

MOTIVATORS OF OPEN INNOVATION USE IN MICRO, SMALL AND MEDIUM-SIZED ENTERPRISES

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ABSTRACT

The main issue presented in the paper is the use of open innovation (OI) among SMEs. The phenomenon of OI is important as it directly affects the development of these enterprises. With regard to SMEs, open innovation is characterized by certain features which distinguish it from its accepted definition, such as the prevalence of exploration over exploitation. The paper attempts to determine the impact of motivating factors (motivators) on the use of OI among SMEs. Two groups of factors were analyzed, i.e. the needs that SMEs wish to fulfill as a result of the use of OI and the benefits they obtain as a result of the application of this paradigm. The aim of the paper is therefore to analyze the main OI "motivators" with regard to Polish SMEs based on the research carried out within the framework of the project financed by the National Center for Science on the basis of decision number DEC-2012/07/B/HS4/03085.

Keywords: Open innovation, Micro, small and medium-sized enterprises (SMEs), Motivators of OI use.

1. INTRODUCTION

Micro, small and medium-sized enterprises (SMEs) play a significant role in the world economy. However, in the economic sense, their position is weak – mostly due to their limited resources. Hence, the need for support of SMEs through cooperation with different actors in their environment whose main task is to supplement existing resource shortages

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Open innovation (OI) is (according to the model proposed by Gassman and Enkel) [Gassmann et al., 2004] a manifestation of such cooperation. Other most frequently mentioned objectives of open innovation include: diversification of risks related to the implementation of innovative solutions or the possibility of acquiring new developmental capabilities through the process of organizational learning [West et al., 2006]. It should be noted that the end result of applied open innovation should be the creation and implementation of innovations.

Open innovation is related to two-way or one-way exchange of knowledge, experience and ideas carried out between SMEs and their competitors, customers, suppliers or universities and research institutes [Elmqvist et al., 2009]. The two-way nature of this exchange means the flow of resources (mostly knowledge) from the enterprise to the environment (the inside-out process) and from the environment to the enterprise (the out-inside process). In practice, one-way flows, in which the environment acts as a “buffer” supplying a given enterprise with resources necessary for its development, are most common. Innovative activities undertaken within the framework of the “out-inside” process are called exploration of the environment, while activities related to the “inside-in” process are described as exploitation of one's own resources [Leadbeater, 2009].

It is commonly believed that exploration of the environment dominates among innovative activities undertaken by SMEs in the framework of OI. This is due to the fact that SMEs, on the one hand, seek ready-made solutions which may be subject to commercialization in the short term, thus bringing them tangible benefits, and, on the other hand, “help” large operators get rid of those ideas which are seen as “undesirable” or of little value [Tether, 2008]. Despite the fact that OI is seen in general as a positive phenomenon, it may have a negative impact on SMEs. The preponderance of exploration of the environment results in the reduction of propensity for conducting one's own research and development (R&D) activity [Laursen et al., 2004]. In addition, SMEs treat OI in their own specific way. They use open innovation as a source of access to distribution channels and marketing, thus focusing their attention on the final stages of the implementation of innovative solutions, while the main idea of OI is the acquisition of knowledge and technology, as well as the creation of cooperation networks between different market “actors”, support institutions and research units [Lee et al., 2010]. However, no matter what the purpose of its application is, OI constitutes an invaluable source of resources, allowing the systematic and consistent development of SMEs. Therefore, it should be emphasized that OI plays a huge role with regard to these companies, becoming a factor and determinant of their success (or lack thereof) measured in the long term

perspective. This results in the need for an analysis of motivators and their significance for the use of OI among SMEs.

The aim of the paper is thus a review of the main "motivators" of OI in relation to Polish SMEs based on one of the authors' own research carried out within the framework of the project financed by the National Center for Science on the basis of decision number DEC-2012/07/B/HS4/03085.

2. THEORETICAL FOUNDATIONS

The literature related to the OI issues includes many different approaches to open innovation. H. Chesbrough, who introduced this concept to the theory of management sciences in 2003, was undoubtedly a precursor in this field. According to H. Chesbrough, OI includes internal and external ways of market entry, including advanced technologies in particular [Chesbrough, 2003]. Most definitions specifies OI in the context of two-way (or one-way) exchange of knowledge and information, that is, in terms of exploitation or exploration of resources. This is reflected in the conceptualization of the OI idea in a way that takes into account the following characteristics of its definition:

- the direction of knowledge transfer depends on the size of the enterprise [Enkel et al., 2009],
- the "inside-out" flow of resources is a result of a lack of certainty as to the benefits of introduced changes [Dahlander et al., 2010],
- the level of exploration of the environment depends directly on the availability of external sources of knowledge [Enkel et al., 2009],
- the involvement of multiple entities present in the environment in innovative processes (the "out" approach), which results in solutions that are then "consumed" by economic organizations (the "in" approach) [Leadbeater, 2009],
- the exchange of resources (knowledge) has a selective nature, i.e. solutions that are "side effects" of innovation activity end up in the environment, which is conducive to their improvement by other entities [Henkel, 2006].

The above-presented definitions indicate wide variations in the scope of their meaning, although as stated above, what they have in common is their bilateral nature, which in practice does not necessarily mean that there is a balance between exploitation and exploration.

Models based on closed innovation are the opposite of open innovation. The differences between the two approaches constitute a great determinant characterizing OI among micro,

small and medium-sized enterprises. These differences are presented in the table below (Table 1).

Table 1. Differences between closed and open innovation – selected areas

Area of difference	Model type		Difference
	Closed model	Open model	
Competitiveness	Breakthrough market novelties	Improved market novelties	Different level of novelty
Human resources	Employees within the organization	Employees within the network	Unlimited knowledge exchange
Ideas and development	Own R&D activity	R&D activity in cooperation with the environment	Different scope of R&D activity
Knowledge protection	Knowledge within the organization	Purchase and sale of knowledge	Different objective of knowledge exchange

The above-presented table shows significant differences between the two approaches. In closed models, knowledge is limited by the boundaries of enterprises, while in the case of open models, it becomes a universal "commodity" which can be exchanged. **The main area of innovative activities undertaken in regard to OI is the environment and cooperation undertaken with various actors and to varying degrees within its framework.** Such understanding of OI became the basis for the research conducted and the results obtained, providing a starting point for the analysis of open innovation used by SMEs presented in this paper.

The level of propensity for OI among SMEs remains in correlation with the **benefits** that they intend to obtain, directly or indirectly, from the use of the open approach, as well as with the **needs** that they report in connection with their innovative development. They are often referred to as "motivators". The literature divides these factors into several major groups: market-related factors (increasing companies' own competitiveness as a result of introducing new products or services), commercialization-related factors (support for market launch of novelties provided by partnership relations), factors related to patent activity (obtaining new

patents or licenses), and factors related to created networks (easier support from external institutions, more formal and informal contacts).

3. RESULTS AND DISCUSSION

According to statistics, the use of OI in the European countries is at the level of 32.5% among SMEs [Lichtenthaler, 2008]. In Poland, the use of this phenomenon is estimated at the level of 36.8% [Stanisławski, 2017]. Most often OI (in Poland) applies to vertical cooperation involving "other SMEs in the environment" and large operators that play the role of providers (respectively: 17.8% and 13.3%) and recipients of goods (respectively: 20.1% and 20.9%). In relation to horizontal cooperation, the most common entities are: business environment institutions, as well as research units and universities in the role of development and deployment partners (respectively: 4.3%, 7.8%, 6.5%, and 2.1%, 5.0%, 4.3%). With regard to the role of "marketing partner", public organizations are of the greatest importance in the field of cooperation with SMEs – 4.2% [Stanisławski, 2017].

In terms of the division into exploitation and exploration, the most common activities undertaken by SMEs in the first of the analyzed areas include: insourcing (49.7%), involving the company's own employees in deployments (43.9%), involving the company's departments in cooperation with the environment (38,2%), creating new relations with the environment (29.3%), as well as the sale of ready-made solutions to the environment (24.2%). The other area (exploration) is dominated by such activities as: signing contracts with external partners in the area of R&D services (62.7%), undertaking joint project deployment (52.7%), %, undertaking joint implementation of projects with customers (31.4%), purchasing ready-made solutions (30.1%), and outsourcing services (35.7%) [Stanisławski, 2017].

The above-presented data indicate a wide variety of innovative activity undertaken by SMEs in the areas of exploitation and exploration. It is worth noting the types of services that are contracted in the framework of outsourcing. These include, among others, the development of new technologies (66.3%) and products (45.2%), or audits that allow to assess the degree of effectiveness of introduced solutions (32.7%). The "popularity" of particular innovate activities depends largely on individual groups of entities that are part of SMEs. This means that the first two categories, i.e. the development of new products and technologies, to a greater extent apply to medium-sized enterprises (approx. 73%) than micro ones (63%), while micro and small entities show a greater interest in accessing new markets (27% and 25% respectively) than medium-sized ones (24%). It is directly connected with the needs existing in this respect among the surveyed SMEs. The size of the entity is in that regard the

determinant of the generated need, and thus translates into the level of use of individual innovative activities within the framework of outsourcing.

3.1. Methodology and Characteristics of the Research Sample

A multi-stage sample selection scheme, which consisted of two stages, was used for the selection of the sample. The first stage was the purposeful selection of enterprises conducting innovative activities in the last three years. The second stage, in which 800 entities were selected, was random. This random selection of the sample ensured its representativeness [Sokołowski, 2004].

The study was carried out with the use of two research techniques, CATI and CAWI, of which the principal was the first technique (approx. 70% of the study). However, the triangulation of these techniques resulted in increased efficiency of the study by reducing its duration and increasing the level of return of completed questionnaires.

Analyzing the characteristics of the sample, attention should be paid to several issues such as: the age of the analyzed enterprises, as well as the market and sector in which they operated. With regard to the first of these elements, it should be noted that developing entities were the dominant group, i.e. entities operating in the market from 4 to 12 years (75% of the respondents). In terms of their share, start-ups (14.8%) and mature, i.e. operating in the market for more than 12 years, entities (10.2%) followed. In terms of market range, the most important for the analyzed SMEs was the international market (44.6% of the respondents) and the domestic market (28.4%). The smallest number of enterprises operated in the local and regional market (respectively: 4.8% and 6.3%). Presenting the characteristics of the sample in terms of the type of business activities, it should be noted that the vast majority constituted the manufacturing sector companies (75%). The remaining entities operated in the service sector (14.8%) and the commerce sector (10.2%). The breakdown of the analyzed SMEs according to the size groups in the research sample was as follows: micro – 35.5%, small – 40.1% and medium-sized enterprises – 24.4%.

3.2. OI motivators - OI needs

Describing OI motivators in the context of needs, it should be noted that among the surveyed SMEs in Poland, the most important was the need which is directly linked with innovation and implementation of novelties in the enterprise (approx. 58% of the respondents). The next two most frequently reported needs that are considered motivators include: the need to improve the company's competitiveness (51.4%) and the need to acquire new customers (51%). While the two latter needs are of a 'current' nature, i.e. they serve to assess the market position of individual entities, the first need has characteristics of a strategic approach, as SMEs perceive

this need in the context of future development of their companies. This is important as it indicates the treatment of innovation as an essential factor in the process of raising the efficiency of their business activities in the next few years (with measurable results in the form of innovative product, process, marketing or organizational solutions), where innovation will play a significant role for SMEs in the context of economic benefits obtained (Table 2).

Table 2. The main needs motivating SMEs to implement OI

Needs	Groups of enterprises							
	Micro		Small		Medium		Total	
	N*	%**	N*	%**	N*	%**	N*	%**
Improvement of competitiveness	128	45.1	169	52.6	114	58.5	411	51.4
Acquisition of new customers	140	49.3	169	52.6	99	50.8	408	51.0
Promotion of own innovations	77	27.1	86	26.8	67	34.4	230	28.8
Novelties in the company	151	53.2	196	61.1	120	61.5	467	58.4
Lower operating costs	54	19.0	75	23.4	58	29.7	187	23.4
Use of external funding	60	21.1	100	31.2	70	35.9	230	28.8
Total (SMEs)	284		321		195		800	

* N - number; ** % - percentage share

It should be definitely noted that in the first of the above-presented cases (novelties in the company), the largest share of the entities that report this need is among the medium-sized entities surveyed (approx. 61% of the respondents). This is due to the fact that it is precisely this group (the largest group among SMEs) which **sees the greatest need for the innovative development**. Thus, it is justifiable to call medium-sized enterprises the "driving force" of the analyzed SMEs. A similar situation is with regard to the next element (competitiveness). The need in this regard is generated by huge competition among medium-sized entities, which is a result of a much smaller market dispersal than in the case of smaller entities - micro and small enterprises. Hence, medium-sized entities see innovation as an opportunity to consolidate their market position. Access to market resources (customers) is the most important for small entities (medium-sized enterprises do not treat this as a priority any more due to their greater

opportunities in this respect). The remaining needs (lowering operating costs and use of external funding) are characterized by a comparatively smaller number of indications in the context of needs motivating SMEs to use OI relative to the needs mentioned earlier (19-35% of the surveyed enterprises).

The assessment of the importance of these individual categories of needs carried out by the surveyed entities provides the confirmation of the above-presented results. The largest number of "positive assessments" (the sum total of the responses "v. high" and "high" among the analyzed SMEs) is associated with: novelties in the company - 75.0%, improved competitiveness - 76.9%, acquisition of new customers - 77.2%, and lower operating costs - 77.5%. On this basis, it can be concluded that the assessments made by the enterprises are at a relatively equal level (the differences in the evaluation of each category vary by no more than 2.5 percentage points), which significantly "blurs" the picture that allows one to draw the correct inference. Slightly greater differences are visible when the extreme cases, i.e. the "v. high" and "average" assessment, are rejected, taking into account only the "high" assessment. In this case, the differences amount to approx. 6 pp, which confirms that "novelties in the company" are the priority in terms of importance (approx. 52% of the responses), while the least important is "acquisition of new customers" (approx. 46%). The below-presented table allows one to draw the following conclusion: **SMEs consider all the indicated needs to be important motivators for the use of OI, though the level of their importance varies slightly** (within the range of 6 pp) (Table 3).

Table 3. The importance for SMEs of individual OI needs

Needs	Importance of individual needs									
	v. high		high		average		low		v. low	
	N*	%**	N*	%**	N*	%**	N*	%**	N*	%**
Improvement of competitiveness	112	27.3	204	49.6	87	21.2	8	1.9	0	0.0
Acquisition of new customers	124	30.4	191	46.8	79	19.4	10	2.5	2	0.5
Promotion of own innovations	51	22.2	120	52.2	54	23.5	3	1.3	2	0.9
Novelties in the company	105	22.5	245	52.5	100	21.4	16	3.4	1	0.2
Lower operating costs	47	25.1	98	52.4	34	18.2	8	4.3	0	0.0
Use of external funding	60	26.1	115	50.0	43	18.7	10	4.3	0	0.0

* N - number; ** % - percentage share

The most important in this regard were "novelties in the company", which indicates that innovations (in strategic and prospective terms) are treated as sources of development (Tab.2 and 3). It should be also pointed out that the total level of "negative assessments" (i.e. "low" and "v. low") amounted to 3.6% and is the highest relative to all the analyzed categories of needs. This is due to, among others, high risk associated with innovation which does not guarantee full market success of implemented innovations or OI used for this purpose. Multiple conditions must be met in this respect, otherwise business failure and consequently the liquidation of a given company may occur. The surveyed SMEs are aware of this, hence their "negative" indications in this respect.

3.3. OI motivators - OI benefits

As above, motivators will be analyzed, but this time in the context of the estimated, i.e. expected by SMEs, benefits (Table 4).

Table 4. Benefits resulting from the use of OI among SMEs

Benefits	Groups of enterprises							
	Micro		Small		Medium		Total	
	N*	%**	N*	%**	N*	%**	N*	%**
Growth of company resources	128	45.0	138	43.0	105	53.8	371	46.3
Internal and external novelties	138	48.6	182	56.7	134	68.7	454	56.7
Growth of company stability	100	35.2	101	31.4	52	26.6	253	31.6
Increased customer loyalty	56	19.7	73	22.7	47	24.1	176	22.0
Improved company image	115	40.5	135	42.0	83	42.1	333	41.6
Increased number of contacts	97	34.5	95	29.6	66	33.8	258	32.2
Lower operating costs	31	10.9	41	12.7	35	17.9	107	13.3
Creating partnerships	15	5.3	15	4.6	23	11.8	53	6.6
Increased employees' activity	54	19.0	77	24.0	49	25.1	180	22.5
Total (SMEs)	284		321		195		800	

* N - number; ** % - percentage share

Among the surveyed SMEs, the "novelties in the company" response has the largest share (56% of the surveyed SMEs), which confirms the earlier thesis (Section 3.2) that the innovative development and the use of OI for this purpose are crucial for these companies. The largest number of responses in this category can be seen among medium-sized entities (more than 68%), which shows (as has been pointed before) the importance of this group of enterprises among all SMEs. Thus, it can be concluded that **the primary objective of OI is the innovative development (through innovations), especially with regard to medium-sized entities**. It is consistent with the earlier adopted definition of OI, where generation and implementation of innovative solutions should be the end result of the approach adopted by SMEs.

Another category indicated by the respondents is "growth of company resources" (approx. 46%). This is undoubtedly the expected "result" of created and implemented novelties. It is assumed that the result of innovation should be an increase in company resources, especially when this company cooperates with other entities in its environment (using OI). Medium-sized entities also have the greatest expectations in terms of benefits in this category (approx. 53%). This is due to enormous needs of this group, as these entities base their development on innovations and all the time need "fresh blood" in the form of mostly intangible resources, i.e. knowledge. Hence, the perception of the OI approach as a source of knowledge exchange in the framework of the type "inside-out" and "outside-in" activities conducted.

Considering the importance of each category of benefits that SMEs wish to obtain with the application of OI, one must undoubtedly point to: "novelties" (v. high and high importance of benefits) - 70% of the responses, increased customer loyalty - 69.9% of the responses, growth of company resources - 65.5% of the responses, and creating partnership relations - 62.2% of the responses. As earlier (Section 3.2), when "high" values are considered, the largest share of responses can be seen for the "creating partnership relations" category (54.7%), which – along with "novelties in the company" – provides the foundations for the application of the OI paradigm among SMEs (Table 5).

Table 5. The importance of individual OI benefits for SMEs

Benefits	Importance of individual benefits									
	v. high		high		average		low		v. low	
	N*	%**	N*	%**	N*	%**	N*	%**	N*	%**
Growth of company resources	62	16.7	181	48.8	109	29.4	18	4.9	1	0.3
Internal and external novelties	90	19.8	228	50.2	125	27.5	11	2.4	0	0.0
Growth of company stability	50	19.8	123	48.6	66	26.1	12	4.7	0	0.0
Increased customer loyalty	31	17.6	92	52.3	47	26.7	5	2.8	0	0.0
Improved company image	56	16.8	166	49.8	97	29.1	11	3.3	0	0.0
Increased number of contacts	20	7.8	132	51.2	88	34.1	16	6.2	2	0.8
Lower operating costs	15	14.0	47	43.9	34	31.8	9	8.4	0	0.0
Creating partnership relations	4	7.5	29	54.7	17	32.1	2	3.8	1	1.9
Increased employees' activity	20	11.1	92	51.1	60	33.3	8	4.4	0	0.0

*N - number; ** % - percentage share

As in Section 3.2, it should be concluded that **all the expected benefits from the point of view of SMEs are important in the context of OI use**, as the level of their variation is relatively small (approx. 6 pp). In the context of "negative assessments" of OI use, the following ones are worth noting: lowering operating costs – 8.4%, increased number of contacts – 7%, and creating partnership relations – 5.7%. These negative indications are mainly due to a lack of certainty as to the expected results. With regard to the first of these "negative" cases, it should be noted that implementation of innovation is associated primarily with incurring extra (at the first stage of deployment) expenditure and not its reduction. The other two categories result mainly from limitations of preliminary verification regarding developed contacts from the point of view of their usefulness. Such verification is usually possible after a period of cooperation and on the basis of achieved results. However, such assessment is typically carried out in relation to results obtained and through the prism of these results. This means that if, as a result of introduced changes, a given company has obtained benefits, the assessment of cooperation is positive. Otherwise, this assessment is negative. Hence, it is difficult to talk about the objectivity of

cooperation assessment (and thus OI) in the context of intended benefits, as the evaluation *de facto* applies to effects of cooperation and not to cooperation itself.

4. CONCLUSIONS

The above-presented considerations suggest several important conclusions. Firstly, OI means a two-way flow of knowledge between various entities and the environment. In the case of SMEs, the most common is a one-way flow – the outside-in flow, i.e. from the environment to the enterprise (exploration of the environment). This is mainly due to limited resources of these entities that seek to supplement them from their immediate surroundings. Secondly, intensification of exploration of the environment may cause negative effects, i.e. by significantly reducing the pressure to conduct one's own R&D activity. Thirdly, SMEs see OI as a source of the needs and the benefits achieved usually at the last stage of commercialization – they tend to avoid "early" activities related to the creation of novelties (i.e. R&D activities) mainly due to costs and their own limited resources.

The empirical part of the paper indicates further conclusions. SMEs report a number of needs and benefits that motivate them to use OI. Among these motivators, the most important are those relating to implementation of innovative solutions. This shows a prospective and strategic perspective concerning the issue of innovation, where it is treated as a source of development and a competitive advantage in the market. However, the differences between the categories (of needs and benefits) are so small that it can be concluded with certainty that all of these factors are of major importance in the application of open innovation.

The analysis of both needs and benefits indicates yet one important regularity. Pioneers in the application of OI are mostly medium-sized enterprises (this is due to the role that they attach to the innovative development - treating it as their primary success factor). Novelties are, according to their assessment, such an important element in their strategy that in many cases these entities associate their relational resources (the number of established contacts) with the end result in the form of new deployments. This allows to conclude that these enterprises are proponents of the use of OI paradigm in practice.

The last important conclusion is the small share of "negative" assessments manifesting in the form of "v. low" or "low" importance (in the opinion of the companies) of the needs and benefits arising from the use of OI. In the first case (needs), these assessments result mainly from a lack of certainty as to the success of deployments made (the risk associated with innovation), while in the case of benefits from a lack of objectivity of cooperation (established relations) assessment, which usually stems from the verification of effects of

cooperation rather than cooperation itself as an activity conducive to the innovative development.

In conclusion, it should be noted that OI (the environment and cooperation undertaken in its framework) is applied among SMEs in Poland and plays a significant role in the process of shaping their level of innovativeness. However, the degree of "openness to the environment", as shown by the research presented, depends on the size of entities – the greater their size, the greater their propensity for innovation and application of OI.

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