INNOVATION TYPES AT SMEs AND EXTERNAL INFLUENCING FACTORS

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Abstract Stimulating innovation is one of the pressing policy challenges facing many countries in the world today. The paper analyses the external factors that Polish entrepreneurs find most detrimental to their innovative activity. Asample of 199 small and medium size enterprises (SMEs) in Poland were subjected to asurvey. The data collected revealed the innovation types of SMEs in Poland and external financial factors influencing innovation the most. The results show external factors such as legal regulations, access to external financing, bureaucracy of institutions, financial government support, the tax system, time necessary to comply with regulations, and crisis and instability are very important for SMEs. According to the results, process and marketing innovations are applied more frequently than product and organisational innovations. Finally, the results indicate that entrepreneurs indicate that lack of government support and weakness of tax incentives is an important barrier to the innovation process.

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Introduction

Nowadays, especially in the industrial sector, innovation has become an important issue. Innovation has started to be considered in enterprise as a crucial element to increase profit and market share. Emerging market development and sustainable growth also depend significantly on small and medium sized enterprises (SMEs) and their innovative activities. SMEs are flexible, easily transform new ideas into market products, develop new technologies, production methods and marketing. But in Polish conditions they meet a lot of obstacles interrupting this process. Establishing innovative enterprises depends primarily on the general economy, systemic solutions aimed at structural changes and increasing effectiveness. Government solutions aimed at innovativeness in Poland often use taxes as a tool that are related to the internal situation of an entity and may impose certain restrictions to its activity. What appears as an essential condition for the competitive advantage of a enterprise is recognizing external support as a significant element in its management process.

Poland is a country where small enterprises tend to dominate. However, they are rather weak in terms of capital and, additionally, they face a threat posed by the state. Despite many declarations and support programmes, Poland does not appear to be a country that is business friendly (see the World Bank's ratings). Its overgrown bureaucracy and instability of law pose a threat to business development. A small company is forced to employ a high number of well qualified staff in order to avoid the traps of regulations and comply with its obligations.

The key objective of this study was to provide updated and extended investigation on SME innovations. Questionnaires completed by 938 SMEs in Poland found 199 innovative units, which implement 298 innovations such as: product, process, organizational

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and marketing solutions. The main aim was to find the external factors influencing different types of innovation from the perspective of entrepreneurs.

Conceptual foundations and hypotheses

The transformation of a new product into a commercial product which meets customer demand constitutes innovation value (Carlson & Wilmot, 2006, p. 56). In this study innovation is defined as the application of new ideas to create value for business (Bozkurt & Kalkan, 2014, p. 190). The Oslo Guide (2005, p. 51) provides a discussion of many definitions concerning innovation and innovation types. According to these definitions, four types of innovation are discussed: product innovation, process innovation, organizational innovation and marketing innovation. Product innovations include the introduction of new products and services to the market and also major improvements of existing goods and services (Oslo Guide, 2005, p. 52). Process innovation includes major changes in methods, equipment and/or software. Marketing innovations aim to respond better to the customer's need. Organizational innovation is defined according to Antonioli (2004, p. 19) as implementing a new organizational method in commercial practices, workplace organization or external relations of company.

Entrepreneurs meet many barriers during their innovative activity. For many authors these barriers can be categorized into internal and external (Piatier, 1984; Hadjimanolis, 2003; Madrid-Guijarro, Garcia & Auken, 2009; Stanislawsky & Olczak, 2010). Internal barriers are often considered as those which arise inside the company. External barriers come from the external environment of the company (Bozkurt & Kalkan, 2014, p. 190). As shown in Table 1 there is a rich literature on investigation of the innovation barriers of SMEs.

Table 1: Barriers to innovation in SMEs

Author	*Examples of barriers*	*Type*
Piatier (1984)	1) lack of government support as an important barrier to innovation in European countries.	Government support
Hadjimanolis (1999a)	1) lack of time; 2) inadequacy of the R&D activities; 3) design and testing within the company; 4) financial resources inadequate.	Time to comply R&D Finance
Hadjimanolis (1999b)	1) ease of copying the innovation; 2) government bureaucracy; 3) lack of government support; 4) lack of qualified human resources policies; 5) bank lending.	Time to comply Government support Human resources
Comtesse, Hodgkinson and Krug (2002)	1) risk aversion; 2) public complacency; 3) non recognition of high value innovation; 4) provincialism; 5) closed networks; 6) inability of framework tools for innovation in education; 7) limited human capital; 8) absence of functional models; 9) lack of entrepreneurial mindset; 10) poor access to financing; 11) legal barriers; 12) insufficient political vision and growth; 13) infrastructure and intellectual capital and underutilized; 14) too many restrictions on the innovation.	Access to financing Legal barriers Government suport Human resources Innovation restrictions and perception
Galia & Legros (2004)	1) high cost of innovation; 2) nonexistence of appropriate sources of funding; 3) internal resistance to change in firms; 4) too much relevance attributed to economic risk; 5) lack of qualify personnel; 6) insufficient information over technology; 7) low information about the markets; 8) level of legislation, regulations and standards; 9) lack of commitment of the customer towards new products.	Access to financing Time to comply Legal regulations Cost of innovation
Iammarino et al. (2006)	1) lack of funding sources; 2) excessive financial risk; 3) innovation cost dimension; 4) inexistence of qualified human resources; 5) low information about the markets; 6) scarce information on technology; 7) rigid regulations.	Access to financing Human resources Financial risk

Author	*Examples of barriers*	*Type*
Tiwari & Burse (2007)	1) low budget; 2) difficulty in recruiting adequate human resources; 3) bureaucracy; 4) poor cooperation between enterprises.	Time to comply Cooperation Human resources
Alinaitiwe et al. (2007)	1) domestic market dimension; 2) security level; 3) governmental intervention; 4) taxing of new products or services; 5) lack of accession to international markets; 6) discouraging policies of labor mobility.	Tax rates Tax payments Time to comply
Mussi & Spuldaro (2008)	1) risk associated with excessive specialization of human resources; 2) super enhancement of production processes or services by its practitioners; 3) limitation in the allocation of financial and human resources; 4) limitation on market access.	Human resources Market access
Demirbas (2010)	1) lack of state policies to support technology and R&D activities; 2) negative impact of the economy in the level of investment; 3) high cost of innovation; 4) lack of appropriate means of financing; 5) lack of qualified personnel.	Government support Access to financing
Kamalian et al. (2011)	1) excessive economic risk; 2) insufficiency of economic resources; 3) unavailability of funds; 4) high cost associated with innovation.	Access to financing
Necadova and Scholleova (2011)	1) high cost; 2) lack of specialists; 3) payback period of investment extremely long; 4) equipment technology; 5) standards and legislation; 6) lack of capital; 7) lack of consumer response; 8) resistance to change; 9) fear of risk; 10) ignorance of the market; 11) infrastructure of the business.	Legislation Access to financing Equipment Human resources Market risk
Bozkurt & Kalkan (2014)	Lack of work experience; 2) lack of training of employees for innovation; 3) lack of communication between departments; 4) crisis or instability of markets; 5) high bureaucracy in government support; 6) difficulty in obtaining the support from institutions.	Time to comply Government support Crisis

Source: Own research

Among many publications we can find some works considering that innovation in SMEs is hampered by lack of financial resources (Acs & Audretsch, 1990). In spite of the many categories of these barriers we find such groupings as government support, legal regulations and access to financing are significant. Focusing on government support we consider in this paper also the tax system factors such as: time to comply, tax rates, and tax incentives (Walicka, 2013, p. 248-259). The current literature on the subject of government policy and its effect on innovative behaviour tends to focus on public funds (Novellis & Parlato, 2005; Czemiel-Grzybowska & Walicka, 2014). Tax measures directed towards innovations increase innovation level, especially Research & Development activities (R&D) but also create a risk of lack of government and institutional subsidies (Owens & Ash, 2010, p. 30). The issues affecting the supply of innovation should go by the existing corporate tax system. The relationship between tax system elements such as: taxes, incentives, and social security contributions can influence entrepreneurial decisions on whether to remain dependent and employed or seek entrepreneurial and innovative solutions. Against this background taxation can reduce the amount of innovative and entrepreneurial activities (Henrekson & Sanandaji, 2011, 167–185).

Methodology

Data and sample

The article is based on research which involved a group of 938 small and medium enterprises registered with the Polish Statistical National Economy Register System (REGON), excluding special economic zones. The entities were private enterprises employing up to 250 employees, active VAT payers and operating for at least 5 years.

The statistical methods applied in the research involved mainly factor analyses. Moreover, other statistical methods and procedures applied included classic measures as a frequency test.

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The majority of firms were registered in the years 1990-2003 (circa 86% of all small enterprises). Employment was applied as one of the main parameters. As many as 81% of the enterprises hired up to 9 employees. Almost one out of three entrepreneurs ran a company individually in the form of self-employment, thus they did not create any additional workplaces. Other enterprises (18%) employed more than 10 employees. Detailed sample characteristics are shown in Table 2.

Table 2: Sample descriptive statistics (N=938)

Variables	*Descriptions*
Gender	
Male	75,80%
Female	24,20%
Education level	
No formal education	1%
Some grade school	3%
Completed grade school	10%
Some high school	51%
Completed high school	54%
Some college	6%
Completed college	19%
Graduate degree	23%
Post graduate degree	0%
Type of business	
Retailing	32,64%
Wholesaling	27,98%
Service	29,26%
Manufacturing or construction	6,11%
Agriculture	2,03%
Multiple type of business	1,98%
Other	0,00%
Average age of business	26,41 years
Average No. of Full-Time Employees	13,11
Average No. of Part-Time Employees	28,22
Innovators (N=199)	21,21%
Non-innovators (N=739)	88,79%
Research and Development expenditures as % of total capital (mean)	7%

Source: Own research

After the survey completion, respondents were divided into two groups: innovators who introduced at least one innovation (N=199) and non-innovators who didn't (N=739). In this paper 199 SMEs operating in Poland and defined by the author as "innovators" were investigated. In creating a set of questions used in the form of questionnaires, the scales for innovation types and external innovation barriers (Gunay, 2007) were used. In this study 4 dimensions: product, process, organizational and marketing innovations with 8 questions for innovation types and 8 questions for frequency were combined with 17 questions for external factors influencing the different innovation types (based on Table 1). The respondents were asked to respond on a 5 point Likert type scale to questions during face-to-face interviews in 2014. Data collected from the questionnaires were entered and analyzed with Statistica 9.0.

Data analysis and results

The first stage of the research aimed at finding the level of innovativeness of Polish SMEs measured by the number of innovations introduced. It was found that 21,21% of responding companies introduced

innovations during the last 5 years. The total number of innovations introduced were 298. As shown in Table 3, the researched companies introduced 51 new products or services to the market, 97 improved production/service processes or implemented new ones, 66 created new or significantly improved organizational relations and 84 marketing innovations.

Table 3: Innovations at companies researched (number)

Size	*Innovation type (N=199)*									
	Product		*Process*		*Organizational*		*Marketing*		*Total*	
	Solutions	*Innovators*	*Solutions*	*Innovators*	*Solutions*	*Innovators*	*Solutions*	*Innovators*	*Solutions*	*Innovators*
Micro	8	4	17	24	15	14	12	2	52	44
Small	23	4	26	29	35	31	33	30	120	94
Medium	20	8	54	22	16	15	39	16	126	61
Total	51	16	97	75	66	60	84	48	298	199

Source: Own research

One-sample normality Kolmogorov test was applied to check the data fitness to normal distribution. According this test (N=199>29) it was determined that the data distributions did not conform to normal distribution. The values obtained are shown in Table 4.

Table 4: One-sample Kolmogorov-Smirnov test values

Variables	*Kolmogorov-Smirnov Z*	*Total variables explained*	*Asymp. Sig. (2-tailed)<0,5*
Innovation types	0,821	67,32	0,00
External factors influencing innovations	0, 780	65, 29	0,00

Source: Own research

In the next step, the factor analysis was done. The dependent and independent variables were analyzed. The results concerned values of factor loadings not exceeding the absolute threshold limits for innovation types and external factors influencing innovations for 3 components and are given in Table 5.

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Table 5: Factor analysis for innovation types and factors influencing innovation

Variables	*Sub-variables*	*Q*	*Components*		
			1	*2*	*3*
Innovation types	Product	A3 A4 A5	0,788 0,764 0,768		
	Process	B2 B3 B6		0,691 0,690 0,686	
	Marketing	C6 C8 C9			0,711 0,694 0,607
External factors influencing innovations	Law and government support LAG	D1 D4 D6 D7 D8 D11	0,735 0,694 0,646 0,625 0,596 0,643		
	Finance FIN	E9 E11 E12		0,768 0,554 0,548	
	Economic conditions E_C	F13 F14 F19			0,594 0,646 0,801

Source: Own research

Finally, the frequency test was applied to get descriptive information. The values of the test are shown in Table 6.

Table 6: Innovation types and external factors influencing innovations – frequency

Factor	*Influencing type*	*Innovation type N=199 (%)*		
		Product	*Process*	*Marketing*
Legal regulations LAG	A NA D Total	**76,2**(μ=3,98) 19,5 4,21 100,0	2,45 34,80 37,25 100,0	34,2 **51,6**(μ=2,67) 14,2 100,0
Access to external financing FIN	A NA D Total	**77,14**(μ=3,76) 13,01 9,85 100,0	**66,80**(μ=3,45) 32,65 0,55 100,0	24,45 15,44 **60,11**(μ=3,22) 100,0
Bureaucracy LAG	A NA D Total	**68,12**(μ=3,17) 21,64 10,24 100,0	**54,2**(μ=3,11) 21,4 24,4 100,0	32,44 33,90 33,66 100,0
Government support LAG	A NA D Total	**80,40**(μ=4,08) 9,88 9,72 100,0	**75,45**(μ=3,99) 22,11 2,44 100,0	**51,21**(μ=3,03) 42,63 6,16 100,0
Tax system LAG	A NA D Total	**79,16**(μ=3,67) 18,54 2,3 100,0	**50,11**(μ=2,56) 40,23 9,66 100,0	49,17 11,54 39,29 100,0

Factor	*Influencing type*	*Innovation type N=199 (%)*		
		Product	*Process*	*Marketing*
Time to comply LAG	A	26, 42	**80,42**(μ=4,56)	7,90
	NA	**69,55**(μ=3,42)	8,90	34,88
	D	4,03	10,68	**57,22**(μ=3,75)
	Total	100,0	100,0	100,0
Crisis or instability E_C	A	**65,45**(μ=2,85)	**67,32**(μ=2,98)	20,67
	NA	11,21	20,76	**69,65**(μ=3,14)
	D	23,34	11,92	9,68
	Total	100,0	100,0	100,0

where: A= agree, NA= neither agree nor disagree, D= disagree
Source: Own research

The study of the effects of government policies towards entrepreneurship and innovation was focused on 7 features (Haufler et al., 2014, p. 13). It was observed that respondents generally confirm that lack of government support and lack of tax incentives are crucial for their innovation. The tax system can be a useful tool to help overcome barriers to innovation by reducing the costs of undertaking innovative activities. Research and development tax credits which are in use in many OECD countries provide tax benefits related to the costs of undertaking specific activities that aims to innovation process (Walicka, 2013, p. 250-251). Accelerated depreciation schemes for innovation-related capital and reduced labour taxes or scientists or researchers are the means that can be targeted to SMEs.

Conclusions

The results of a study that examined a sample of 199 small and medium-sized innovative entrepreneurs in Poland gives a deep overview of the main external barriers to innovation. The article examined the relation between (1) innovation types and (2) external financial obstacles to innovation. A better understanding of barriers to innovation can assist firms to foster development of an environment that supports innovation (Hadjimanolis, 1999). As a result of the findings, it was found that SMEs implement innovation mainly in process and marketing. In addition to these results, it is worthwhile to discuss innovation types by SME size. There are two types of innovation applied in SMEs. One is process innovation, the most popular among the smallest companies (up to 50 employees), the other is marketing innovation typical rather for small and medium companies (employing between 10 and 250 employees). In process innovation, SMEs have some benefits from cooperation between functions and costs are audited with some savings provided. In marketing innovation, SMEs use new methods for the promotion of products and change the package, design or price of the product to increase sales.

The results of the study indicate also the external factors that SMEs see by the prism of barrier. Crisis or instability in the market, difficulty in obtaining support from government, the large amount of bureaucracy, and the length of time to comply with government requirements are important external barriers to innovation in SMEs. According to the results, factors affecting innovation of SMEs are:

1) legal regulations – important in introducing product and organizational innovations,
2) difficulty in obtaining financial support from institutions – very important for implementing product and process innovations,
3) high bureaucracy in government support – very important for implementing product and process innovations, not important in organizational and marketing innovations,
4) financial support of government and tax system support – high importance for each type of innovation,
5) length of time to comply with legal requirements is too long – important for process innovation, not important for marketing,
6) crisis and instability – generally important for each type of innovation.

The contribution of this paper should be discussed with respect to the progress made in methodological and empirical knowledge concerning innovation types, factors influencing innovation and financial strategies in SMEs. External factors (crisis or instability in the market, the large amount of bureaucracy in government support, difficulty in obtaining support) are very important for innovation in SMEs. It is expected, as past literature has consistently shown, that economic and cost barriers are the main barriers

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to the innovation process (Madrid-Guijarro et al., 2009; Mohen & Roller, 2005; Baldwin & Lin, 2002). To Demirbas (2010) SMEs hold an important role in national economies because of their number and engaged workforce. However, despite recognizing its importance, some key barriers to innovation for SMEs prevent them from success in driving innovation processes. This high number of innovation barriers proves that there is a need for a clear strategy for SMEs to deal with these basic barriers for their position and to implement innovation practices within the firm (Teece, 1996).

Moreover, process and marketing innovation is applied more frequently than product and organizational innovation in SMEs. The frequency results of descriptive statistics of the research show that the average level of R&D expensive in relation to total capital is 7%, but 75.6% of SMEs do not spend on R&D. Finally, the results indicate that SMEs should increase their expenditures for innovation by applying effective strategy and developing their technology accordingly. To overcome the obstacles, due to the financial and bureaucratic resources, SMEs should create strategies. To remove these barriers it is necessary to accelerate the innovation efforts. Future research should focus on the comparison of internal and external innovation influence factors in SMEs in Poland and aimed at requirements of open innovation.

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