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Innovative economy, and the activity of financial market institutions. Case of Poland

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Abstract. The article presents the institutional arrangements in Poland concerning the support of innovative activity of enterprises, mainly in the scope of availability of financing sources. The main aim of the study is to assess the activity of financial market institutions in the field of innovations financing and the attempt to present the relations between the availability of capital and the level of economy's innovativeness.
Innovativeness of the economy is the result of interrelatedness between companies, science and government, but the factor determining innovativeness is capital availability. Although the offer of funding sources of innovation is wide, it can be argued that its use is unsatisfactory. Mainly banks are responsible for such a situation, which are characterized by, in addition to certain regulatory restrictions, risk aversion. Banks, achieving financial benefits during conducted activities, do not see, so far, a need to engage in risky ventures, that innovation financing is considered.

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INTRODUCTION

Innovative economy is an economy with high growth potential, and a necessary condition for having such a characteristic is enterprises' innovativeness. An important role, in creating innovative attitudes among entrepreneurs, plays innovation policy pursued by the government, including both government programs and legal norms supporting such activities. Innovative activity is burdened with high risks, which translate into difficulties with raising capital for its financing, therefore many pro-innovative initiatives, especially in the R&D sector, are based on the capital coming from public funds. It can be assumed that the availability of capital for financing innovations is one of the determinants for enterprises' innovativeness, that's why

financial market, having free financial resources should be more active in its response to innovative needs of economic entities.

One of the basic condition for smooth functioning of an economy is strong and effectively operating financial market, the role of which include the optimal support for companies in terms of undertaken economic initiatives, including innovative projects. This symbiosis of real economy with financial market brings mutual benefits. A strong economy means a strong financial market and vice versa. It would be difficult to find a country contradicting to this thesis. Such dependence has already been shown and well grounded by the research, carried out by R. Levin and R. King (1993), T. Ghirmay (2004) and Wan – Chun Liu and Chen - Min Hsu (2006).

Bearing in mind the role which financial market plays in the economy and the importance of innovations in its development, reasonable becomes the formulation of the aim of this study, which is to assess the activity of financial market institutions in the field of innovation financing and the attempt to present the relations between the availability of capital and the level of economy's innovativeness.

The article consists of two parts. The first one, basing on domestic and foreign literature, defines and discusses notions and categories related to innovation and innovative economy, its determinants, as well as the importance of capital in launching innovative projects. While the second part is the presentation of institutional arrangements supporting innovative activity of enterprises, mainly financial market institutions, with the assessment of their capital commitment in the field of innovations.

THE THEORETICAL APPROACH OF INNOVATION AND INNOVATIVE ECONOMY

In the literature there are many definitions of innovation, starting from foreign words dictionary, and ending with recent Polish literature. Term of 'innovation' is defined in the works of: E. Mansfeld (1968), P. Drucker (1992), Ph. Kotler (1994), E. Stawasz (1997), W. Janasz (2011), J. Prystrom (2012), however, for a classic - is considered - definition of J. Schumpeter (Schumpeter 1960, p. 104), who an innovation understood as:

- new products,
- new methods of production,
- new sales markets,
- new methods of management,
- new sources of raw materials,
- new organizational methods and structures.

The analysis of scientific studies allows the existence of the three approaches to identifying an innovation, according to which an innovation is: a concept, a result or a process. Innovation as a concept refers to the effect of human activity, ideas and concept. Innovation, considered as a result, is the final effect of activities and processes, which implementation led to the creation of a new product, service, method of production, concept of management, attitudes and behavior of consumers, social norms or law regulations. In turn, the innovation as a process is seen through the prism of diverse and interdependent sub-processes of a creative, technical, legal, social, cultural character, recognizing changes of products or methods of resources and capital commitment (J. Duraj, M. Papiernik - Wojdera 2010, p. 62).

According to the OECD terminology, an innovation is the implementation of a new or significantly improved product, service or process, a new marketing method or a new organizational method in business practice, workplace organization or relations with the surrounding. In accordance with above definition, OECD has developed four types of innovation: product, process, marketing and organizational. While

innovative activity is defined as the whole of scientific, technical, organizational, financial and commercial activities, including investments in new knowledge, which in fact lead, or are expected to lead to the implementation of innovation. On the above definition, formulated in the Oslo Manual, are also based Central Statistical Office reports, concerning investing activities in Poland.

In Polish law, innovative activity is defined in the Act of 30 May 2008 *on Certain Forms of Support for Innovative Activities* (Art. 2), according to which innovative activity is the activity consisting of the development of a new technology and launching on its basis production of new or significantly improved products, processes or services.

The condition for conducting innovative activity is to have an ability to innovation, understood as innovativeness. Innovativeness refers to the economy and is defined as the ability and motivation of enterprises to constantly seek and put into practice the results of research and development, new concepts, ideas, inventions, or improvement of existing production technologies (Mądra 2013, p. 201). Innovativeness is very important in the process of governance and management and is considered as an important development factor, that determines economic progress. In macroeconomic approach, innovativeness is the result of links between industry, science and government, attaching great importance to knowledge and intellectual capital, and lower to capital, land and labor.

Innovativeness is associated with creativity, originality of solutions and competitiveness in a global scale. These features, so important for the image and the current operation of enterprises, are no less important or even it can be argued that they are more, for national economies. Therefore, among entrepreneurs the active participation for the creation of innovative attitudes should play the adopted and implemented innovative policy, which is understood as a process of supporting innovative activities of enterprises. It is one of the economic policies of a state, which includes the following areas:

- strengthening linkages in the national innovation system,
- formation and development of abilities to implementation of innovation in field of technique, technology, education and organization,
- optimum use of innovation as a major factor of economic growth and increasing the number of permanent work places,
- making structural, technical, technological and qualitative changes in the industry,
- the use of international cooperation and globalization processes in the economy (Kozioł 2005, p. 131).

Innovative policy is formed by the government, which - through appropriate institutional, economic and legal tools, impacts on the shape of the innovativeness of an economy, in accordance with the adopted socio-economic objectives. It is carried out through the use of instruments of direct and indirect influence (Stanisławski 2011, p. 17). The first ones include legal regulations, while the second – are related to formation of the environment, in which the enterprise operates. Tools of implementation of innovative policy can be divided into:

- demand - by which the state creates demand for innovation, that arise as a result of market demand,
- supply-side - by which the state impacts on innovators, contributing to the formation of innovation created from scratch as a result of research and development works for purposes of solutions of specific problems,
- forming the environment – which have legal, financial and administrative character (Piersiała, Nowakowska-Grunt 2014 p. 150).

The aim of innovative policy is the development of the system of institutions, as well as financial and non-financial incentives, which are to serve the knowledge-based economy, increasing mutual cooperation between science, education, companies, national and territorial administration, financial environment and

through introducing innovation on market, improving the competitiveness of the economy and increase of the quality of life of society.

Innovative policy shapes the behavior of entrepreneurs and affects the environment in which they operate. The activities contained in the innovative policy should motivate entrepreneurs to bring innovation, decrease the degree of difficulties in their implementation, reduce the degree of risk, create innovative climate-friendly through the wider use of scientific achievements, promote and implement new organizational and technical solutions (Mądra 2013, p. 204).

The role of innovation in economic development is indisputable. In the present day, in very competitive economies it is difficult to imagine the development of a modern company without implementation of innovation and their appropriate management. Innovation increases the manufacturing capabilities of the economy, allow for more and better conditions for their functioning, have the impact of the structure of the economy. The innovation's mechanism contributes to changes in quantitative and qualitative production factors, their better use and the use of higher quality resources. New or improved product, new economic activities, improved production process, new sales markets, improvement of business management, have an impact on creating enterprises' competitive advantage and thus the whole economies. Innovation and technological progress have an impact on:

- productivity and consequently a decline in the employment in traditional manufacturing,
- lowering prices and consumption revival, and as a result in an increase in production and employment,
- creation of work places due to the formation of new products and services.

Summing up, the innovativeness of domestic enterprises is the determinant of the economic condition of a country, because it positively reflects on the labor market and its structure, as well as economic growth (Prystrom 2012, p. 17).

FINANCIAL CAPITAL AS A DETERMINANT OF INNOVATIVENESS OF THE ECONOMY

The ability of a country's economy to innovative actions depends on many factors determining the innovative processes. These are:

- R&D potential, resources of scientific and technical knowledge of a country,
- innovative policy of a state,
- the economic structure of a country, socio-economic development,
- system of economy's functioning,
- psychological, cultural and sociological factors (Pomykalski 2001, p. 81).

Another classification of factors, shaping the innovative potential of a country is group them into three groups (Dwilińska 2005, p. 116). The first of them referred to as 'innovative potential' include: the level of economic development of a country, resources of human capital and the level of society's education, resources of financial capital and expenditures on research, number of research staff, the number of patents and inventions. The second group includes factors determining a country's openness relative to other countries, namely the scope of economic, scientific and technical cooperation with foreign countries. And in the third group there are systemic factors of economic activity in the country, which include the country's economic policy.

Economy's innovativeness is expressed through innovativeness of enterprises. Most often the main factors, influencing the innovative activities, include: expenditures on research and development, patents and inventions, level of technology and human capital (Wołodkiewicz-Domimirski 2011, p. 10). However, it

can not be forgotten about the sources of financing such activities, which may come from internal sources, as well as closer or further environment. Very important in the innovative activities are domestic capital resources, because their use is easier than those coming from foreign sources. Nevertheless, the shortcomings of the national capital can be quickly supplemented by a system of incentives for foreign investors.

Enterprises, especially from small- and medium-sized sector, often do not conduct innovative activity due to difficult access to capital. Their own resources, saving up from current activities are insufficient, and foreign capital is difficult to access, especially in the initial phase of business or burdened with high costs, adequate to risk, incurred by the lending institutions. Already in 1934 in the UK, parliamentary committee chaired by H. P. Macmillan stated that gaining long-term capital by small and medium-sized enterprises, often innovative, is extremely complicated and often ineffective. This phenomenon is called the *Macmillan gap*, and the response was the establishment of private equity/venture capital market (Janasz 2011, pp. 53-54).

Innovation activities in a free market economy are not easy to finance. This is due to very high risk, especially in the early stages of innovative activities and is associated with uncertain effects of the investment. The second reason of the difficulties in obtaining capital, is high outlays on the development of new products and services, namely knowledge, which is non-consumption, which means that its use by one company does not rule out its use by others. On the other hand, expenditures for salaries of highly qualified staff will be recouped through specially created by them intangible assets and knowledge base of the company, which in the future should generate high profits (Janasz 2011, p. 48).

In countries such as Poland, entering the path of technological development, the financial resources intended to research and development come mostly from public funds. Only with the improvement of the economic situation and growth of capital resources increase private sector involvement in such activities. The aim of enterprises' investments, even in research and development, is profit. Therefore, the interest of companies in expenditures on research and development is a certificate of growing economic potential of a country and it can be assumed that expenditures, incurred for this purpose, generate financial benefits. In Poland gross domestic expenditure on research and development (GERD) in 2010 amounted to 10.4 bln PLN, while in 2014 it was 16.2 bln PLN. This means an increase in the five-year period by 55.2%. However, in relation to the GDP of the country this relation was only 0.72% in 2010, and 0.94% in 2014 (Central Statistical Office of Poland 2015). Although these expenditures grow, in 2014 they accounted for just over 46% of the European Union average, which was 2.03% of GDP (Eurostat 2015). According to Eurostat, Poland in this area occupies one of the last places, in classification ahead of the only countries such as: Bulgaria, Greece, Croatia, Cyprus, Latvia, Malta, Romania and Slovakia.

In the area of financial support of innovative activities three law acts are noteworthy: the National Capital Fund Act from 2005, Act on Certain Forms of Support for Innovative Activities from 2008 and Act on the Principles of Financing Science from 2010.

The main objective of the Act of 4 March 2005 on the National Capital Fund was to create a capital instrument for financial strengthening of the Polish small and medium enterprises with high growth potential. The sole object of the National Capital Fund shall be to provide financial support to risk capital funds which invest in enterprises established in the territory of the Republic of Poland, and especially in innovative or research and development enterprises (Art. 5). The fund manages of more than 200 mln EUR originating from the state budget, EU Structural Funds and from Swiss Government.

The purpose of the Act of 30 May 2008 on Certain Forms of Support for Innovative Activities is to increase competitiveness and innovativeness of Polish economy by increasing the expenditures of private

sector and improvement the management of public resources for research and development. The Act defines the principles of supporting innovative activities by:

- granting technological credit by crediting banks and the technological premium by National Economy Bank (BGK);
- giving entrepreneur the status of research and development center.

The Act of 30 April 2010 on the Principles of Financing Science defines the principles of financing science from the financial resources determined for this purpose in a separate part of the state budget – 'Science' and from the financial resources of Polish Science and Technology Fund, which minister of science and higher education disposes. According to the Act the financing of science covers the financing of activities that contribute to the pursuit of state scientific, scientific and technological and innovation policies, including without limitation research, development work and the performance of other tasks of particular importance for the civilisational progress, economic and cultural development of the state (Art. 3).

Financing of innovative activity can not only rely on the commitment of public funds, or European Union funds. It is an important element of national innovation policy, although can not be the only one. Financing innovation does not also have to limited to worked out by the enterprises' own financial resources. The third source of financing can be, or even should be a financial market.

OVERVIEW OF FINANCIAL INSTRUMENTS OF SUPPORTING INNOVATIVE ACTIVITY IN POLAND

A 26-year period from systemic changes in Poland has resulted in the development of a number of different institutions, which aimed at supporting innovative and development activities of enterprises. Especially, the first perspective, and then membership in the European Union, dynamized the development of support institutions. Gradually, there were appeared new organizational concepts, creating a network of various institutional arrangements, which includes (Matusiak 2011, p. 206):

- technological parks,
- technological incubators,
- pre-incubators and university business incubators,
- training and consulting centers,
- business incubators,
- technology transfer centers,
- seed capital funds,
- Business Angels Networks,
- local and regional loan funds,
- loan guarantee funds.

The core business of the last four groups of institutions is primarily a financial support of innovative activity of enterprises. A catalog of these institutions complements private equity/venture capital funds, commercial banks (including in particular National Economy Bank - BGK) and the National Capital Fund. For financing innovative activity, enterprises can also raise funds from the EU funds - Operational Program - Innovative Economy Measure 3.1. IE OP 3.1 Initiating of innovative activity. The overview of above institutions is presented in Table 1.

Table 1

Organizational forms of supporting innovative and development activities in Poland

Organizational form of support	Subject of activity	Market characteristic
1	2	3
Seed capital funds	They are designed for start-up companies. The maximum grant for a single entrepreneur is 200 thousand euro. To get support it is sufficient only to have a good business idea. The fund helps set up a business, develop a business plan and a strategy of operation, provides premises for office and finances the development of a new product or service. In return, it covers no more than 50 percent of shares. The funds currently dispose a total budget of nearly 500 mln zł.	24 seed capital funds Funds based on funds from the financing of measure 3.1 OP IE - Initiating of innovative activity Operational Program - Innovative Economy. Measure 3.1
Business angels Business Angels Network	Business angels are private individuals, who invest their own funds in companies that are in early stages of development. Their activity fills the gap between friends and family as investors, and *venture capital* funds.	Currently, there are 12 business angel networks in Poland: – Lewiatan Business Angels – Warsaw. – Guild of Business Angels – Lodz, – Trinity Group – Wroclaw, – PolBAN Business Angels Club – Warsaw, Bydgoszcz – trans-regional Business Angels Network – Innovation – Katowice, Warsaw, Wroclaw, Zielona Gora, Suwalki, – Regional Network for Equity Investors – Cracow, – Satus Venture – Cracow, – Amber Business Angels Network – Szczecin – Secus Business Hunters – Warsaw, Wroclaw, Katowice, Poznan, Cracow, – Silesian Business Angel Network – Katowice – Eastern Business Angels Network – Lublin – Student Business Angell Network - Katowice
Loan guarantee funds	The main task is to facilitate entrepreneurs and individuals starting economic activity, in access to external financing in the form of bank credits and loans. The offer is addressed to entrepreneurs, who are creditworthy, do not have the required by financing institution collaterals. The guarantees are provided to 80% of the amount of credit or loan.	In National Association of Guarantee Funds is registered 45 loan guarantee funds. The total value of active guarantees at the end of 2014 amounted to 1 367.5 mln zł. In 2014 the funds granted 5 578 guarantees for the amount over 833 mln zł. At one fund falls an average of 124 surety agreements on the total amount of 18.5 mln zł.
Loan funds	Loan funds provide financial services in the field of granting loans only for micro, small and medium-sized enterprises. These companies must operate in an area that the fund covers. They are often the only source of capital during the economic slowdown. The amounts of loans, adapted to entrepreneurs needs, may range from a few to 500 thousand zł.	In Polish Union of Loan Funds is registered 50 loan funds.

1	2	3
Private equity/venture capital funds	Venture capital is defined as capital, used for funding of investments in the early stages of enterprise's development. Private equity is high risk capital, including all phases of enterprise's development, also venture capital.	48 PE/VC funds are ordinary members of the Polish Private Equity and Venture Capital Association. At the end of 2014 the value of private equity investments amounted to 1 410 mln zł (a decrease compared to the previous three years). Capital support received 76 companies (a decrease compared to 2013 and an increase compared to the period of 2011-2012).
National Capital Fund	NCF is a fund of funds. It invests in venture capital funds that finance the development of the companies seeking capital for their innovative projects.	For the day of 28 November 2015 NCF has been involved in 17 venture capital funds, which have implemented in total 120 investments.
Commercial banks	Financing innovation may be done by providing a classic bank loan. However, a condition of crediting is to have, required by Banking Act, creditworthiness, which a company, especially in the early stages of development may not have. Banks, in terms of carried out investment banking services, may engage in PE/VC funds or advise and organize the issuance of securities on NewConnect - a market for small, innovative companies that do not fulfill requirements of the primary market of Warsaw Stock Exchange.	In Poland there are 38 commercial banks, of which 18 in a narrower or broader scope, perform investment banking activities. Since 2012, banks have not carried out any activity on the PE/VC market.
National Economy Bank (BGK)	On the basis of the Act of 30 May 2008 on Certain Forms of Support for Innovative Activities, BGK provides credit for technological innovation. It is an instrument of non-repayable financial support for micro, small and medium-sized enterprises, planning to implement technological innovations. The bank's tasks are: conducting the recruitment and assessment of applications for technological premium, signing contracts with beneficiaries and payment of allocated support. BGK in a subject scope, cooperates with commercial banks and acts as the Implementing Authority in sub-measure 3.2.2 'Loan for Innovative Technologies' - under Operational Programme Smart Growth.	In the previous perspective of the EU 2007-2013 – 'technological loan', starting from 2009 BGK provided beneficiaries a total of 1.03 bln zł. Investments were selected for funding in 2009-2013, and the payment of technological premium will be completed in December 2015. The total amount of investments was 3.7 bln zł, of which 1.2 bln zł are entrepreneurs' own funds, and 2.5 bln zł – funds of banks providing loans in cooperation with BGK. The total value of financing of projects from public funds amounted to over 1.8 bln zł.
European Union funds	Operational Programme Smart Growth (SG OP) – provided for the period of 2014-2020. The Program concentrates on projects related to increasing innovation of the economy, the development of the science sector, its cooperation with enterprises and ensuring high quality of business environment conducive to raising enterprises' innovativeness. It is addressed to companies, clusters, research units and business environment institutions.	For the day of 1 November 2015 under the program there was financing 9 projects for the total amount of approximately 58 mln zł.

Source: Data on the day of 28 November 2015 by: Polish Private Equity and Venture Capital Association (psik.org.pl), National Association of Guarantee Funds (ksfp.pl) Association of Business Angels Networks (aban.org.pl), Polish Union of Loan Funds (pzfp.pl), Polish Innovation Portal (pi.gov.pl), National Capital Fund (kfk.org.pl), National Bank of Poland (nbp.pl), The Polish Bank Association (zbp.pl).
Operational Programme Intelligent Development (poir.gov.pl).

Table 1 shows the sources of financing coming from both private and public funds. However, not all the projects can be financed by private capital, especially those that have less commercial potential or are at an early stage of development, such as: research, implementations, prototypes, preparation and implementation of production. Private equity/venture capital funds or business angels engage only in those projects that best hit the market, also banks do not want to finance early stages of development, demonstrating the far-reaching conservatism (Wiśniewska, Janasz 2012, p. 226).

The total take over of financing by private capital is impossible, but it should be postulated more activity of financial market institutions. Although they offer is constantly evolving, their activity in the field of innovation financing is insufficient, especially commercial banks, which activities in the area of innovation financing is often limited to the cooperation with National Economy Bank (BGK) in the scope of loans on technological innovation.

Financing of innovative activity is for banks taken literally 'high risk capital'. In the literature it is defined differently, though mostly as private equity/venture capital, business angels or seed funds. These issues are extensively the subject of interest in the national literature of: W. Przybylska - Kapuścinska and M. Mozalewski (2011), M. Panfil (2005), K. Sobańska-Helman and P. Sieradzan (2013), A. Kornasiewicz (2004), and on the Anglo-Saxon market: D. Gladstone and L. Gladstone (2002), as well as P.A. Gompers and J. Lerner (2004).

Both national and EU regulations do not restrict banks the activity on high risk capital market, therefore, due to the growing competition on the market of conventional bank loans and decreasing margins, banks should pay more attention on this segment of their activity. However, because of the role that they play on the financial market and the requirement to ensure the safety of - entrusted by clients - funds, they should not, and even can not engage in a direct way – they can be founders of PE/VC funds and providers capital to them or finance the funds that have already existed on market. This restriction mainly results from the requirement to hold, by the financed company, creditworthiness and the assessment of innovative investment intensions as potentially effective, with a chance of success. Enterprises, in the early stages of development, do not have adequate creditworthiness and required collateral, and bank may have incomplete knowledge about the assessment of risk of innovative projects. Low investment base, which results from a small share of term deposits in total liabilities of banks towards customers and a lack of confidence to economic knowledge of companies' owners are also factors holding back banks from higher activity in the financing of innovation.

In order to increase the share of banks in financing innovation, it should be postulated:

- organizational and staff strengthening of investment banking departments, to more effectively could be a partner for enterprises, seeking capital coming from outside of bank loans and issuance of securities,
- the introduction of a wide range of government programs, encouraging banks to such activity, for example by participation in risk,
- creating systemic mechanisms of the assessment of innovative investment projects, control of their implementation and limiting of credit risk,
- introduction to the banks' offer deposits, similar to structured deposits also purchased through subscriptions, which give customers the opportunity to achieve a higher rate of return, but not obtained on the financial market, but by investing these funds in innovative companies in the development phase, with full investor's knowledge, that such deposits are not guaranteed by the Bank Guarantee Fund.

Not only companies but also government and financial market should be interested in developing the system of financing of innovative activity. Difficulties in obtaining capital may contribute to locate innovative activities abroad or absorb innovation by multinational corporations. And it does not contribute to the development of national economy, but only result in added value for the countries of origin of foreign companies (Wiśniewska, Janasz 2012, p. 228).

CONCLUSIONS

Innovative economy is a modern economy with high growth potential. And so it is seen through the eyes of potential global investors. Government programs or law regulations which are aimed at entrepreneurs under, conducted by the government, innovation policy is definitely not enough. The more that, the Polish economy takes far places in the world's innovation rankings. In addition to the favorable institutional and legal environment, financial environment should also direct its business interests towards the financing of innovation. Of course, the activity on this market is burdened with high risk, but mutual cooperation between the government, parliament, the financial market, especially banking sector and entrepreneurs should lead to a solution, in addition to the existing ones, which in the long run will bring measurable benefits for the whole economy, including also financial sector. Public funds will be used to finance innovative projects yet for a long time, but they can not form the basis of the system. The financial sector should also participate in these tasks, admittedly treating them as potential, future profit center, but at the same time contributing to the growth of innovation economy, and thus to the improvement its image in the global environment.

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