IDENTIFICATION OF THE IMPORTANCE OF ENTERPRISES' OWN FUNDS IN THE PROCESSES OF INNOVATION ACTIVITY FUNDING AT THE LEVEL OF POLISH REGIONS

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Abstract

The funding sources of innovation activities carried out by enterprises are classified by identifying the following types of funds: own, public, originating from capital-related entities, received from other enterprises outside the financial sector, obtained from the financial sector entities, transferred from transnational and international organizations, as well as other funds not listed above [Oslo Manual 2005]. Among the aforementioned, potential sources covering the outlays on innovation processes, the enterprises' own funds are of particular importance, as they not only constitute the basis for self-funding of this activity, but also determine the access to many external sources providing funding (e.g. bank loans, aid funds and other funding sources). The purpose of this article is to assess the diversity of Polish 16 regions in terms of the funding level of innovative processes carried out by enterprises from their own funds. The research also covers changes occurring in this respect in the years 2008-2017.

Key words: innovation activities, enterprises' own funds, funding sources of innovation activities

JEL Code: C18, O31

Introduction

The implementation of new or significantly improved solutions determines many activities (scientific, technical, organizational, financial and commercial) (Sobczak and Głuszczuk, 2018; Proctor, 1998; Johnson, 2001) but among them special attention should be focused on the ones which involve obtaining funds for preforming innovation processes. The sources for covering their costs may vary, ranging from enterprise's own funds, through debt and public aid instruments, to complex funding forms involving equity and foreign capital (hybrid funding). Within the spectrum of the aforementioned solutions, own enterprise funds seem essential, primarily in the conditions of financial engineering. Such funds, on the one hand,

constitute the basis for self-funding of innovative processes and, on the other hand, determine access to many external funding sources. A prosperous enterprise, having adequate own funds at its disposal (e.g. in the form of retained and/or forecasted profits), does not have problems either with creditworthiness or with a positive image among the potential providers of return and share capital (Phillips, 2010; Windrum et al., 2016; Moura et al., 2019).

The dual function of enterprises' own funds in funding innovative activities should be reflected in the structure of sources for covering costs of these processes. It is difficult, however, to determine clearly the right proportions between own and external funds, although the first of them should not be the dominating ones in the investment portfolio. Their excessive share may mean that enterprises are either deprived of or have difficult access to external funding sources (bank credits, loans from natural persons and/or legal entities, leasing, bonds, aid funds), as well as hybrid instruments (e.g. warrants and bonds).

The purpose of this article is to assess the diversity of Polish regions in terms of the funding level of innovative processes carried out by enterprises from their own funds.

1. Enterprises' own funds – definition problem

Correct interpretation and analysis of the published information regarding the funding sources of innovation activities carried out by enterprises is not only related to the knowledge of key terms (such as: innovation, innovation activities, types of innovations), but also to an unambiguous understanding of terms which define different categories of funds covering outlays on innovations. In accordance with the Oslo Manual terminology the following funds are listed: own, originating from capital-related entities (subsidiaries or affiliates), received from other enterprises (outside the financial sector), obtained from the financial sector entities (bank credits, venture capital, etc.), public (loans, grants, etc.), from supranational and international organizations, other, e.g. originating from other sources than the listed ones (Oslo, 2005). The above mentioned classification has not been fully reflected in the reports on innovations in industry and the service sector. The forms use the following categories of funds: own, public, foreign (non-returnable), from venture capital funds, credit (bank loans) and other than the listed ones (CSO, 2017a; CSO, 2017b).

Own funds are included in the Oslo Manual classification and also in the reports on innovations in industry and the service sector, however, they are not defined and their semantic dimension seems to be ambiguous. The synthesis of enterprise capital classification in accordance with the property rights criteria (capitals: own, foreign) and sources of origin

(capitals: internal, external) results in identifying four sources for covering costs of innovation activities, i.e. funding: own of internal nature, own of external nature, foreign, external (debt, public aid), hybrid, i.e. characterised by foreign and own funding (Janasz, 2005).

Following this approach, own funds can be perceived in terms of own internal and external funding. First of them cover – in general terms – retained profits, depreciation and structural transformation of assets (sale of unnecessary assets), whereas the latter involve owners' contributions to equity, a stable expansion of the shareholders' group, earning surplus on the share or stock sale price of a capital company over its nominal value (so-called agio) and also venture capital funds (Głuszczuk, 2015).

Confronting the aforementioned division of funds to cover the costs of innovation activities with the classification proposed by the Oslo Manual and applied by the Central Statistical Office, it is easily noticeable that the venture capital funds (VC) are classified differently. The nature of VC seems to support their inclusion in own funds. The essence of this funding type is the purchase of enterprise shares or stocks, motivated by the profit to be achieved from their sale based on the growth of goodwill in a medium or long term perspective (Tarczyński, 1999). These transactions (purchase - sale) do not result in a stable change in the ownership structure, however, the company co-funding is of a lasting nature (as in the case of owners' contributions to equity capital or stable expansion of the ownership structure – new stockholders or shareholders), as in the future only the entity holding the title of ownership can change to the fractional part of the enterprise.

In the context of the presented discussion, and also bearing in mind the terminology applied in public statistics, it should be adopted that own funds cover the items constituting internal and external funding, whereby own external funding does not include venture capital.

2. The scope and procedure of empirical research

The subject of the analysis is the share of enterprises' own funds in funding total innovation activities in Poland and in 16 Polish NUTS 2 regions. The analysis was carried out separately for the service sector enterprises and industrial enterprises. The statistical information necessary to assess the importance of enterprises' own funds in funding innovation processes were retrieved from the Local Data Bank, the largest database covering the economy and innovation in Poland, including statistical indicators describing the NUTS 2 regions. The statistical data were collected as part of the Community Innovation Survey and published in the form of reports on innovations in industry and the service sector (PNT-02 and PNT-02/u

respectively). The time range of the conducted research depended on the availability of statistical data and covered the years 2008-2017.

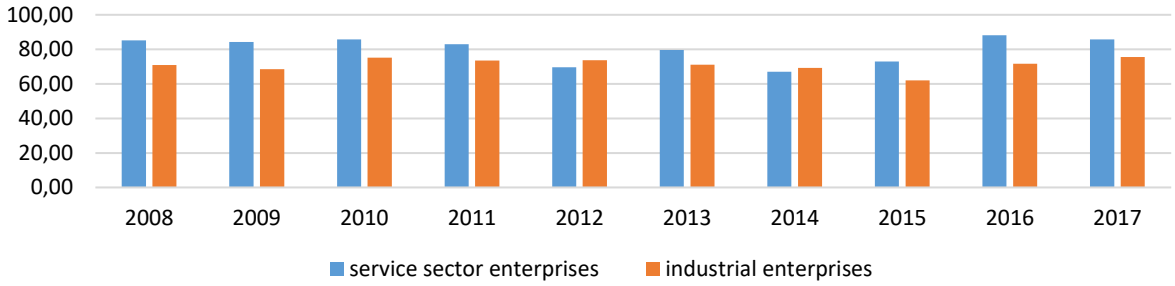
The following research scheme was applied in empirical studies:

1. the share and importance of own funds at the disposal of service and industrial enterprises in funding innovation activities in Poland and the respective differences in the service and industry sectors were identified;
2. the trend for changes in the importance of own funds in funding innovations by enterprises in the analysed sectors as well as the descriptive parameters of the share of enterprises' own funds in Poland in the years 2008-2017 were specified;
3. the division of Polish regions into relatively homogeneous classes was carried out in terms of the degree of enterprises' own funds dominance in funding innovations in the service and industry sectors;
4. the typology of the obtained classes of regions was determined taking into account the average share of funding innovations from own funds of service and industrial enterprises and the level of GDP per capita in the years 2008-2017.
5. Using Yates' Corrected Chi-Square Test the correlation between innovation funding shares from own resources of service and industrial enterprises in Polish regions in the years 2008-2017 was examined.

3. The assessment of spatiotemporal diversification of the importance of enterprises' own funds for funding innovation in Poland

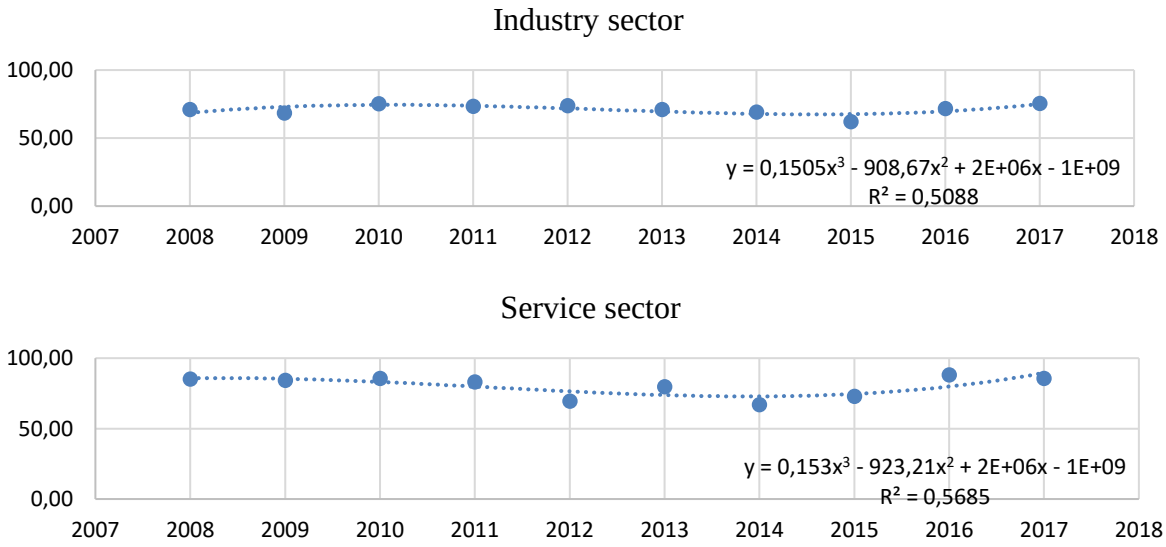
The share of enterprises' own funds in funding innovation activities in Poland, separately for the service and industry sector enterprises, in the years 2008-2017, is shown on Fig. 1. Throughout the analysed period, both in the service and industry sector, a clear dominance of funding innovation from own funds provided by enterprises in Poland, was recorded. The average share of such funds in the analysed period was 80,12% in the service sector and 71,11% in the industry sector. The changeability of the analysed indicators in the years 2008-2017 was not very high and amounted to 9,44% in the service sector and 5,60% in the industry sector. The share of enterprises' own funds was usually higher in the service sector enterprises comparing to the industrial ones, the exception were the years 2012 and 2014, when the opposite situation was observed. Fig. 2 presents the trends of changes in own funds for funding innovation activities in Poland in 2008-2017.

Fig. 1: The share of own funds in funding innovation activity in Poland in the years 2008-2017



Source: authors' compilation based on statistical information from the Local Data Bank.

Fig. 2: Trends in the development of the share of own funds in funding innovation activities in Poland in the service and industry sectors in the years 2008-2017



Source: authors' compilation.

As it can be noticed, the changes over time in both economy sectors are best approximated by the third-degree polynomial. The changes of the analysed indicators in the years 2008-2017 were characterised by a relatively mild decreasing-increasing trend. The next stage of the research procedure was the division of Polish regions into relatively homogeneous classes in terms of the stability of enterprises' own funds dominance in funding innovation. The results of the classification of regions into 4 classes and the typology of the obtained classes are presented in Table 1 and on Figures 3-4.

Class 1. includes regions characterised, in each year of the analysed period, by the share of enterprises' own funds in funding innovation activity exceeding 50%, hence it was the dominating one. The first class covers two regions: Mazowieckie and Śląskie,

characterised by a very high average share of enterprises' own funds in funding innovation in both analysed sectors of the economy and a high level of socio-economic development measured by GDP per capita. In the case of Mazowieckie, the average share of own funds was the highest among all regions and amounted to 85% for the service sector and 83% for the industry sector.

Tab. 1: The classification of Polish regions in terms of the stability of enterprises' own funds dominance from the service and industry sectors in funding innovation activities in the years 2008-2017

Class No.	Class type	Regions	Average share of funding innovations from enterprise own funds		GDP per capita (thous. PLN)
			service sector	industry sector	
1.	Stable dominance of funding expenditure on innovations from own funds of enterprises in the service and industry sector	Mazowieckie Śląskie	0,85 0,77	0,83 0,83	67,47 44,69
2.	Stable dominance of funding expenditure on innovations from own funds of enterprises in the industry sector only	Dolnośląskie Lubelskie Małopolskie Podkarpackie Podlaskie Wielkopolskie	0,73 0,67 0,71 0,73 0,64 0,59	0,76 0,77 0,79 0,71 0,74 0,72	47,33 29,50 37,96 29,92 30,65 45,54
3.	Stable dominance of funding expenditure on innovations from own funds of enterprises in the service sector only	Pomorskie	0,72	0,64	40,95
4.	Absence of stable dominance of funding expenditure on innovations from own funds of enterprises in both sectors of the economy	Kujawsko-Pomorskie Lubuskie Łódzkie Opolskie Świętokrzyskie Warmińsko-Mazurskie Zachodniopomorskie	0,53 0,78 0,63 0,68 0,66 0,60 0,65	0,68 0,65 0,56 0,61 0,60 0,52 0,60	34,87 35,61 39,53 34,57 31,68 30,44 35,92

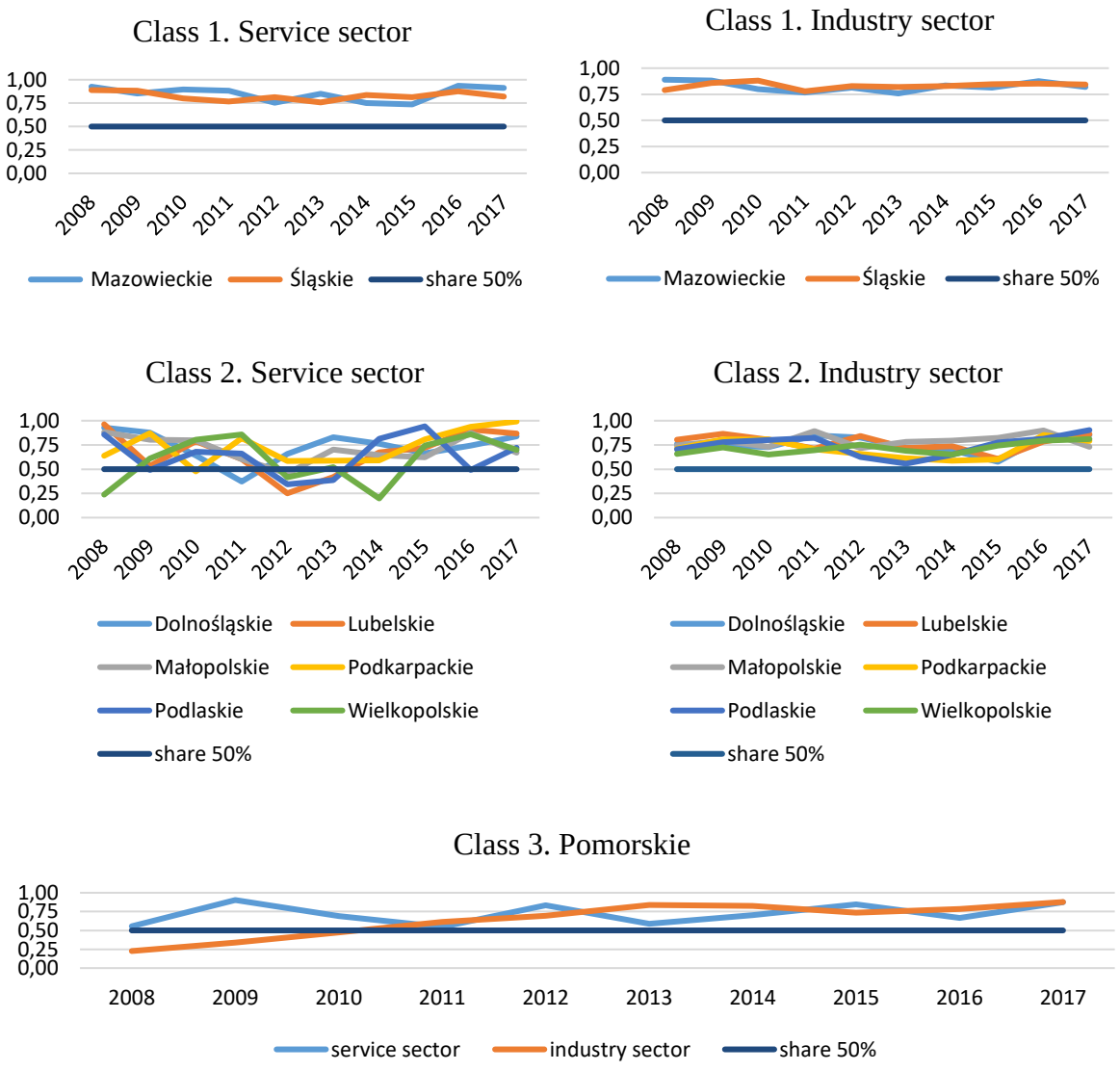
Source: authors' compilation.

Class 2. includes 6 regions characterised by a dominant share of enterprises' own funds in funding innovation in each of the analysed years in the industry sector only. The average share of industrial enterprises' own funds in funding innovation was lower than in class 1. and ranged from 71% to 79%. Class 2. is internally diversified regarding the level of GDP per capita. It includes both rich Polish regions (Dolnośląskie and Wielkopolskie) and the poorest ones (Lubelskie and Podkarpackie).

One-element class 3. includes Pomorskie region characterised, in each year of the 2008-2017 period, by the dominance of service sector enterprises in funding innovation

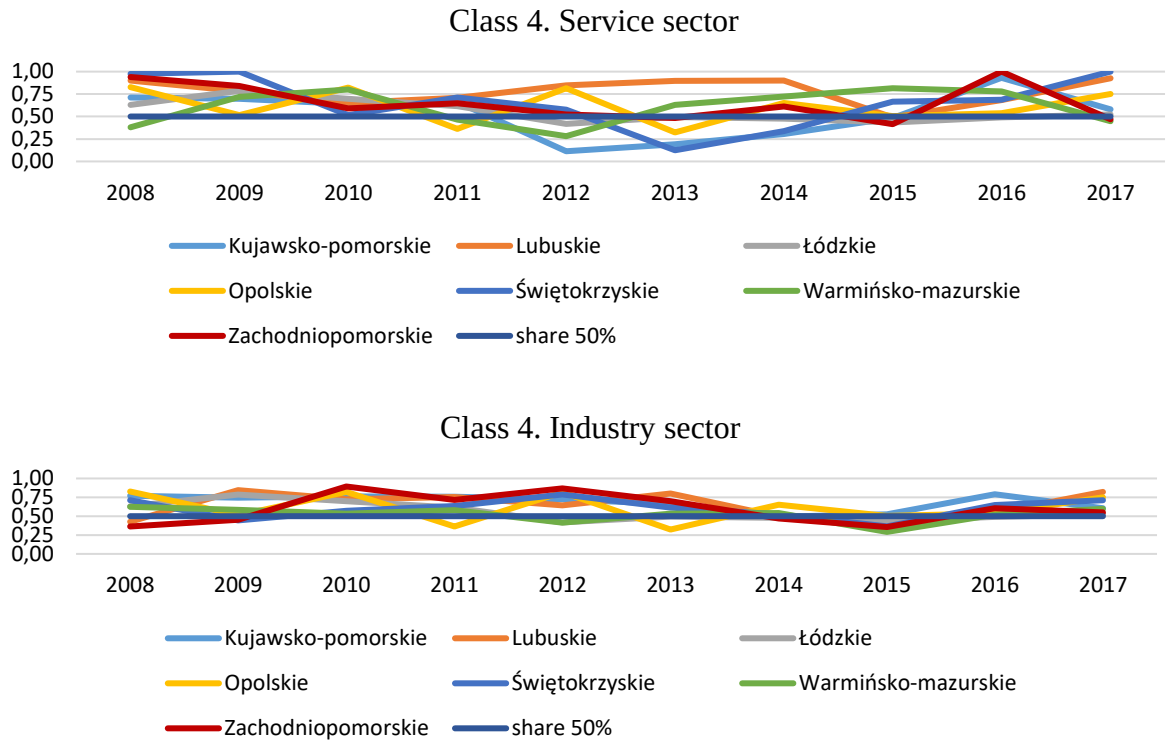
activities. The average share of funding innovation from the service sector enterprises' own funds in Pomorskie region was relatively high and amounted to 72%. This region is comparatively rich (the average value of GDP per capita in 2007-2017 was PLN 40,95 thousand). The most numerous class 4. includes regions in which, in the analysed period, the dominance of enterprises' own funds in funding innovation did not occur permanently. It applies to both the service sector and the industry sector enterprises. In the regions of this class only in Lubuskie region, in the service sector, the average share of enterprises' own funds in funding innovation processes exceeded 70% (reached 78%). The regions included in this class are characterised by average and low level of development.

Fig. 3: Average shares of enterprises' own funds in funding innovations in Polish regions included in classes 1-3 in the years 2008-2017



Source: authors' compilation.

Fig. 4: Average shares of enterprises' own funds in funding innovations in Polish regions included in class 4. in the years 2008-2017



Source: authors' compilation.

The final stage of the analysis consisted in the application of Yates' Corrected Chi-Square Test for a two-factor contingency table defined for 16 Polish regions in 2008-2017. The division of regions into two groups was adopted for both the service sector enterprises and the industry sector ones. One of the groups was characterized by the dominance, whereas the other one by the absence of dominance regarding the share of own resources in funding innovation. It was found that for the statistical significance level $\alpha = 0{,}05$, in the years 2008-2017, no correlation was observed in Polish regions between the share of innovation funding from own resources of service enterprises and the share of innovation funding from own resources of industrial enterprises ($\chi^2_{\alpha,df} = 0{,}81$; $df = 1$; $p = 0{,}37$).

Conclusion

The following conclusions can be formulated on the basis of the carried out empirical research:

1. In Poland, in the years 2008-2017, the enterprises' own funds played a highly important and dominant role in funding innovation activity. It referred to both the enterprises from

the service and industrial enterprises. The smallest share of service sector enterprises' own funds in funding innovation in Poland was recorded in 2014 (66,96%), and the industry sector enterprises in 2015 (62%). The analysed period was characterised by a decreasing-increasing trend of changes regarding the studied indicators, the course of which in terms of variation was the closest to the function of the third-degree polynomial.

2. 4 classes of the relatively homogeneous Polish regions were identified regarding the dominance stability of the share of enterprises' own funds in funding innovation in 2008-2017. Stable financial dominance of expenditure on innovations from enterprises' own funds in both the service and the industry sector was recorded in the regions characterised by high development level and included in the 1. class: Mazowieckie and Śląskie. The most numerous, seven-element class of regions was characterised by the absence of permanent funding dominance of expenditure on innovations from enterprises' own funds in both sectors. This class included regions with a relatively low level of GDP per capita.
3. A correlation was observed between the level of regional development and the stability of enterprises' own funds dominance in funding innovation activity. The regions featuring higher level of socio-economic development were characterised by a more stable and often higher dominance of enterprises' own funds in funding innovations.
4. In the years 2008-2017, Polish regions showed significant differences in the average share of enterprises' own funds in funding innovation processes. In Mazowieckie region this indicator was the highest both for the enterprises from the service sector (85%) and the industry sector (83%). The lowest average dominance of enterprises' own funds occurred in the analysed period in Kujawsko-Pomorskie region in the service sector (53%) and in Warmińsko-Mazurskie region in the industry sector (52%).
5. In the analysed period the shares of enterprises' own resources in funding innovation in Polish regions were mutually independent in the service and industry sectors.

The dominating share of enterprises' own funds in the processes of funding innovation activities does not result in completely clear assessments. It can be adopted that enterprises have adequate capital potential at their disposal to provide funding for these processes on their own, however, it cannot be ruled out that their capital is not supplemented by foreign funds, due to the fact that they are either not accessible or such access is significantly limited. The verification of these assumptions determines further course of research to be carried out by the authors of this article.

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