Norek, Tomasz; Costa, Leorardo

Article

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Table of Contents

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Evaluation of the impact of the innovative potential of the companies from the SMEs sector on the efficiency of innovative actions. Suggestion of the evaluation method.

Tomasz Norek
University of Szczecin
tomasz.norek@wzieu.pl

Leonardo Costa
CEPP – Centre of Portuguese Thought Studies,
Catholic University of Portugal at Porto
lcosta@ucp.pt

Abstract: The modern model for the innovative activity indicates that one of the key factors for success of innovative activity of enterprises is properly implemented the introduction of new solutions to market. It is widely recognized that the powers of innovation diffusion is an important determinant of the capacity of firms. The analysis of innovative activity of companies very often indicates that the innovations introduced to the market do not bring the expected benefits. This leads to the conclusion that very often innovation activities of enterprises are inefficient.
This article is an attempt to examine relationship between the company's internal resources and the effectiveness of innovative activity. To achieve this research objective author formulated the hypothesis: (H1) There is the relationship between the company's internal resources and the effectiveness of innovative activity.
This paper will present the results of empirical research conducted by the author among Polish SMEs in the years 2012 – 2014. The applied research method is based on the analysis of the innovative processes taking place in companies - with a special consideration of the nature of innovative processes taking place in SME sector companies.The author, using an online survey, conducted an empirical study of 200 SME sector companies (selection of companies was intentional - layered. The layers were: size of the company, the dominant type of business).In order to confirm hypotheses author applied the two-step analysis. The first step was the analysis of the innovation potential of the surveyed companies. This analysis allowed the precise determination of the factors affecting the innovation of enterprises. The second step was the analysis of the effectiveness of the innovative activity the surveyed companies. Summary of the study is to analyze the relationship between the company's internal resources and the effectiveness of innovative activity

Keywords: SME sector, Poland, innovation, efficiency of innovative

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1. Introduction

In today's economy it is widely accepted paradigm of innovation. It is recommended to businesses to conduct innovative activities which are by definition should generate profits and increase competitiveness. The paradigm of innovation is confirmed by several studies. On the basis of these studies are also commonly formulated a recognized economic development strategies. Meanwhile, innovative activity is often inefficient and do not deliver the expected results. This problem is particularly noticeable in the case of SMEs.

Poland is presently in specific moment of its development. Previous competitive advantages based on law work costs are more and more vividly losing their significance. It becomes necessary to create new advantages based on knowledge and innovation forming a main factor of the long-term economic growth. From this point of view, it is crucial to develop innovative activities of companies, including research and development, as the most important factors of the competitiveness in global scale.

Unfortunately, the innovation of Polish economy is relatively low. In Innovation Union Scoreboard report, published in 2014 by UNU-MERIT research institute, commissioned by the European Commission, the Polish economy in view of innovation expressed with SII (Summary Innovation Index) has been located at the 25rd position with 28 EU member countries researched (the value of the aggregate SII ration for Poland = 0, 296, the value of the averaged ration for EU27=0,539) 9UNU-MERIT, 2014).

UNU-MERIT lowest evaluates the innovative activity of SMEs (value for Polish = 13.76, the average EU27 = 30.31), the cooperation of the SME sector in innovation with other companies in the market (Poland = 6.4, the average EU27 = 11 16) and sale of innovative products and services (in the scale of the market or the company) (Polish = 9.84, the average EU27 = 13.26).

Within the years 2006 – 2013 huge investments have been made in order to increase the innovativeness of the Polish economy. The investments have been implemented in the form of the Operational Programme Innovative Economy (OPIE), financed from the EU funds and from the state funds. Total value of the investments within the framework of the programme was 10.18 billion EUR, including 8.65 billion EUR from the EU budget and the rest from the state funds1.

The main priority within OPIE were actions related to investments in innovative undertaking (15.08 billion PLN), researches and development of modern technologies (6.24 billion PLN), infrastructure of research and development area (5.32 billion PLN), information society – increase of the economy's innovativeness (3.84 billion PLN) or diffusion of the innovation (1.82 billion PLN)

According to the situation as for October 2013, within OPIE 13,277 projects have been approved for total amount of 40.15 billion PLN. Such support level is unprecedented in Polish history.

Simultaneously, such a great scale of investments in the innovativeness of the economy forces to perform an extensive analysis and assessment of the undertaken actions. One of the assessment possibilities is the efficiency evaluation in relation to the dynamics of changes in innovative activity of Polish companies. The Authors of this article has focused on the evaluation of the innovative efficiency of SME sector companies.

[1] Retrived from www.poig.gov.pl (10.10.2014)

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A series of reports on the innovativeness of Polish economy has been issued recently (Rybiński 2011, Hausner 2012, Baczko 2012). The reports critically evaluated the innovativeness of Polish economy and analyzed various aspects of the problem.
The Rybiński's report evaluates nine components influencing the level of Polish economy's innovativeness and reveals that Poland is rapidly losing its distance to other countries in the area of innovativeness.
The Hausner's report elaborates weaknesses of the Polish development policy and reveals the lack of mechanisms stimulating innovativeness. The Hausner's report provides data indicating the low level of Polish economy's innovativeness and points out a series of causes of the situation, among other: the lack of strategic leadership, bureaucratic procedures, identification of the UE funds expenditure with the development policy, low evaluation level of the EU funds expenditure. Similarly, critical opinions are included in the Baczko's report.
Also the reports issued by foreign institutions provide critical evaluation of the Polish economy's innovativeness level. It may be exemplified with the reports: Union Scoreboard and World Economic Forum.
In the report, the value of the innovativeness index dropped for Poland from 3.5 to 3.3 within the last six years, and in the global innovativeness ranking Poland went down from position 44 to 66.
The low innovation of the Polish economy is especially noticeable for the small and medium businesses sector, which may have negative consequences related, among others, to the decrease of the competitiveness of the economy and its marginalisation on the international arena. This aspect is frequently addressed in numerous scientific publications and reports considering the condition of the Polish economy's innovation – among others, the publications by: E. Horodyńska-Okoń, W. Świtalski, M. Zastępowski.
Simultaneously, many national researches (and some statistics published e.g. by GUS [Central Statistical Office]) reveal that Polish companies frequently declare a relatively high level of own innovation – especially in the aspect of introducing to the market innovative goods and services or the absorption of innovative solutions - A. Żołnierski PARP Report [Innovation of Polish Companies 2011].
The revealed cognitive dichotomy indicates the existence of possible differences in methodological defining and understanding the innovation or omitting during the evaluation of the innovative activities, the aspects related to results that should be caused by such activities – despite the fact that the researched companies more and more frequently declare implementation of the innovative undertakings, the efficiency of such actions is not reflected in the companies' results.

2. Company innovation potential: Review of the literature

The innovation of a given country's economy is mainly determined by the innovation of companies that operate in the economy. The innovation of the companies is influenced by internal factors (including, above all, potential and resources of a company, plus intellectual capital, material, financial and organizational resources). Additionally, the development of enterprise innovation abilities is influenced by the particulars of the industry and sector, where the company operates and external factors (including national conditions [e.g., legal regulations related to innovation support activities] and region-specific conditions [e.g., legal, culture, economic and technical factors).

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Analysis of all of the modern models of enterprise innovation (Norek 2012; Tidd and Bessant 2011) and research on the scope of innovation determinants (Lager, 2011) reveals that the key factor that regulates efficiency in the innovation processes is internal the enterprises' innovation potential.

The theory of innovation potential is based on the concept of company resources. This concept, developed at the beginning of the 1990s, assumes that a company's ability to develop all of the aspects of activity is closely related to the possessed resources. Edith Penrose (1959) was an early proponent of this outlook. Her publications have revealed the role of resources in the formation of company competitive advantage and the increase theory (Hall and Rosenberg, 2010).

A detailed analysis of the factors that determine company innovation potential is subject to numerous studies and scientific publications. It seems that the most global view of the factors that determine company innovation potential was suggested by Birchall and Armstrong (2001), who created a model of innovation conditions that includes the following factors: external environment, internal environment, innovation process and development management.

Tidd et al. (2001) held a somewhat different view of innovation determinants and focused in particular on internal organizational factors that stimulate the innovation processes. The most important include, among others: visionary leadership, appropriate organizational structure, recruitment, the willingness to engage in the innovation process, ability to conduct teamwork or the readiness to learn and adopt new solutions.

A comprehensive concept of innovation potential factors was presented by Gloet and Samson (2103). They pointed out, among other: strategy, leadership, change, customer focus, pro-innovative organizational culture, knowledge alliances, quality processes, learning and innovative HR orientation.

In the Polish literature, the analysis has been presented, among others, in works by Białoń (2010), Poznańska (1998) and Żołnierski (2005). The most precise seems to be the interpretation suggested by Żołnierski (2005), who suggested that a company's innovation potential is determined by the internal innovation potential as well as the access to external sources of information necessary for the innovation process.

In sum, innovation ability or potential determine a company's ability to create innovations. By analogy, it may be stated that the lack of innovation potential is a barrier to the companies' effective innovation processes.

In addition to the definition of the essence and the role of innovation potential in the innovation process, an issue is the measurement of individual determinants of innovation potential. A considerable part of factors that significantly affect the innovative capacity of a company (particularly as related to external factors) are difficult to measure or to quantify, which, to a large extent, makes it difficult to analyse and evaluate these issues precisely (Mangiarotti and Mention 2014;Fagerberg, 2004).

A company, in practice, can influence only internal factors in the process of conscious formation of innovative capacity and the creation of a strategy related to innovative activity for the long term. For this reason, ability to analyze and evaluate internal factors that constitute enterprise innovative capacity become extremely important. Recently, discussions about the determinants that affect enterprise innovativeness and methods of innovativeness measurement have gained significant meaning. This discussion, supported by numerous publications, has both the academic and practical dimension, as it is economic practice that is remarkably interested in effective tools

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for the measurement and evaluation of innovative capacity and the effectiveness of innovative processes that occur in companies (Cook 2011; Prahalad and Krishnam 2011).
The indicated multisidedness and complexity of the phenomena that form the innovative capacity of enterprises forces one to search for optimum methods by which to analyse and evaluate this area. This problem particularly applies to SME sector enterprises. Various publications have suggested new methods for the measurement of innovative capacity and potential of the enterprises that precisely account for the special character of operations performed and the effect of the regional conditions on the innovativeness of the enterprise. New proposals for the measurement of innovative potential very often assume different measurement methods for different sizes of companies (Rosebusch et al. 2009; Martinez-Ros and Labega 2002) or groups of companies (e.g., service companies; (Skaalsvik and Johannessen 2014; Kaplan and Norton 2009; Kanerva et al., 2006) or high-tech companies (Dibrel et al. 2008;Miles 2004). The authors of these proposals have indicated that in the implementation of the innovative process in companies belonging to various industries or sectors, there are such great differences that the use of one method of innovative potential measurement very often leads to incorrect results. Such a situation forces one to conduct in-depth studies designed to capture the actual innovative potential of companies.

3. The essence of effectiveness of innovative activity implemented by companies

The concept of action efficiency is often applied especially in relation to economic science, where it receives a special meaning in the context of the evaluation and improvement of actions and decision-making processes. In the literature the efficiency is usually defined as a result of undertaken actions, characterized with the relation of the achieved effects to the borne expenditures [Stoner 1994, pp. 29-30]. The question of efficiency as an economic category is supported with a series of comprehensive theories. Among the pioneering works there are publications by M.J. Farrel (describing methods of efficiency measurement [Farrel, 1957]), T.C. Koopmans (formal definition of efficiency [Koopmans 1951]) and G. Debreu [Debreu, 1951]. Primarily, the authors suggested methods of the individual undertakings' efficiency evaluation or the efficiency evaluation of individual enterprises' activity.
The next step in the development of the efficiency evaluation methods was introduction of stochastic frontier analysis enabling description of relations in all economy industries and sectors by means of the comparison of expenditures and results of individuals' activity, taking into consideration the occurrence of two data components: random factor and inefficiency. Publications by L.R. Murillo-Zamorano and L. Hjalmarsson, S.C. Kumbhakar, A. Heshmati include theoretical basics of presently applied statistical methods of efficiency evaluation: Data Envelopment Analysis (DEA) [Murillo-Zamorano, 2004], or Deterministic Frontier Approach (DFA) and Stochastic Frontier Approach (SFA) [Hjalmarsson and others, 1996]. The interest in the potential of DEA method resulted in a series of publications - they are listed in the article Evaluation of research in efficiency and productivity: A survey and analysis of the first 30 years of scholarly literature in DEA [Emrouznejad and others, 2008]. Previous years revealed not only a tremendous increase of the interest in the described methods, but also the variety of their application for the evaluation of various business entities, all industries and sectors.
A concise and precise description of contemporary comparative methods is presented among others by V. Sarafidis [Sarafidis, 2002] or in the Polish literature - a suggestion systematizing a

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description of methods supporting the efficiency evaluation based on the analysis of companies' activity in comparison to their competition [Kozieradzka, Lis 2000].
The analysis of the literature on the subject indicates that the issue of the efficiency of innovative actions is relatively seldom addressed (among others: Arundell, Bloch, Rosebusch, Sawang), and the Polish literature practically does not present a full elaboration considering the influence of company's resources on the efficiency of innovative actions (among others: Karaganov, Karasek, Wach, Zastępowski).
The efficiency is measured (both ex post and ex ante) with the use of index methods, based on the partial , synthetical productivity indicators of the resource usage (e.g. work, capital). The calculation of ex ante efficiency estimates the anticipated effects with the use of specific means or time. The ex post efficiency is implied to determine the results of the specific tasks' implementation.
The authors undertaking the subject of evaluating the innovative activity's efficiency try above all to define the efficiency of the innovative activity (usually in relation to defining the efficiency of other types of company activities) and apply classic efficiency measures, usually based on the measurable features of innovative activity.
As indicated in the literature (e.g. Brzeziński, 2001, p.146) the innovative activity is basically evaluated with the same methods as used for the evaluation of investment projects. Thus, the wide scope of innovation forms is brought to technological, production or process shape, as those the effects of which may be evaluated with financial measures. However a problem occurs e.g. in case of the value innovation or even the organizational innovation, when it is hard to specify an expected rate of return and the prospected market success – due to the complexity and multidimensionality of possible effects and costs. Thus there are suggestions to distinguish the evaluation of the efficiency of purely capital investments and the evaluation of the innovation usage, since these undertakings have different goals and methods of their implementation, results, methodology of specifying expenditures and results, conditions of evaluating the results and the influence on changes of other activity indicators (Karganov, 2008, p.135-136).
Synthetic and comprehensive review of the theory of economic efficiency, including an assessment of the possibility of applying them to assess the effectiveness of innovation, has been pre-presented by M. Kotsemira [Kotsemir, 2013].
The above observations prove the necessity to undertake detailed researches in relation to the nature of innovative processes' efficiency and determine an attempt to elaborate methods of measuring the efficiency of innovative activities that in the fullest way would take into consideration the nature and complexity of the innovative processes.
The starting point for creating the methodology for the evaluation of innovative activity's efficiency may be a detailed analysis of innovative processes that take place in companies.

4. The measurement of innovative activity on the basis of the analysis of innovation diffusion

The implementation of innovative projects – regardless of the size of company which implements the innovation and regardless of the type of the implemented innovation - takes place according to the diagram which is defined in the subject literature as the model of the innovative process (Drucker 1994, p.35). Actually the best known examples of subsequent descriptions of the implementation of an innovative process include: the "chain-linked model of the innovative

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process" suggested by S.J. Kline and N. Rosenberg (Kline, Rosenberg 1986, p 289-290) and the "integrated model" described by R. Rothwell and W. Zegveld (Rothwell, Zegveld, 1985).
Further research on the essence of the implementation of innovative projects, the development of the innovation theory and the practice concerning innovative activities led to the creation of subsequent evolution models of innovative processes. The authors of the new proposals integrated the implementation of the innovative process with virtually each area of a company's activity, showing that the resources owned by the company determine its innovative potential – namely the ability to effectively and efficiently implement innovative projects (Norek 2012). The currently binding models of the implementation of innovative projects include the model of: "the 5th generation innovative process" (Rothwell 1995), the spiral innovation process (Oslo Manual 2005), the efficient management of innovation (Tidda, Bessant, Pavitt 2001).
Analyzing the contemporary models, it may be clearly stated that the Authors of each of the new proposals emphasize the significance of the stage related to diffusion and popularization of the implemented innovation.
The diffusion of innovation, defined by the Oslo manual, means the "dissemination of innovation by market and non-market channels, starting from the first implementation at any place in the world" and "the way in which innovations are subject to dissemination by market and non-market channels, from the first implementation to the contact with various consumers" (Oslo Manual 2005, p. 80).
To sum up the above discussions, it may be concluded that the diffusion of innovation determines the principles of market commercialization of innovative products and services and is an element of the innovative process which is directly responsible for the market success of new products and services. Therefore, it may be concluded that innovations would not have an economic significance without diffusion processes (Klincewicz 2011, p.22), which makes many researchers acknowledge the issues of diffusion as crucial for a successful implementation of innovative processes (Klein, Sorra 1996, Angle, Van de Ven 2000).
Furthermore, emphasizing the significance of innovation diffusion issues, it should be indicated that knowledge with regard to the diffusion of innovation is necessary to create product and marketing strategies in companies introducing innovative products and services.
Accepting the previously suggested understanding of the efficiency of innovative activity, in the process of efficiency evaluation, both on the ground of diffusion and absorption, a series of indicators may be applied. This may be exemplified with:

1. Innovation sale level.
2. Success indicator related to the sale of innovation.
3. Innovation level of the researched companies.
4. Customers' acceptance level in relation to new products and services.
5. Efficiency level of diffusion processes for new products and services.

In order to examine the relation between a company's inside resources shaping innovative potential and the efficiency of innovative activeness the above indicators should be correlated with the innovative activity efficiency indicator. The literature commonly indicates that the basic indicator evaluating the efficiency of innovative actions is ROI2 indicator which bases on the calculation of the profits gained on the sale of innovative goods and services in relation to the expenditures on the innovative activity.

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Although the ROI2 indicator is very useful in relation to the evaluation of the efficiency of specific innovation projects, it is controversial for the evaluation of the innovation efficiency of all economical branches or sectors and requires precise defining reference values.
This results from the fact that the efficiency of the innovative actions is strongly dependent on the size of companies, branch of economy, type of the conducted activity or the specificity of individual innovative undertaking. For example, large production companies usually receive much larger ROI2 values than small service companies. Detailed concept and the methodology for calculating the ROI were presented among others by A. Kandybin (Kandybin 2014), P. Drake et al. 2006 (Drake et al. 2006) and A. Kandybin and M. Kihn (Kandybin & Kihn 2004).
Literature analysis allows for the adoption of the reference values for the ROI 2 - depending on the size of the company. Reference values are: 20% for micro enterprises, 27% for small enterprises and 30% for medium-sized enterprises (Thuriaux-Aleman et al. 2013). The proposed reference values are based on empirical studies of innovative activity different size companies operating in various sectors of the economy.
In this article the author shall analyse the efficiency of the innovation diffusion processes in Polish SMEs.

5. The analysis of the relationship between the company's internal resources and the effectiveness of innovative activity of SMEs in Poland. Research Method and Data

On examining the causes of low innovation of companies from the small and medium businesses sector (Norek 2013) the author has paid special attention to the barriers related to the efficiency of the innovative process implementation. The author has performed a detailed analysis of the relation between the company's innovation level, the sale of innovative products and services, indicator of the achieved success and interrelation between the customers' acceptance of a new product or service and possibility of its market commercialisation.
On the analysis of the above features the author has formed the following research hypothesises: There is the relationship between the company's internal resources and the effectiveness of innovative activity.
The set research goal has been implemented on the basis of logical induction method based on the analysis of processes of innovation diffusion in the companies of small and medium businesses sector. The research includes the evaluation of relationship between the company's internal resources and the effectiveness of innovative activity of SMEs in Poland.
The research has been conducted with the use of the research questionnaire consisting of 43 questions, divided into eight categories – stages of the innovative process implemented in the company.
This research hypothesis has a research aim, which is the analysis and evaluation of internal innovation potential of companies of the small and medium business sector in Poland to identify the barriers that prevent effective implementation of innovation processes. The research goal has been achieved in these studies based on logical induction and analysis of all of the crucial, internal determinants that influence enterprise innovation abilities as well as the classic static analysis.
Preparing a research tool and a range of research, I conducted a detailed review of global research in the field of innovation potential and drew upon the experience of other authors. In particular, I took into account the results of research carried out by Miller (1983) and Zahra and

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Wicklund (2010; research on the level of innovation), Koberg et al. (2003; research on communication in organizations), Cameron and Quinn (2003; research on organizational culture). The detailed methodology of the research and the full scope of the study are described in other publications by the author (Norek 2011).

Within the evaluation of individual categories, the companies performed the evaluation of the selected aspects of functioning within a given area. The research was conducted with a use of an Internet questionnaire during the period from April 2012 to August 2014. 200 companies were selected for analysis. They were selected in a purposeful manner to ensure an appropriate research structure: 45% of production companies, 55% of service companies. The division due to the size of the examined companies was as follows: 79 (39%) micro enterprises, 94 (47%) small enterprises, 27 (13%) medium enterprises. The sample for comparative researches was standardized with statistical methods taking into consideration the structure of individual provinces' economy: size of the company and dominant type of the conducted activity. The author is fully aware that the analysed sample is not representative, however it is an amount sufficient to perform the analysis and make conclusions.

In order to confirm hypotheses author applied the two-step analysis. The first step was the analysis of the innovation potential of the surveyed companies. This analysis allowed the precise determination of the factors affecting the innovation of enterprises. The second step was the analysis of the effectiveness of the innovative activity the surveyed companies. Summary of the study is to analyze the relationship between the company's internal resources and the effectiveness of innovative activity

The Author examined in detail, among others, the following characteristics describing the innovation potential of surveyed companies and process of innovation diffusion:

1. Analysis of the internal and external situations of the company,
2. Issues concerning the search for ideas with regard to innovation,
3. Issues concerning project planning with regard to innovation,
4. Financing of innovative projects.,
5. Innovation culture and strategy of human resources development,
6. Company internal communication and its organization,
7. Issues concerning diffusion and transfer of innovation into the market, and
    a. Level of innovation sales.
    b. Indicator of success related to innovation sales.
    c. Level of innovation of examined companies.
    d. Level of acceptance of customers with regard to new products and services.
    e. Level of effectiveness of diffusion processes for new products and services.
8. Issues concerning implementation of innovative projects.

5.1 Results

In Table No. 1 presents the aggregated values for the innovative potential of the enterprises surveyed in the analyzed areas.

The analysis of obtained results allows to state that the examined companies demonstrate the lowest internal innovative potential with regard to innovative culture (whole sample is 2.35), evaluating and planning innovative activities (whole sample is 2.05) as well as communication

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and organization (whole sample is is 2.45). Such low result in these categories may be caused by the lack of experience of examined companies related to innovation, historical lack of innovation culture in Polish SME companies and the continuously lasting transition of Polish economy (from centrally planned to free-market).
It should be noted that, in spite of a low innovative potential in most of the researched categories, the analyzed companies evaluated their own capacity with regard to transferring the results of innovative activities onto the market very highly.

Table 1: Agregate values for the innovation capacity of enterprises surveyed

Type of business/ Stages of the innovation process.	**Type of operations**						**Size of the enterprise**								
	Production			***Services***			***Micro***			***Small***			***Average***		
	2012	***2013***	***2014***	***2012***	***2013***	***2014***	***2012***	***2013***	***2014***	***2012***	***2013***	***2014***	***2012***	***2013***	***2014***
Culture of innovation and human resources development strategy	2	2,1	2,4	2	2,2	2,3	1,4	1,4	1,5	2,1	2,3	2,3	2,5	2,9	2,9
Internal communication within the company and its organization	2,2	2,3	2,4	2,5	2,5	2,5	1,7	1,8	1,7	2,2	2,4	2,3	3,1	3	2,9
Diffusion of innovation and commercializatio n	1,9	2,1	3,2	1,9	2	3,1	1,4	1,8	2,5	1,6	1,9	3,8	3,6	3,6	3,8
The issue of implementation of innovative	3	2,9	2	2,9	2,7	2,8	2,9	3	3,1	2,9	3	3,3	4,1	3,5	3,4
Financing of innovative projects	2	2,1	1,8	2,1	2,2	1,9	2,8	2,8	2,5	3,1	3	2,7	4	3,6	3,5
The issue of planning projects in the field of innovation	1,9	2,1	2	2	2	2,1	1,8	1,8	1,7	2	2	2,1	3,7	3,5	3,5
Problem of seeking ideas for innovation	3,2	2,9	2	3,1	3	3	2,4	2,5	2,5	3	3,1	3,3	3,5	3,7	3,8
Analysis of the situation and environment	2,1	2,3	2,3	1,9	2	2	2,8	2,7	2,8	3	3	4,2	3,9	4	4,1

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Innovative potential	**2, 29**	**2, 35**	**2, 26**	**2, 30**	**2, 33**	**2, 46**	**2, 15**	**2,23**	**2, 29**	**2,49**	**2,59**	**3,00**	**3,55**	**3,48**	**3,49**

Source: Author's elaboration

A positive aspect is the fact that the examined companies, over the three analyzed years, increased the innovative potential in most of the evaluated categories, the general change of innovative potential of the examined companies amounted to 3,00%. The examined companies in the analyzed period (2012-2014) increased the innovative potential the most with regard to innovative culture (change by 15.01% between the first and the third research) and with regard to the analysis of the situation and environment (change by 7.51% between the first and the third research). On the other hand, the biggest decrease in the potential of the examined companies occurred in the category financing (change by -12.42% between the first and the third research) and in the category communication and organization (change by -2.25% between the first and the third research) - which may also be explained by a reduced availability of financial funds for innovative activities.

The level of innovation of a unit is defined as a share of new products or services in its offer in the period of the last three years, regardless whether they were a market success. The notion of "success indicator", on the other hand, should be understood as the share of new products or services in a company's offer in the last five years which, after implementation, gained approval of the market. The evaluation here is supplemented by indicators with regard to the relations of revenue and profit from the sale of new products/services as compared to the company's turnover in the last three years. Those companies for which the values of the abovementioned indicators exceeded the level of 30% should be considered as distinctive in this respect. If, on the other hand, they oscillate within the range of 1%, these entities are in the weakest group of the examined ones. Such a description of ranges is generally adopted in the research concerning the innovativeness of companies or innovation audits. The aggregated results have been presented in Table no. 2.

Table 2: Key indicators describing effectiveness of implementation of innovation diffusion in examined companies

Group	Category	< 1%	2% - 10%	11% - 20%	21%-30%	> 30%
Services	Sale of innovations	24%	25%	25%	18%	6%
	Success indicator	30%	29%	19%	17%	5%
	Level of innovation	28%	24%	23%	19%	5%
Production	Sale of innovations	25%	30%	22%	14%	9%
	Success indicator	15%	23%	27%	25%	10%
	Level of innovation	24%	22%	26%	20%	8%
All	Sale of innovations	26%	28%	22%	16%	8%

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	Success indicator	23%	26%	23%	21%	7%
	Level of innovation	27%	23%	25%	19%	6%

Source: Author's elaboration

The obtained results indicate that half of the examined companies (50%) has a low innovation level (innovation level <10%) which classifies them in the category of non-innovative companies. Only 6% of the examined companies may be considered as innovative, namely such which implemented new products or services in the period of the last three years (innovation level > 10%). These results show that the examined companies do not have a sufficient innovative potential which makes it possible to implement innovative projects. The Author's other research confirms this thesis and indicate that the examined companies demonstrate the lowest innovative potential in the following areas: evaluating and planning innovative activities, communication and organization or financing innovative operations (Norek 2012).
The abovementioned results may be supplemented by an indicator describing the market acceptance of the introduced innovations – namely, in fact, describing the effectiveness of the diffusion process. This indicator is very unfavorable for the examined companies. As much as 49% of the examined companies evaluate the indicator of success below 10%. On the other hand, only 7% percent of the implemented innovations obtained the market's acceptance – indicator of success above 30%. The obtained values should be considered as a clear proof of poor effectiveness of the implementation processes of the implementation of innovation diffusion in the examined companies resulting from an inadequate potential in this aspect.
The financial dimension of the weaknesses of the implementation of innovation diffusion processes is characterized by the indicator of innovation sales. As much as 54% of the examined companies declare that profits from the sale of innovations are below 10% of the total profit, and only 8% of the examined companies declare over 30% of profit from the sale of innovations. The obtained results indicate that production companies achieve slightly better results than service companies but this difference is small.
Another category analyzed in detail was the dependence between customer acceptance towards a new product or service and the effectiveness of its diffusion. The obtained results made it possible to clearly evaluate the effectiveness of the innovation diffusion process implementation in the examined SMEs companies. The aggregated results have been presented in Table no. 3.

Table 3: Dependence of customer acceptance for implemented innovations and effectiveness of diffusion

Group	Category	Not	Sometimes	Often	Usually	Always
Services	Diffusion of innovation	31%	25%	23%	15%	6%
	Acceptance of customers	13%	14%	19%	25%	29%
Production	Diffusion of innovation	27%	26%	19%	17%	10%
	Acceptance of customers	18%	13%	14%	25%	30%
All	Diffusion of innovation	29%	26%	21%	16%	8%
	Acceptance of	16%	14%	16%	25%	29%

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	customers					

Source: Author's elaboration

As it seems from the obtained data, despite the fact that 29% of the introduced innovations always obtained customer acceptance, the diffusion of only 8% of them ended with a full market success. These results clearly indicate that the examined companies, in spite of the fact that they often have valuable, new products and services which obtain a positive customer evaluation, are very rarely able to carry out an effective process of their market diffusion. This is yet another confirmation of the thesis presented in the article that the examined companies have insufficient potential with regard to innovation diffusion.
The detailed results providing the percentage share of profit on the sale of innovative products in the total profit of the researched companies are presented in Table no. 4.

Table 4: Average % share of profit from the sale of innovation

Size of the companies	Type of activity		Total Average	The expected value of the mean	The difference between the research sample and the expected value	Normative average values	The difference between the research sample and the normative average values
	Production	Service					
Small	11,20%	9,45%	10,33%	31,00%	20,68%	27,00%	16,68%
Micro	9,43%	6,76%	8,10%	25,00%	16,91%	20,00%	11,91%
Average	14,10%	13,34 %	13,72%	42,00%	28,28%	35,00%	21,28%
Total Average	11,58%	9,85%	10,71%	32,67%	21,95%	27,33%	16,62%

Source: Author's elaboration

The table includes the values of the researched companies' profits gained on sale of innovative goods and services. The author has compared actual profits with a declared profit level expected by the researched companies and with a reference profit level indicated in other researches.
The received results also indicate that the researched companies receive significantly lower profits on sale of innovation both in relation to the expectancy level (21.95%) and in relation to the reference level (16.62%). The difference between actual profit level and the expected level is understood - company owners would like to receive possibly high profits. Unfortunately the difference between the actual profit on sale of innovation in the researched group of companies and the reference profit clearly confirms the relation between the low innovative potential of the researched companies and the profit on the sales of the innovations.

Due to the results obtained, the author has divided the surveyed companies into two groups:

1. not innovative companies,

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2. innovative companies.

To the group of innovative companies, the author classified the company that in the first step of the analysis obtained 10% of the best average results.

Table 5: The results of clusters analysis for year 2014

Type of business/ Stages of the innovation process.	*Non innovatives companies*	*Innovatives companies*
Culture of innovation and human resources development strategy	2,5	4,2
Internal communication within the company and its organization	2,1	4,3
Diffusion of innovation and commercialization	1,8	4
The issue of implementation of innovative	2,4	4,2
Financing of innovative projects	2,6	4,1
The issue of planning projects in the field of innovation	2,1	4,3
Problem of seeking ideas for innovation	2,4	4,1
Analysis of the situation and environment	2,8	4
Aggregate innovative potential	2,2	4,3
Average% share of profit from the sale of innovation	9,81%	14,52%
Numbers of companies in the group	167	33

Source: Author's elaboration

The data presented clearly indicate that innovative companies have a very low efficiency of innovative activity. The effectiveness of innovation activities for companies with strong internal resources is much higher than for firms with low resources. Discussed difference is presented in figur no. 1 (the area with the greatest difference in levels is indicated by the dark color). Additionally, the table reveals a difference between the received average profits on sale of innovations for innovative companies and non-innovative companies. The results reveal that the companies with a larger innovation potential resulting from their inside resources receive significantly higher (by 48.01%) profits on sale of innovation that the companies with a lower innovative potential. This is another argument confirming the hypothesis.

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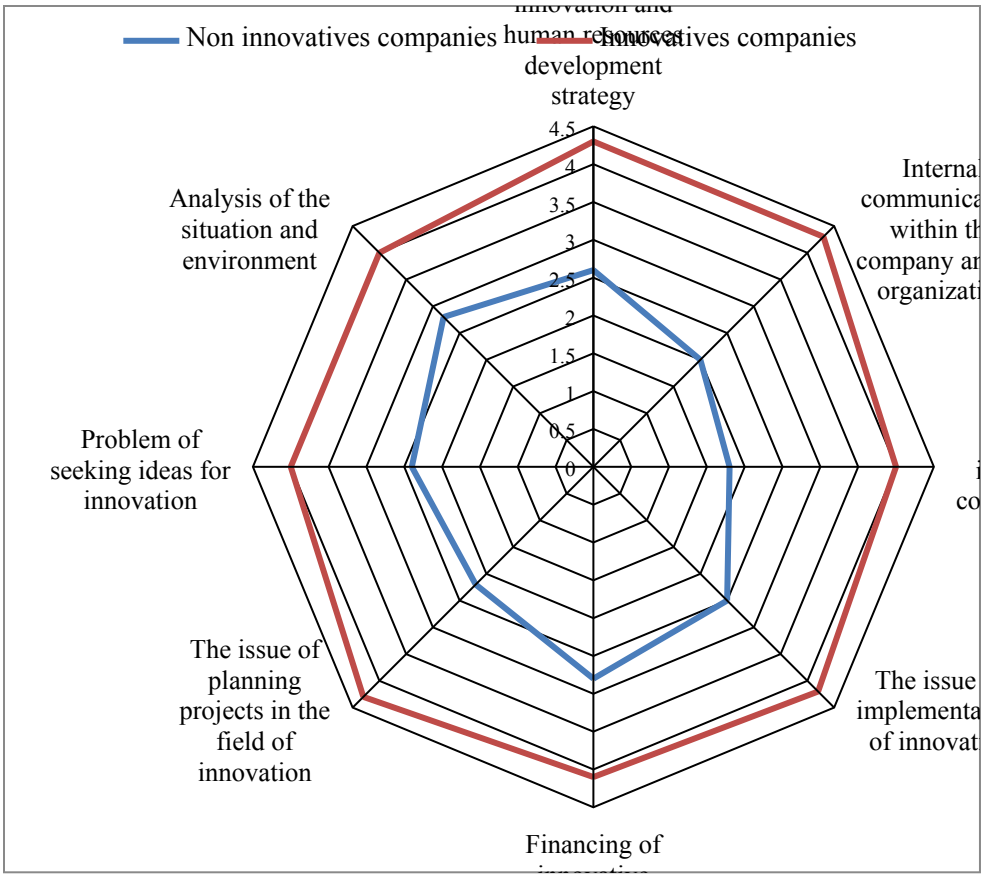

Figure 1 - Relationship between the company's internal resources

Source: Table 5

The presented results seem to confirm the formulated thesis that there is the relationship between the company's internal resources and the effectiveness of innovative activity.

4. Conclusions

The author of this paper has formed a thesis that there is the relationship between the company's internal resources and the effectiveness of innovative activity. The presented results confirm the research hypothesis formulated by the author. Companies with low potential for innovation also showed very low efficiency in terms of innovation. This low potential in scope of the efficient implementation of diffusion processes is one (not the only – which is indicated by other, mentioned researches by the Author) of the determinants of the low innovation of Polish companies of the small and medium businesses sector.
Despite the fact that 29% of the introduced innovations always obtained customer acceptance, the diffusion of only 8% of them ended with a full market success. As much as 54% of the examined companies declare that profits from the sale of innovations are below 10% of the total profit, and only 8% of the examined companies declare over 30% of profit from the sale of innovations. The received results also indicate that the researched companies receive significantly lower profits on sale of innovation both in relation to the expectancy level (21.95%)

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and in relation to the reference level (16.62%). Additionally, the table reveals a difference between the received average profits on sale of innovations for innovative companies and non-innovative companies. The results reveal that the companies with a larger innovation potential resulting from their inside resources receive significantly higher (by 48.01%) profits on sale of innovation that the companies with a lower innovative potential.

The obtained results should induce to conduct in-depth research in this respect. In-depth research, type case study would be significant from the point of view of evaluating the effectiveness of innovative processes. The diffusion processes of particular innovations should be subject to a detailed and thorough analysis as part of that research. Such research could help indicate specific mistakes made by companies when implementing diffusion processes.

Equally valuable information would be provided by studies of change dynamics in the effectiveness of diffusion process implementation over an extended period – this would lead to conclusions and evaluations about whether SMEs are increasing their competences in this area. The author has at his disposal, data on innovation process implementation in companies over the period 2009-2012. Such a range of data will enable in-depth research into the dynamics of this phenomenon.

Comparison of the effectiveness of the innovation activities of Polish companies against those from other countries, especially innovation leaders such as Denmark, Finland or Sweden, would be another complementary study and would help to identify the innovation gap between the compared countries. Such a study may be based on the author's research and the widely available statistics, e.g. published by Eurostat.

Another direction of research into the effectiveness of innovation process implementation may be the idea proposed by N. Rosebusch, J. Brinckmann and A. Bausch which combines the effectiveness of innovation processes with company size, length of operating on the market or organisation culture – one of the resources constituting company innovation potential (Rosebusch, Brinckmann, Bausch 2009).

The author advocates the idea of the creation of a comprehensive model for the assessment of the effectiveness of innovation processes implemented by SMEs, which would describe in the most precise manner the nature and complexity of innovation processes.

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