Zeszyty Naukowe Politechniki Częstochowskiej
Zarządzanie Nr 27 t. 2 (2017) s. 50–58
dostępne na: http://www.zim.pcz.pl/znwz

PUBLIC AND PRIVATE FINANCING OF INNOVATIVE ACTIVITY OF ENTERPRISES IN POLAND

Izabela Krawczyk-Sokołowska, Justyna Łukomska-Szarek

Czestochowa University of Technology
Faculty of Management

Abstract: The study concerns the problems of financing in innovative activity of enterprises in Poland. The aim of the study is to evaluate sources of financing of innovative activity of enterprises. The sources of finance in innovative activity of enterprises in Poland were described in the perspective of the pecking order theory and financial growth cycle theory. The empirical analysis was based on the statistical data published by the GUS used to evaluate the structure of individual sources of financing in innovative activities of enterprises in Poland. Furthermore, the share of enterprises that obtained public support for innovative activity was also analysed.

Keywords: innovativeness of enterprises, own and debt financing public funds, sources of financing

DOI: 10.17512/znpcz.2017.3.2.05

Introduction

Innovations are a key element in enterprise development (Zawada et al. 2015, p. 7-8; Kowalik 2015, p. 23-25). However, innovative activity requires engagement of specific financial resources. The insufficient level of the sources of financing drives enterprises to search for other opportunities, such as using debt financing, public support from the state budged or local government entities and EU funds. Less frequently, the enterprises use alternative sources of financing, e.g. venture capital.

The aim of this study is to identify sources of financing of innovative activity of enterprises in Poland from the standpoint of the pecking order theory and financial growth cycle theory. The theoretical fundamentals of the financing concept were brought closer to the reader and the ex-post analysis of the sources of financing for innovative activities in Polish enterprises was presented based on the data of the Central Statistical Office. The research period covered the years 2010-2015.

Financing of enterprise operation – theoretical approach

Searching for optimal solutions in terms of the sources of financing (Rudny 2017, p. 315) for innovative activities of enterprises involves the division of the sources into enterprise's own and borrowed capital (Grzywacz 2012, p. 14-16; Caputa 2016). The enterprise's own sources of financing can be further subdivided into internal, such as profit, and external, acquired through issuing new shares or

stocks. Borrowed capital is mainly obtained from trade liabilities, bank loans and issuing bonds. The enterprise strives for the most beneficial structure of capital in specific conditions, which determines the effectiveness of operating and investment decisions that impact on the profits (Nehrebecka, Dzik-Walczak 2015, p. 42). Effectiveness is viewed as a positive relation between the effects and incurred expenditures.

A particularly optimal source of financing for the enterprise is borrowed capital used after previous depletion of the internal capital sources (Duda 2016, p. 29; Prędkiewicz 2016, p. 111-112). This is consistent with the pecking order theory. The originator of the theory is Myers (Myers 1984, p. 575-592), who defined the usefulness of application of the hierarchy of the sources of financing due to the enterprise striving for reduction in inefficiency of investment decisions and internal preferences of capital resources in the enterprise, mainly equity, profits and sales of negotiable securities. Another item in the hierarchy of financing is external capital, i.e. debt financing using trade credits, bank loans and issuing bonds. Furthermore, the enterprises use convertible bonds and, if necessary, issue shares (Lisińska 2015, p. 207).

The theory of financial growth cycle (Bergerab, Udellc 1998, p. 613-673) is based on the phases of enterprises life, from "plantation" to liquidation. According to the theory, newly created and young enterprises can usually utilize only their own financial resources and/or those owned by their family or friends. Other phases of the development are enhanced with internal capital in the form of investment funds, loan funds and surety funds, investment and working capital loans, EU funds, subsidies and targeted resources (Krawczyk-Sokołowska 2011, p. 142-151). Opportunities for utilizing specific sources of financing depend on the phase of the development of the enterprise size and availability of information necessary for the potential financing institutions (Duda 2016, p. 31; Kokot-Stępień 2016, p. 19).

Financial determinants of innovative activity of enterprises

Explorations of the problems of financing of enterprise activities concern mainly limited opportunities for acquisition of capital and costs of capital. This is especially noticeable with respect to financing of innovative enterprises, which are capital-consuming, risky and produce benefits delayed in time (Borowiecki, Dziura 2016, p. 13; Skowron-Grabowska 2014, p. 84-90).

Innovative activity of enterprises can be financed from public sources and by means of market instruments. Division of sources of financing of innovative activity of enterprises is presented in *Table 1*.

Financial resources from European funds are oriented at entrepreneurs, scientific centres and individual scientists (Malara 2015, p. 5-11). In the nearest future, EU funds will support innovativeness. In order to improve the dynamics of the economic and social growth, the institutions that allocate EU funds prefer support for the projects which show innovativeness. Development of innovations is also stimulated by creation of platforms for creating of new ideas, within which

potential new entrepreneurs can transform their business ideas into an innovative start-up. The program to support innovativeness is managed by the Polish Agency for Enterprise Development (PARP) (www.popw.parp.gov.pl). The group of important institutions related with the Operational Programme – Innovative Economy (POIG) include (www.pi.gov.pl): the Ministry of Development, National Centre for Research and Development, Polish Agency for Enterprise Development, Bank Gospodarstwa Krajowego BGK and the Foundation for Polish Science.

Table 1. Sources of innovation financing

<table>
<tr><td colspan="2">Sources of innovation financing</td></tr>
<tr><td>Public instruments</td><td>Market instruments</td></tr>
<tr><td rowspan="2">Budgetary instruments:
- technological credit
- tax reliefs and exemptions
- obtaining the status of a R & D Center;</td><td>Capital instruments:
- stock exchange (WSE, NewConnect)
- over-the-counter (Venture Capital, Private Equity, Bussines Angels)</td></tr>
<tr><td rowspan="2">Debt instruments:
- Bank credit
- loans
- bonds
- leasing</td></tr>
<tr><td>EU instruments 2014-2020:
- Intelligent Development (POIR)
- Eastern Poland (POPW)
- Regional Programs (RPO)</td></tr>
</table>

Source: Own study based on (Zembura 2016, p. 114)

As supported by study results, financing of innovative activity of enterprises represents an important barrier to innovativeness (Jasiński 2006, p. 67; Romanowska 2016, p. 31-32; Janasz, Wiśniewska 2012, p. 239-248; Sopińska, Wachowiak 2016, p. 21-22). These examinations emphasize the role of the enterprise's own financing of innovative activities with a relatively low contribution of financing from the state and EU funds. It should be also emphasized that the enterprises which are older, more mature and more experienced can more easily acquire capitals for financing innovations, with particular focus on borrowed capitals.

The main financial instruments used to support innovative activity of enterprises include direct financing of innovative activities of enterprises, especially subsidies and loans (Kluzek 2015, p. 90).

Financing of innovative activities needs a financial engineering which involves a set of public and private capitals. Opportunities for financing of innovative activities are one of the most basic factors that impact on the readiness for introduction of innovative solutions in enterprises (Różański 2015, p. 496; Barcik 2014, p. 6; Kościelniak, Puto 2014, p. 68; Ziółkowska 2016, p. 365-370). Enterprises expect the support in the form of flexible financial instruments which are characterized by low cost, short time of access to the resources and high flexibility in evaluation of potentially financed innovative projects. The particularly limited opportunities are offered for financial support of new enterprises, which do not have credit history yet and assets that can secure the loan products offered by financial institutions. These enterprises, even if they have adequately high

development potential, face substantial difficulties with the access to external sources of financing of projects with innovative character.

Analysis of the sources of financing of innovative activity in Polish enterprises revealed consistency with both the pecking order theory and financial growth cycle theory. Innovative enterprises act based on the pecking order theory i.e. after depletion of internal sources of financing, they use external capital.

The improvement in availability of debt capital for innovative activities of enterprises should translate into their development and increase in incomes. It is important to start activities that allow for implementation of innovative products and financial services which stimulate the increase in opportunities for financing with outside capital.

Financial support from public institutions is also insufficient. Some initiatives (e.g. technology credit) did not attract sufficient interest of enterprises due to the burdensome procedures involved in crediting.

The state policy should be oriented at promotion of innovative initiatives through adequate financial system in terms of taxes, opportunities for support by public resources and access to banking and non-banking loans and credits. It is also necessary to extend the guarantee facility, loan funds and other forms of financing i.e. investment funds.

Assessment of the sources of financing of innovative activity of enterprises in Poland

This part discusses the ex-post analysis of the sources of financing of innovative activity of enterprises in Poland. Based on the data from the Central Statistical Office of Poland, *Figure 1* illustrates first and foremost the financial expenditures incurred in 2010-2015 on innovative activities by enterprises in Poland. Furthermore, the structure of individual sources of financing of this activity was assessed.

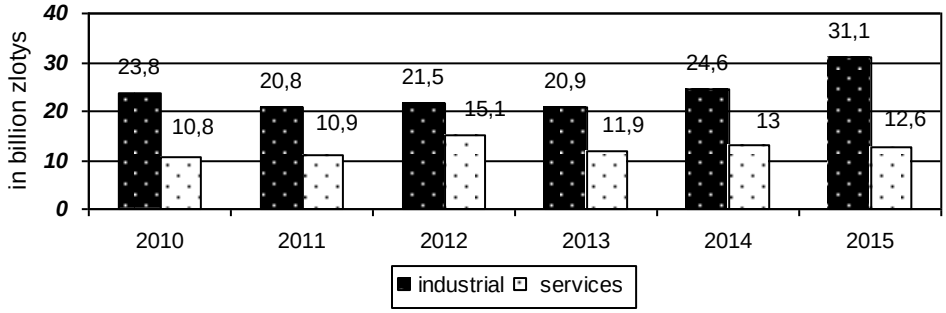

Figure 1. Expenditures on innovation activities in enterprises in Poland in 2010-2015

Source: Own elaboration based on the data of the Central Statistical Office of Poland (www.stat.gov.pl)

Analysis of the data illustrated in *Figure 1* leads to the conclusion that over the years, expenditures on innovative activity ranged from 20.8-31.1 billion zlotys in the case of industrial enterprises. However, their highest value was recorded in 2015. Substantially lower financial expenditures which ranged from 10.8 to 15.1 billion zlotys and showed progression in 2010-2012 and 11.9 to 13 billion zlotys in the following years were found for service-providing enterprises.

The enterprise studied used mainly borrowed capital, which is shown in *Table 1*. This type of financial expenditures dominated in the structure of the sources of financing of innovations in Polish enterprises as it ranged from 67% to 85.7% in the case of industrial enterprises and 62% to 75.2% in service-providing enterprises.

By conducting an evaluation of this, it is possible to come to the conclusion that in the years of 2010-2013 equity capital used for innovations by industrial enterprises were characterized by a downward trend, from 17874.4 billion zlotys to 17897.8 billion zlotys. The greater possibilities of generating equity capital as the principal source of financing innovations by these entities were witnessed in the period of 2014-2015 (17 billion zlotys and 19.3 billion zlotys respectively). The equity capital of service firms ranged between 8.7 billion zlotys and 10.5 billion zlotys in the years of 2010-2015.

Table 2. Expenditures on innovation activities in enterprises by sources of funding in Poland in 2010-2015

IE - (industrial enterpris), SE - (service enterprises)		Expenditures on innovation activities in enterprises by sources of funding									
		own		from state budget		from abroad		bank credits		others	
		in million zlotys	%	in million zlotys	%	in million zlotys	%	in million zlotys	%	in million zlotys	%
2010	IE	17874.4	75.2	270.6	1.2	1879.0	7.9	2089.7	8.8	1686.3	7.1
	SE	9247.6	85.7	52.4	0.5	268.9	2.5	1129.2	10.5	101.9	1.0
2011	IE	15287.2	73.5	265.4	1.3	1763.1	8.5	2153.4	10.4	1330.9	6.4
	SE	9115.7	83.7	118.8	1.1	205.6	1.9	1122.7	10.3	337.2	3.1
2012	IE	15868.7	73.9	418.3	2.0	1550.1	7.3	1422.8	6.7	2240.1	10.5
	SE	10534.3	69.8	2139.2	14.2	956.7	6.4	728.8	4.9	741.0	5.0
2013	IE	14897.8	71.3	330.5	1.6	1897.5	9.1	1456.2	7.0	2318.0	11.1
	SE	9544.8	80.3	234.0	2.0	999.2	8.4	996.6	8.4	125.4	1.1
2014	IE	17032.2	69.3	400.8	1.7	2477.5	10.1	2487.9	10.2	2201.6	9.0
	SE	8709.1	67.0	283.3	2.2	2162.2	16.7	1326.8	10.3	518.6	4.0
2015	IE	19277.3	62.0	626.7	2.1	2181.2	7.1	3574.1	11.5	5440.7	17.5
	SE	9221.6	73.2	202.1	1.7	2110.5	16.8	789.0	6.3	276.8	2.2

Source: Own elaboration based on the data of the Central Statistical Office of Poland (www.stat.gov.pl)

The second important source of financing was bank loans, although in the structure of the sources of financing, service-providing enterprises in 2012 had the lowest value of only 4.9%. This resulted from the fact that an important source of financing in that year was resources (from the state budget (14.2%)). The loans

were less used by industrial companies, with this source of financing accounting for 11.5% of financial expenditures in total in 2015.

In 2010-2013, the foreign resources were characterized by the biggest share in the case of industrial enterprises (ranging from 1.5 to 1.9 billion zlotys, whereas for service-providing companies, this value ranged from 0.2 to 1 billion zlotys). In 2014-2015, the enterprises studied generated similar values of resources from abroad used to finance innovations (2.1-2.5 billion zlotys). However, it can be indicated that for service-providing enterprises, foreign resources represented over 16.7% of financial expenditures in total compared to 10.1% in 2014 and 7.01% in 2015 for industrial enterprises.

Furthermore, the resources obtained from the state budget only for service-providing enterprises exceeded 2.1 billion zlotys in 2012, with their share, as mentioned before, being at the level 14.2%, whereas in other years, they ranged from 0.2 to 0.6 billion zlotys for industrial enterprises (1.6 to 2.1% in the structure of the sources of financing) and 0.05 to 0.2 billion zlotys for service-providing enterprises (1.7 to 2.2%). Evaluation of the public financial support obtained by the innovatively active enterprises in Poland

Public support for innovative activity is analysed in this study over the period of three years. The study revealed the percentage of the innovatively active enterprises that obtained public financial support for the activities performed in this area, which is presented by the data showed in *Table 3*.

Table 3. Enterprises which received public financial support for innovation activities

IE - industrial enterprises SE - service enterprises	Enterprises which received public financial support for innovation activities as the share of innovation active enterprises by number of persons employed in %		Enterprises which received public financial support for innovation activities from national institutions as the share of innovation active enterprises in %					
	IE - industrial enterprises	SE - service enterprises	total		from local authorities		from central authorities	
			IE	SE	IE	SE	IE	SE
2010-2012	25.9	18.7	12.4	10.5	4.9	4.1	8.9	7.6
2011-2013	25.1	22.9	11.6	8.4	3.8	3.4	8.8	6.0
2012-2014	29.4	21.2	13.9	8.9	4.8	3.8	10.4	5.8
2013-2015	27.9	19.8	15.1	13.1	5.8	7.2	10.7	7.2

Source: Own elaboration based on the data of the Central Statistical Office of Poland (www.stat.gov.pl)

In 2010-2012, public financial support for innovative activity was obtained by 25.9% of innovatively active industrial enterprises and 14.7% of enterprises from the sector of services. The biggest value was generated by the indices studied for industrial enterprises in 2012-2014, reaching 20.4%, whereas their highest value for the service-providing enterprises was recorded in 2012-2013. In 2013-2015, public financial support for innovative activity was obtained by 27.9% of

innovatively active industrial enterprises (compared to 29.4% in 2012-2014) and 19.8% of service-providing enterprises (compared to 21.2% in 2012-2014).

Public support consists in initiatives taken by state authorities to support enterprise activities, including innovative activities. The support for innovative activities is connected with providing better opportunities for enterprises to implement innovations by offering preferential and privileged conditions of business activity with respect to market conditions. As shown in the study, public support for innovative activity can be granted by national institutions, including entities of local level (budgets of gminas, poviats and voivodeships), entities of the central level (state budget) and the European Union (including the 7th Framework Programme for Research and Technological Development of the European Union). The study leads to the conclusion that the enterprises which obtained financial support from state institutions utilized the resources more than it was the case for the entities of the central level. For industrial enterprises, the index showed the progression and ranged from 8.8% to 10.7% for service-providing enterprises while a regression from 7.6% to 5.8% was observed in 2010-2014, whereas an increase to 7.2% was observed for the period of 2013-2015. The support from the local level entities was obtained by ca. 3.8-5.8% of industrial enterprises and 3.8-7.2% of service-providing enterprises.

Conclusions

Analysis of the sources of financing of innovative activity in the enterprises in Poland revealed consistency with both the pecking order theory and the financial growth cycle theory. Innovative enterprises act based on the pecking order theory i.e. after depletion of internal sources of financing, they use external capital. Own capital dominated in the structure of sources of financing of innovative activities in the case of both industrial enterprises and service-providing enterprises. However, for the latter enterprises, the figures recorded in 2010-2015 were higher.

The improvement in availability of debt capital for innovative activities of enterprises should translate into their development and increase in incomes. It is important to start activities that allow for the implementation of innovative products and financial services which stimulate the increase in opportunities for financing with outside capital. However, the study showed that the bank loans did not exceed 12%, and they mostly remained at the level of 10%.

Financial support from public institutions is insufficient (the resources acquired from the state budget accounted form 1.6-2.2%). Some initiatives (e.g. technology credit) did not attract sufficient interest of enterprises due to the burdensome procedures involved in crediting.

The state policy should be oriented at promotion of innovative initiatives through adequate financial system in terms of taxes, opportunities for support by public funds and access to banking and non-banking loans and credits. It is also necessary to extend the guarantee facility, loan funds and other forms of financing i.e. investment funds.

Literature

1. Barcik A. (2014), *Financial Restructuring of the Company's Liability by Insolvency Proceedings*, "Organizacja i Zarządzanie. Kwartalnik Naukowy", nr 2(26), p. 5-16.
2. Bergerab A.N., Udellc G.F. (1998), *The Economics of Small Business Finance: The Roles of Private Equity and Debt Markets in the Financial Growth Cycle*, "Journal of Banking & Finance", Vol. 22, Issues 6-8, p. 613-673.
3. Borowiecki R., Dziura M. (2016), *Nowa gospodarka – aspekty wiedzy i innowacji*, „Przegląd Organizacji", nr 5, p. 9-16.
4. Caputa W. (2016), *Crowdsourcing w procesie kreowania kapitału klienta*, [in:] Bartkowiak P., Jaki A. (red.), *Dylematy rozwoju nauk o zarządzaniu. Perspektywa metodologiczna*, TNOiK "Dom Organizatora", Toruń, p. 120-136.
5. Duda J. (2016), *Finansowanie działalności innowacyjnych MMSP – w kontekście teorii wyboru kolejności źródeł finansowania i teorii finansowania cyklu wzrostu*, "Nauki o Zarządzaniu = Management Sciences", nr 1(26), p. 27-43.
6. Duliniec A. (2015), *Wybór źródeł finansowania a optymalna struktura kapitału w przedsiębiorstwie*, "Zeszyty Naukowe Uniwersytetu Szczecińskiego. Finanse, Rynki Finansowe, Ubezpieczenia", nr 74, t. 2, p. 73-82.
7. Grzywacz J. (2012), *Kapitał w przedsiębiorstwie i jego struktura*, Oficyna Wydawnicza SGH, Warszawa.
8. Janasz K., Wiśniewska J. (2012), *Innowacyjność organizacji w strategii inteligentnego i zrównoważonego rozwoju*, Difin, Warszawa.
9. Jasiński A.H. (2006), *Innowacje i transfer techniki w procesie transformacji*, Difin, Warszawa.
10. Kluzek M. (2015), *Efektywność ulg podatkowych sprzyjających innowacyjności przedsiębiorstw*, "Prace Uniwersytetu Ekonomicznego we Wrocławiu", nr 386, p. 89-98.
11. Kokot-Stępień P. (2016), *Finansowanie działalności innowacyjnej przedsiębiorstw w Polsce*, "Zeszyty Naukowe Politechniki Częstochowskiej. Zarządzanie", nr 24, t. 1, p. 16-29. DOI: 10.17512/znpcz.2016.4.1.02
12. Kościelniak H., Puto A. (2014), *Crisis Management: Effect of Financial Liquidity on Return on Equity in Enterprises of the Sector of Building Materials*, "Organizacja i Zarządzanie. Kwartalnik Naukowy", nr 2(26), p. 67-77.
13. Kowalik J. (2015), *Analiza poziomu innowacyjności państw Unii Europejskiej*, "Zeszyty Naukowe Politechniki Częstochowskiej. Zarządzanie", nr 19, p. 22-34.
14. Krawczyk-Sokołowska I. (2011), *Finansowanie innowacji w przedsiębiorstwie a zrównoważony rozwój*, "Studia i Prace Kolegium Zarządzania i Finansów / Szkoła Główna Handlowa", nr 105, p. 138-154.
15. Lisińska K. (2015), *Determinanty struktury kapitału na poziomie państwa na podstawie przeglądu literatury*, "Prace Naukowe Uniwersytetu Ekonomicznego we Wrocławiu", nr 412, p. 204-215.
16. Malara Z. (2015), *Współpraca nauki i gospodarki. Uwarunkowania, model, implementacja*, "Przegląd Organizacji", nr 1, p. 5-11.
17. Myers S.C. (1984), *The Capital Structure Puzzle*, "Journal of Finance", Vol. 39, No. 3, p. 575-592.
18. Nehrebecka N., Dzik-Walczak A. (2015), *Badania źródeł finansowania działalności przedsiębiorstw – efekt selekcji publikacji. Analiza metaregresyjna*, "Nauki o Finansach", z. 2(23), p. 41-70.
19. Prędkiewicz K. (2016), Znaczenie długu w finansowaniu innowacji w sektorze małych i średnich przedsiębiorstw w Polsce, "Nauki o Finansach", nr 1(26), p. 110-124. DOI: 10.15611/nof.2016.1.07

20. Przybylska K. (red.) (2014), *Uwarunkowania innowacyjności polskich przedsiębiorstw*, Wydawnictwo Naukowe PWN, Warszawa.
21. Romanowska M. (2016), *Determinanty innowacyjności polskich przedsiębiorstw*, "Przegląd Organizacji", nr 2, p. 29-35.
22. Różański J. (2015), *Finansowanie innowacji w przedsiębiorstwach regionu łódzkiego*, "Annales Universitatis Mariae Curie-Skłodowska. Sectio H. Oeconomia.", t. 49, nr 4, p. 493-503. DOI: 10.17951/h.2015.49.4.493
23. Rudny W. (2017), *Finansjalizacja we współczesnej gospodarce*, [in:] Jędralska K., Dyduch W. (red.), *Nauki o zarządzaniu. Dokonania, trendy, wyzwania*, Wydawnictwo Uniwersytetu Ekonomicznego w Katowicach, Katowice, p. 313-325.
24. Skowron-Grabowska B. (2014), *Innovativeness in the Strategies of Enterprises and Processes of Globalization*, [in:] Skowron-Grabowska B. (ed.), *Innovation of Logistics Processes*, Technical University of Ostrava, Ostrava, p. 84-96.
25. Sopińska A., Wachowiak P. (2016), *Innowacyjność przedsiębiorstw działających w Polsce*, „Przegląd Organizacji", nr 5, p. 17-23.
26. Ślusarczyk B. (2016), *Wspieranie konkurencyjności polskiego przemysłu w świetle założeń nowej polityki przemysłowej*, "Zeszyty Naukowe Politechniki Częstochowskiej. Zarządzanie", nr 22, p. 7-22. DOI: 10.17512/znpcz.2016.2.01
27. www.pi.gov.pl.
28. www.popw.parp.gov.pl.
29. www.stat.gov.pl.
30. Zawada M., Pabian A., Bylok F., Cichobłaziński L. (2015), *Innowacje w sektorze energetycznym*, "Zeszyty Naukowe Politechniki Częstochowskiej. Zarządzanie", nr 19, p. 7-21.
31. Zembura W. (2016), *Finansowanie innowacji*, "Studia Ekonomiczne. Zeszyty Naukowe Uniwersytetu Ekonomicznego w Katowicach", nr 305, p. 109-125.
    Ziółkowska B. (2016), *Procesy innowacyjne w przedsiębiorstwach i ich uwarunkowania*, [in:] Bitkowska A., Weiss E. (red.), *Wielowymiarowość podejścia procesowego w zarządzaniu*, Wydawnictwo Wyższej Szkoły Finansów i Zarządzania w Warszawie, Warszawa, p. 359-375.

FINANSOWANIE PUBLICZNE I PRYWATNE DZIAŁALNOŚCI INNOWACYJNEJ PRZEDSIĘBIORSTW W POLSCE

Streszczenie: Opracowanie dotyczy problematyki finansowania działalności innowacyjnej w przedsiębiorstwach w Polsce. Celem jest określenie źródeł finansowania działalności innowacyjnej przedsiębiorstw. Dokonano opisu źródeł finansowania działalności innowacyjnej przedsiębiorstw w Polsce w perspektywie teorii wyboru kolejności źródeł finansowania oraz teorii finansowania cyklu wzrostu. Do analizy empirycznej wykorzystano dane statystyczne publikowane przez GUS, na podstawie których określono strukturę poszczególnych źródeł finansowania działalności innowacyjnej przedsiębiorstw w Polsce. Dodatkowo analizie poddano udział przedsiębiorstw, które otrzymały publiczne wsparcie na działalność innowacyjną.

Słowa kluczowe: innowacyjność przedsiębiorstw, finansowanie własne i dłużne, środki publiczne, źródła finansowania