowski & Mażewska, 2015, p. 38). And even in the case of ones that have them, modern and expensive infrastructure becomes a source of new challenges and problems. Maintaining the equipment constitutes a considerable financial burden which the parks have to face. Representatives of universities admit that in fact, the use of EU support enabled them to enhance the quality of the research infrastructure; however, in the long-term perspective, it leads to financial problems of the universities, which need to take out substantial loans to maintain them (Forum Akademickie, September 2013). Thus, the cooperation with private companies mainly refers to soliciting academic specialists in the field of technology transfer. The use of research infrastructure and project partnerships with business is the second most important element. Consequently, there has been a gradual increase in financial contribution to the park from the leading institutions, most often a university or a unit of territorial self-government. In 2013, the level of financing from own resources only amounted to about 38% of the current needs, in comparison to 53% in 2011 (Bąkowski & Mażewska, 2015, p. 33). The basic offer for clients of the parks, which consists of counselling in areas of economic law (~39%), technological and patent information (~23%) and business management (~20%) is gradually becoming exhausted (Bąkowski & Mażewska, 2015, p. 34). Although several centres revealed revenues from laboratory services, they were on a despicably low level of about 3% (Bąkowski & Mażewska, 2015, p. 34). The parks limit their offer exclusively to services paid for within the scope of the executed projects and they focus on renting out the space. The fact that among the tenants of parks, 45% of the companies are innovation enterprises can be regarded as a kind of success. Nevertheless, companies dealing with telecommunication services and the activity related to software and counselling in the IT field prevail (Bąkowski & Mażewska, 2015, p. 36–37). Nonetheless, the parks have been established to support the development of technological enterprises with production or service potential, but these proportions have been distorted in favour of companies supporting production. It is also worrying that parks rent out their area to companies whose activities are not related to technology. Sometimes tenants include beauty salons, insurance companies, or even constituency offices. This phenomenon is pathological. In this context, the data on meagre activity in the field of soliciting funds for research comes as no surprise. Merely 10% of the companies functioning in the parks have applied for funds from financial support programs distributed by the National Centre for Research and Development, Polish Agency for Enterprise Development (hereinafter PARP) and Regional Operating Programmes. Polish scientists sporadically demonstrate entrepreneurial approaches. The survey of the PARP reveals that only one-third of academics have over 3 years of experience in commercial companies, and only one-seventh of the surveyed academics have more than 5 years of such experience (Banerski, Gryzik, Matusiak, Mażewska, & Stawasz, 2009, p. 11). Half of academics do not have any experience of this kind. Only 9% of the surveyed university staff run their own
companies. Half of scientists consider their employment environment as fostering entrepreneurship. Still, while 66% of the academic staff believe that their colleagues would have a positive attitude to them establishing companies, only slightly above half of scientists (54%) claim that their superiors would display a favorable attitude to such decisions (Banerski et al., 2009, p. 82). The report “Academic Entrepreneurship Versus Development Dilemmas” reveals that academics assess negatively the activity of the university with regard to establishing contacts with the industry (Pregiela, 2010, p. 22–23). The dominant opinion is that such activities are random and chaotic. More than a half of the respondents do not know whether their university cooperates with the PARP or Foundations for Enterprise Development. Others assess that relationship as not satisfactory and highly formalized (Pregiela, 2010, p. 28–29). The main form of cooperation refers to academic’ participation in trainings organized by such institutions. With regard to technical barriers, the respondents most often point to the lack of appropriate, modern laboratory and experimental equipment, although the majority of them emphasize positive changes occurring recently in that respect. Among financial barriers, the respondents list the lack of funds for the preliminary investigation and implementation phase, the lack of funds for consultation travels or funds related to the necessity to conduct research and experimental trials in recognized foreign research centres (Pregiela, 2010, p. 31–32). They point out the lack of support from the university to the entrepreneurial individuals and, at the same time, the creation of an organizational structure and introduction of legal regulations with respect to academic entrepreneurship. It should be noticed that the engagement of academics in commercializing knowledge preceded regulations introduced in this matter. Those who take up such activities encounter many obstacles which they have to overcome alone in the not-so-friendly atmosphere of legal and market environment. One of the representatives of universities emphasized:

Any type of engagement of an educational institution, its employees and students in business activity is a problematic issue in the light of the binding provisions of law. Actions of the business world combined with tasks pursued by public educational institutions raise many fears with respect to the interpretation of the binding regulations by regulatory bodies. Such a public and legal partnership is particularly subjected to evaluations of regulatory bodies which, in the maze of legal provisions, seem to be utterly aiming at finding reasons to suspect abuse and irregularities, which actually are not even intended by cooperating partners. Therefore, to avoid such problems, there is a tendency to withhold from attempts of such cooperation. (Klimczuk, 2011, p. 22)

4. Human resources paradox
In this section, the term human resources paradox is used to describe the unintended consequences of science and innovation policy for the quality of the human capital. The main aim of this part is to analyse the consequences of educational boom and the problem of brain drain in Poland.

In reports of the OECD and EU, in terms of the quality of human capital, Polish innovation system is assessed quite high. In 2016, the percentage of youths aged 20–24 having attained at least upper secondary level of education reached about 90%, in comparison to 82.6% of the EU average (European Commission, 2016, p. 67). These results are mainly obtained thanks to a significant percentage of people with higher education, which in Poland is above the EU average. Probably, on the basis of enrolment rate, the development of Polish society can be discussed in terms of knowledge society. However, optimistic analyses of the growing level of Poles’ education ignore the weaknesses in higher education, stemming in particular from the process of its commercialization, more and more often articulated by sociologists and pedagogists. The authors of the report ‘Poland 2050’ recognize such an impressive educational boom as the greatest weakness of the Polish educational system (Kleiber et al., 2011, p. 46). They notice the emergence of the enormous disproportion between the increase in the number of students and the didactic staff. Contrary to the growth in the number of students (in the peak time it was fivefold), the number of academic staff did not even double (Kleiber et al., 2011, p. 32). There is an increase in the number of individuals who begin their scientific career, but this growth is disproportionate to the scale of the higher education boom. This especially applies to educational institutions of the humanities,
which have subjected the already marginal research activity to teaching. With regard to technical universities and specialized universities, quite an opposite process occurred: the outflow of top graduates to the private sector abroad, which offers much better financial conditions. According to the “Global Talent Flows” report (Kerr, Kerr, Ozden, & Parsons, 2016), Poland is second in the world (India is first) with respect to the growth rate of the outflow of qualified personnel. The analysis performed by the World Bank shows that educated immigrants increase the level of innovations in their country of destination and it seems that young people are less attached to a place or nationality (Kerr et al., 2016). In Poland, in just one decade (2000–2010), intellectual migration increased by 115% (the indicator comprises people who completed at least 1 year of higher education) and the number of educated people leaving the country was 500,000 in 2000 and over 1 million in 2010 (Central Statistical Office of Poland, 2016, p. 431–461). The authors of the ‘Poland 2050’ also note the deficient number of doctoral students in science and technology. In 2015, the number of new doctoral graduates per 1,000 persons in the population aged 25–34 was on the low level of 0.6 in comparison to the EU average, which was 1.8 (European Commission, 2016, p. 67–68). The number of non-EU doctoral students as the percentage of all doctoral students was much below the EU average and amounted to 1.3% vs 17.8% within the union (European Commission, 2016, p. 67, p. 89). In the past decade, Poland occupied one of the last places in respect of creation of intellectual property. In 2015, the number of international scientific co-authored publications per million residents was about 251 vs the EU average of 451 (European Commission, 2016, p. 67, p. 89). Almost twice lower than the EU average, 5% vs 10.5%, was also the number of scientific publications in the top 10 most cited publications worldwide as the percentage of the total scientific publications of the country (European Commission, 2016, p. 89). What is important, in the 2007–2012 period, the number of patents for Polish inventions in the European Patent Office per 1 million of workers tripled. But it is still 10 times fewer than the EU average, and much fewer than the average for Hungary or the Czech Republic (Weresa, 2015, p. 228). These results are especially alarming, revealing the phenomenon of unstable potential of the innovation. The authors of the report “Pro Inno Europe” (European Commission, 2012, p. 4–5) argue that parallel to the growth of gross enrolment ratio, the increase of other innovation indicators is observed. Still, in Poland, this indicator is not correlated with other dimensions of innovation. Meanwhile, the states of the region with lower enrolment ratio, in particular, Estonia, the Czech Republic and Slovenia, are improving their innovativeness much faster than Poland.

5. Financial paradox

This part will examine the absurd repercussions stemming from the development of EU innovation policy by Polish authorities. This phenomenon is described as the financial paradox and refers to the situations of impressive influx of union funding being counterproductive in relation to innovation rate.

A significant weakness of the Polish innovation policy is the level and source of funding. According to experts from the Institute for Structural Research,

at the macroeconomic level there is an obvious complementarity between the government and private R&D expenditure. This means that the increase in public spending on innovation entails an adequate increase in private expenditure, although these changes do not occur linearly. (Bukovski, Szpor, & Śniegocki, 2012, p. 10)

Despite the fact that government actions are directed towards the growth of expenditure on R&D to the level of 1.9% in 2020 (about 1% now), it is still not a satisfactory rate. The reason for concern is the fact that the previous growth of GDP expenditure on research involved exclusively European funds (Bukovski et al., 2012). Cohesion policy, of which Poland was a beneficiary for many years, is almost ending, and one should reckon with the fact that after 2020, the pool of funds allocated to support Polish innovation can be significantly reduced. Cohesion policy designed to reduce the developmental differences between the new member states in the EU will be gradually displaced by the strategy of promoting competitiveness. It may be a black scenario for the Polish innovation policy.
On the other hand, a sudden influx of funds for innovation policy contributes to its low efficiency, as the money has to be used in a relatively short period of time. As a result, the investment bubble appears, that is, the mechanism that lies in too rapid growth of expenditure on innovations (Freeman & Van Reenen, 2009). Suddenly emerging funds are hard to use effectively by officials and entrepreneurs who simply do not have appropriate experience and know-how. If there is no potential for generating innovation, financial resources allocated to stimulate innovation only decrease the quality of R&D works and exclude private financing. Therefore, it seems quite possible that the amount of €82 billion allocated to stimulate innovation in Poland from 2012 to 2020 will not gain the expected return. The dysfunctional mechanism of management of European funds is strengthened by the conservative attitude of public administration, which, when assessing projects for subsidizing, mostly chooses ones that are not very ambitious and not very risky. Breakthrough innovative ideas do not fit this category. The analysis of the structure of resources allocated as part of “The Innovative Economy” operational programme shows that large enterprises, often branches of international corporations, receive the larger part of the resources. In effect, the majority of the money is spent as non-refundable aid for not very innovative capital investments of large enterprises, e.g., the modernization of production lines. Thus, public aid goes to safe investment projects of large enterprises, generating considerable effects of idle loss, i.e., subsidizing projects that would be executed even without this help (Plawgo, Klimczak, Cżyż, Boguszewski, & Kowalczyk, 2013).

In Poland, there is a paradoxical situation. Because numerous laboratories and other research infrastructure on many universities have been (co) financed by operational programme “Innovative Economy”, in accordance with the European norms of bureaucracy, these infrastructures cannot be used for commercial purposes. It is the weak point of many Polish academic centres. The researchers, collaborating with the business sector, often in companies such as spin-off, cannot use modern research infrastructure, purchased to promote Polish innovation. From these, laboratories cannot even use students in the academic start-up. In such situation, research resources are simply just wasted and another barrier in establishing relationships between the academy and business is created. The representatives of private sector can have the impression of participation in a facade of mutual cooperation, which rules are not entirely clear nor even logical.

6. Absorptive capacity paradox
This section of the article discusses the absorptive capacity paradox. The term refers to the growing problem of mismatch between the technological capability and social capability leading to different rates of the growth and development. The absorptive capacity paradox is established in the literature starting with Cohen and Levinthal (1990), Koo and Perkins (1995), Fukuyama (1996).

Although for more than a decade Poland has been taking part in international comparative studies of innovation potential using the “Oslo Manual” methodology (OECD 2005), in source literature the Polish innovation system is classified as a system in the course of transformation (Bukovski & Śniegocki, 2011). The available empirical data show that the system is actually in statu nascendi. Indeed, there exist some component institutions, but there are no relationships between them. It seems legitimate to conclude that as a result of the need to allocate financial resources from the EU devoted to the development of innovation, the Polish government is implementing a kind of innovative policy, but it is much too early to call it a system. The authors of the report “Regional Innovation Systems in Poland” argue that so far, Polish authorities have not managed to build cohesive systems of innovation (Plawgo et al., 2013, p. 17). “We can only identify individual institutions, documents and activities—expressions of the system functioning—but we should be aware that they do not make a comprehensive system of innovation” (Plawgo et al., 2013, p. 20). The environment of innovative business, i.e., entities such as clusters, science and technology parks and consortiums, is considered to be the weakest element of the structure. Actually, local decision-makers find it difficult to evaluate the role of these institutions. They appreciate the very fact that they exist, but they question their effectiveness. No relationship is observed between provinces’ levels of innovation and the positive assessment of the role of these institutions (Plawgo et al., 2013, p. 30). The dominant attitude of the
system stakeholders is that if a task can be done individually, no collaboration is pursued. This paradox is determined by the lack of coherence between the rules of the European Union innovation policy and the standards of Polish culture and economy. From the point of view of the new institutionalism, it is possible to refer to “certain fields which overlap, thus creating a multi-level collage of different logics” (Sadowski, 2014, p. 96). The innovation system—designed as a remedy for the decline in production capacity of economies of developed Western European countries—has been copied in a country with a different history and social structure. The logic of benchmarking, which requires the creation of national innovation systems and is addressed to states where the formula of productive economy is becoming depleted, is not suitable for Poland, which just two decades ago was an example of a centrally planned economy and now is undergoing transformation, with ambitions to become a productive one. The problem, indeed, is more complex, and its essence seems to rely on the fact that even the concentration of innovation policy on attracting foreign investors will not affect the change of imitative character of Polish innovation. Innovations arise in countries with the greatest potential for research, and where these resources are on the lower level are done only minor products modifications (Bukovski & Śniegocki, 2011, p. 42–44). Therefore, in Poland, companies’ investments in innovation do not have the nature of R&D, but reproductive based on the adoption of existing solutions (Bukovski et al., 2012). In this respect, Poland is significantly above the EU average. Yet, there is a fairly high rate of export of innovative goods, but produced in the country on the basis of technology and know-how developed abroad. As a result, in Poland, the imitative model of innovation is preserved.

Therefore, the assumption that in Poland innovation may be created by the cooperation of scientific, business and state institutions does not correspond to the actual status quo. Each of the above entities has its specific cultural roots, legal and administrative procedures, and organizational governance. These characteristics are so distinctive for each institution that a compromise and cooperative activities among them are very unlikely. Consequently, the model of triple helix interactions as the source of innovation cannot be applied to Polish society.

After 1989, universities commenced the process of constructing the rules for conducting scientific activity in a free country. Liberation from the power of the USSR required the reconstruction of the standards of academia, which should be closely connected with the mission of science, that is, pursuing the truth. It is a time-consuming process that requires a certain level of stability with respect to the functioning of scientific establishments. Presently, there are no appropriate conditions for Polish universities to constitute their own standards for conducting commercial scientific activity, since they are in the stage of constructing the standards of classic research activity. Consequently, only to some extent does the world of Polish science notice a chance in stimulating academic entrepreneurship and developing the cooperation with the business world. Although a number of initiatives were undertaken to obtain EU funds intended to increase the quality of human resources and stimulate economic innovation, very often the aim of Polish education and government institutions was not to actually develop academic entrepreneurship, but rather to obtain financial resources. When the financial sources were depleted, initiatives were closed down or switched to the sleep mode.

Thus, before higher education institutions in post-communist countries adopt a business approach, they need to establish stable conditions for conducting (traditional, university) R&D activity. Otherwise, universities will become a phony institution with very little potential for research and, thus, a marginal area for cooperation with the business world. Nonetheless, it seems that currently Polish universities are falling into the trap of never-ending cycle, which from the perspective of neo-institutionalism is referred to as constant reinstitutionalization defined by Jepperson as an exit from one institutionalization and entry into another institutional form, organized around different principles or rules (1991, p. 152). As Pawlak (2011, p. 365) depicts,

Because of the shaking off of the institutional order, the kaleidoscope of new successive institutional orders appears, but such a kaleidoscope in fact is not an order but chaos. In this view,
institutional creation follows the logic of appropriateness, since new institutions are adopted because they are understood to be legitimate in light of prevailing (inter) national practices.

Scholars have applied this argument to explain countries’ failure to comply with international standards (Cortell & Peterson, 2001, p. 773). Among them, Miettinen (2002, p. 18) stresses that

The current innovation policy is beset by a fundamental paradox. The forms of governance aimed at increasing the efficiency of the production of well-defined outputs, which were inspired by the mass production paradigm, are continuously, and in many cases, increasingly used in industry and public management. These forms of governance not only reduces the quality of activity but also virtually stifles experimentation and social innovations. These outdated forms of governance should be replaced or transformed so that they support and encourage local experimentation and innovation. This, in turn, would lead to the strengthening of democracy in society.

7. The success stories of innovation
For the time being, the process of establishing effective organizational standards of supporting innovation in countries with specificity different than that of the developed countries of Western Europe, instead of beginning with the implementation of mechanisms of systemic nature, should start with designing and testing some solutions, also experimental ones, on the micro-scale—not even the regional one, but preferably at the higher education institution level. In poorly industrialized regions, universities will find it more difficult to establish cooperation with the world of business, which is focused on providing services and is less interested in producing new technology. However, it does not prove that higher education institutions situated in such a region cannot be innovative on their own. The Bialystok University of Technology and the Medical University of Bialystok located in the poorly industrialized eastern region of Poland are perfect examples to prove this thesis.

The Medical University has the Centre for Experimental Medicine, which is 1 of the 10 most advanced experimental facilities in Europe. In the case of University of Technology, innovation is mostly visible on the part of students, who without professional support from local entrepreneurs win prizes in international competitions of Martian rovers. The rovers designed by students won the championship title at the University Rover Challenge competition in Utah three times: in 2011, 2013 and 2014. Moreover, the application-controlled robot Photon that teaches children software development and logical thinking was also developed at the Bialystok University of Technology. This is the first commercial invention of students. It is also worth mentioning that at first, due to difficulties with obtaining financial aid from the educational institution, students presented their project on one of the crowdfunding websites and thus collected money to build the prototype of Photon. They did not receive any funding from public sources at the implementation stage. In the case of the Martian rover, the situation was similar.

It is also important to follow the case of the biggest commercialization of Polish research so far. In 2016, the team from the Faculty of Physics and the Centre of New Technologies of the University of Warsaw, under the direction of professor J. Jemielity, discovered the way to increase the stability of mRNA, which transfers genetic information from DNA. Introduction of an appropriate artificial mRNA into immune system cells, e.g., as a vaccine, may stimulate the acid which can enable the activation of natural processes that will cause the body to fight cancer cells naturally. The discovery was called S-ARCA. Soon afterwards, another way to extend the stability of mRNA was discovered. These two inventions earned $610 million in total. Louisiana State University was interested in the research of the Polish team, and in 2007, it began collaboration with the University of Warsaw. The universities entered into a contract of co-ownership of the invention. Then, the University of Mainz, as well as a biotechnological company which belongs to the university, decided to join the team. Soon after, the company bought a license for the inventions. In 2015, it granted a sublicense to another company for $300 million, and in 2016, the sublicense was sold to one more company for $310 million. Presently, the latter company is conducting clinical tests and further research. Pursuant to the license agreements, the scientists of the
University of Warsaw will receive a percentage (less than 10%) from transactions conducted by the University of Mainz. Under the regulations of the university, half of that sum will go to the scientists who are directly responsible for the inventions and the other half will go to the university. True, both the scientists and the university shall obtain much higher remunerations from the possible sale of the developed therapies and drugs, but this still remains a distant prospect. The question remains why Polish scientists earned so little from the inventions if the company which belongs to the University of Mainz has already earned $600 million. One clinical test costs about $20 million and the total cost of marketing a new drug is about $1 billion. Just for comparison, the annual budget of the University of Warsaw amounts to $1.4 billion. Polish higher education institutions and enterprises cannot afford the expenses connected with marketing inventions. They have to sell them abroad.

Despite numerous difficulties beyond the scope of this article, Polish universities, even those situated in regions with low levels of industrialization, are able to generate an innovative mindset. Indeed, impressive research infrastructure and some forcefully institutionalized relations between the academia and private enterprises are not the only trajectory for innovation. According to the triple helix model, the process of knowledge capitalization is at the early beginning stage, so far there is not observed any systematic collaboration among universities, business and government authorities. Moreover, it seems from the examples presented above that in Poland innovation is still outside the national innovation system.

The explanatory perspective to science-innovation problems may then be to “think about institutional work in terms of the metaphor of the anthill proposed by Czarniawska (2006, p. 23), where the shape of the construction is the product of constant modifications of multiple actors’ activities, not a perfect realization of a fixed plan (Pawlak, 2011, p. 367). Generally, an innovative mindset is highly sensitive to economic and cultural conditions (Freeman, 1982; Niosi, 2002). The case of Finland, where the government adopted the category of innovation system as early as in 1990, can be used as an example to demonstrate this thesis (Karpinska, 2016).

The development of Finnish economy in the late 1990s, reflected in the history of Nokia, became the basis for reference to the so-called Finnish model, regarded as the optimal example of proper application of innovation system (Ahlback, 2005; Castells & Himanen, 2002; OECD & EUROSTAT, 2005). Indeed, in the year 2000, Nokia accounted for more than a half of the Finnish IT sector, and its share in IT export was 70%, which meant 25% of Finland’s total export. However, the dominant thesis in the literature is that of the lack of direct association between the country’s innovative policy and the company’s expansion. Historian M. Haikio so writes in the conclusion of his book devoted to Nokia:

I come to the conclusion that the rapid economic development of Finland cannot be explained with innovative policy.... The new stage in economic development is to be explained with the liberalisation of competitiveness, among others deregulation, which occurred simultaneously with the unprecedented quantum phase transition in technology (the change into digital technology). (Haikio, 2006, p. 103)

Economists stress that decisive for the success of Nokia was a coincidence connected with the transition into digital technology (Ali-Yrkko & Hermans, 2004; Hytinen, Paija, Rouvinen, & Yla-Anttila, 2006; Palmberg & Martikainen, 2005). In the late 1980s, Nokia’s managers decided to concentrate the company’s operation on the manufacture of cordless phones, which later resulted in the global leading position on the mobile phones market. There are, however, no premises to suggest the influence of the state’s innovative policy on that success (Hytinen et al., 2006; Lemola, 2006). At the beginning of the 1990s, the level of governmental subsidies for Nokia did not exceed 5% of the total distributed funds. What differentiates Nokia from other Finnish companies is the organisational structure which concentrates on R&D activity. The number of people employed in R&D increased from 4,000 in 1993 up to 18,000 in 2002. Nearly two-third of
them were Finnish (Ali-Yrkkö & Hermans, 2004, p. 110). The quality of human capital represented by employees—the factor emphasised by Freeman who described the influence of Japanese people’s education on the success of innovative economy (Freeman, 1987)—is invaluable. In Finland, as a result of reforms of the educational system in the 1970s and 1980s, the level of education greatly improved and Finnish students began to have the best results in OECD’s tests of PISA competencies. This was a direct result of the reforms, the idea behind which can be summarised as from the culture of control to the culture of trust. Since the 1990s, no nationwide secondary school exams have been carried out. Evaluation in primary schools is used to implement the principle nobody is left alone, so its results are the starting point for the development of systemic assistance for the students with the poorest effects. Education following the principle of culture of trust creates the attitude of mutual trust between citizens, so important in an innovative society. This quality of social capital is regarded as one of the conditions for economic cooperation. According to R. Miettinen,

> General trust may also enhance the formation of innovation networks and encounter between people with different kinds of expertise and cultural background. The universal education therefore not only creates the know-how and expertise needed in economic life and in public services. It also contributes to the formation of generalized trust that function as a lubricant of horizontal innovative collaboration across boundaries. (Miettinen, 2012, p. 163)

### 8. Conclusions

On the basis of studies conducted by OECD, innovation systems were classified as: the market model (USA), the European type (EU-15, with the exception of Scandinavia), model in transformation (Poland) social-democratic type (Scandinavian) and mezzo-corporate model typical for Japan (Nelson, 1993). The model in transformation is characterized by the lowest share of market sector in research funding and the least effective innovation policy. Because in countries belonging to this category, mechanisms to encourage innovative activity, adequate to local economic and cultural conditions were not developed, it is preferred to transform this model towards types with much higher efficiency. However, many countries fall into the trap and do not develop the mechanisms that provide a way out of the impasse at all. Besides, the factors which proved to be somehow important for the stimulation of innovative activity in one country may be completely ineffective in countries with other economic and cultural determinants. As a result, if the so-called good practice is constructed on the basis of quantitative data, the information does not provide much knowledge about the specificity of the processes that generate them. Consequently, although the governments of a few dozen countries have adopted the innovation policy, in many of them it is an administrative instrument whose goal is to coordinate relations that have not yet occurred and we do not know if they will ever occur. Paradoxically, the mechanism of benchmarking by assumption eliminates some determinants of success and makes it more difficult for the countries copying the model to achieve the expected result. Probably an attempt to overcome this trap would be to complete this pattern with knowledge acquired by potential followers during the observation, discussions or study visits in the country where the solution was successfully implemented. Ethnographic knowledge gained this way should lower the risk of failure in implementing best practices (Cambrosio, Limoges, & Pronovost, 1990). Such knowledge is, however, not available for economists, who apply quantitative research methods.

Representatives of the humanities argue that research in the area of innovation studies is characterised by excessive structural deviation (Godin, 2002; Nelson, 1993; Niosi, 2002). In the literature of the field, there is the knowledge on institutional components of the innovation system, and individual elements are attributed certain functions, but there are no teleological studies to explain the construction of each segment which is said to have started functioning as a system because of its mutual relations. The research on the structure of innovation system does not provide much information about innovativeness itself. The matter is discussed as part of the actor network paradigm, but this concept is not part of innovation studies. The actor network
paradigm shows among others that the source of innovative solutions is an unexpected and unique combination of knowledge represented by the involved individuals and the resources they have received (Miettinen, Eela, & Rask, 1999). But this specific synergy effect is something that can be neither calculated nor even predicted. For the few sociologists of knowledge who take up the issue of international innovation systems, e.g., B. Latour, it is a misunderstanding to attribute the category of system to various and often spontaneous relations between individuals participating in the process of learning. The thing that is the most important for the occurrence of innovation process, i.e., knowledge (often in the form of tacit knowledge), cannot be categorised at the beginning of the cognitive process (Latour, 2000).

For the time being, outside the discourse about innovation, stronger is articulated the thesis of the priority of social capital on the level of innovativeness of local economies (Niosi, 2002). However, the operation of such Dewey’s community of inquiry (Dewey, 1981) requires the existence of appropriate institutional background. Innovation will not appear, where citizens are afraid to cooperate because they do not trust each self and do not know how to build relationships other than those based on competition. In such situation, the institutional conditions of democratic state act as weak, since there are constituted many new public organizations such as scientific-technological parks, which activities should be seen as a facade. Their operation involves the state in the international process of building innovative economies, but in marginal way stimulates real state innovation.

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