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## **COOPERATION OF ENTERPRISES IN THE FUNCTIONAL AREA IN THE FIELD OF INNOVATION<sup>1</sup>**

### **Summary**

*Purpose* – The aim of the presented article is the assessment of the relationship between the intensity of cooperation in the field of innovation of small and medium-sized enterprises with other business entities and their location in the functional area.

*Research method* – A review of the literature on determinants of cooperation in the field of innovation of small and medium-sized enterprises operating in the functional area was carried out. The second part of the article presents the results of empirical research conducted among 150 small and medium-sized companies operating in the Lodz-Warsaw functional area. The survey was carried out based on the interview method, using an anonymous questionnaire, with owners or co-owners of enterprises or their main managers.

*Results* – Proximity of companies and other entities located in the functional area and the resulting cooperation in the field of innovation have a positive effect on financial and non-financial results obtained through cooperation. This indicates a dependence between cooperation and innovativeness of companies which are located in the functional area and have partners there.

*Originality / value* – The analysis of the results of the conducted research confirms the assumption that the intensity of cooperation in the field of innovation of Polish small and medium-sized enterprises with other economic entities depends on their location in functional areas.

**Keywords:** functional area, scope and results of cooperation of enterprises in the field of innovation

**JEL classification:** D22, I24, R12

### **1. Introduction**

In the literature devoted to managing the development of companies from the SME sector, determinants of cooperation of enterprises in the field of innovative activity and policies supporting enterprise development are of interest to management researchers as well as practitioners. These determinants are considered as a potential factor in improving companies' performance as well as their development. The issue of location and forms of SMEs' economic cooperation in the field of

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innovation is relatively well-recognised in the literature but there is no in-depth assessment of the impact of particular determinants of this phenomenon [Radicic, Pugh, 2017; Poznańska, 2016]. Thus, it is important to examine the modifying role of location in functional areas characterised by relatively well-developed territorial capital on the intensity of cooperation in the field of business innovation.

The aim of the presented article is the assessment of the relationship between the intensity of cooperation in the field of innovation of small and medium-sized enterprises with other business entities and their location in the functional area. The diversity of companies from the SME sector in terms of cooperation intensity as well as the specificity and determinants of the functional area are discussed. The second part of the article presents the results of empirical research concerning the impact of cooperation intensity in the field of innovation on the results achieved by companies from the SME sector located in the Lodz-Warsaw functional area.<sup>2</sup>

## **2. Cooperation of enterprises in the field of innovation and the functional area**

The measure of development of contemporary small and medium-sized enterprises is, among others, their ability to cooperate in the course of their innovative activity, which is important from the point of view of overcoming their developmental challenges [Czakon, 2017]. Cooperation of enterprises (and other external entities) is defined as a form of cooperation which involves sharing of the available resources or information possessed in order to achieve the desired, joint or individual, results of cooperating partners [Grabowska, 2014]. Companies undertake cooperation in simple or complex forms, including, for example, trade in goods, production cooperation, joint ventures, acquisitions, mergers and strategic alliances as well as participation in various types of networks. Thanks to the established cooperation, companies can obtain tangible benefits that they would not be able to achieve on their own, such as access to information, resources, markets and technologies as well as benefits of learning, scale and scope [Węgrzyn, 2016]. At present, cooperation with other entities (other companies, R&D units, universities, customers and suppliers) in the field of innovative activity is of significant importance, as it results in innovation-related benefits [Ross, 2016; Forsman, Rantanen, 2011]. The success of cooperation can be measured by benefits achieved by a given company and parties involved as well as the intention to continue cooperation [Nowak, 2013].

According to the resource-based approach, the ability to cooperate is positively related to the scale of companies and the stage of their development as well as the proximity of cooperation partners. The literature emphasises that along with the growth of the scale and development of maturity of companies, due to an increase in their resources and capabilities, there is a certain decrease in the importance of

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barriers to their development [Plawgo et al., 2017; Grandea et al., 2011; Hamilton, 2010]. A positive role in the development of SMEs can be played by the proximity of cooperation partners, which enables building trust, networking, cooperation in the field of production, undertaking joint ventures, innovation, exchange of knowledge and information, etc. In this approach, the proximity of cooperation partners may play the role of an accelerator in the process of developing innovative capacity [Roper, Love, 2018]. The greater the scale and scope of cooperation in the field of innovation is, the greater the possibilities for the development of companies are, and at the same time the importance of barriers to enterprise development decreases [Micek, Pyziak, 2017; Huggins, Thompson, 2015; Stawasz, Ropega, 2014]. It should be noted, however, that this is facilitated by the company's relative proximity to its key partners and its ability to absorb knowledge obtained from its local partners [Presutti et al, 2019].

Cooperation of SMEs with local customers, suppliers, co-operators, R&D units, as well as competitors may provide enterprises with an opportunity to create competitive advantages [Grabowska, 2014, pp. 58-59]. It stems from the advantage provided by geographical proximity of potential cooperation partners, which is a source of direct contacts and strengthens the intensity and density of relations between entities. It plays an important role in building other forms of closeness, namely social, institutional and organisational as well as cognitive. As a result, geographical proximity enables better recognition of possibilities and needs of cooperation partners, offers lower transaction costs as well as higher flexibility of matching partners to everyday business practice [Nowakowska, 2011, pp. 39-51].

Using the advantages resulting from geographical proximity of potential cooperation partners becomes all the greater, the more developed the regional (local) environment in which they are located is in terms of the number and diversity of companies and institutions, direct links and interdependencies, access to resources as well as the level of economic, social and demographic development. Considering the territorial factor, a functional area can be described as an environment whose boundaries are delineated by activities of entities in the social, economic or political sphere and whose delimitation is determined by a set of dominating functions [Markowski et al., 2011, pp. 25-44]. It is an area of strong centripetal links between the settlement units which form it and which are characterised by common developmental challenges but also by a great potential for cooperation expressed through processes of self-organisation and cooperation of various entities [Kuźnik, 2015].

Creating conditions within the regional policy for better use of the potential of functional areas and their inclusion in the process of cooperation and competition with other functional areas (centres) is one of the most important spatially determined developmental challenges. It contributes to the economic development of an area, raising its rank nationally (and internationally) [Heffner, Gibas, 2013]. In this process, the ability of the functional area to use its own resources and the capacity to build a cooperation network through the inclusion of a wide range of local entities are important [Żak-Świerczyńska, 2016]. This creates better conditions for the development of local innovative entrepreneurship and local business entities as

well as other institutions, and for locating economic entities in an attractive economic area. It also provides conditions for more intensive cooperation of entities located in the functional area [Arendt, Grabowski, 2019].

The Lodz-Warsaw functional area is considered to be an area of intense impact of both agglomerations observed in the closer and further environment, especially in the field of transport, education, science and research, creative sectors, urbanisation processes, tourism, cooperation of enterprises and economic activity [Żak-Świerczyńska, 2016]. The overriding objective in the development plan of this area is to build territorial capital by strengthening economic and social ties and increasing the attractiveness of the anthropogenic environment [Markowski, 2015, p. 9]. In this context, the relationship between the intensity of cooperation in the field of innovation of small and medium-sized enterprises with other business entities and their location in the functional area seems to be interesting. Its proper identification should provide knowledge about the factors shaping the scope and intensity of cooperation as well as the results of cooperation and barriers to cooperation experienced by SMEs. The existence of a dependence between the intensity of cooperation of enterprises and their location in the functional area may be useful for assessing the effectiveness of regional policy and demonstrating the level of development of territorial capital of the functional area. It can also be an argument for companies when choosing their business location.

### 3. Characteristics of the sample

The article uses the database of 150 small and medium-sized enterprises operating in the Lodz-Warsaw functional area which cooperated with other business entities or R&D units, business environment institutions, local government units, etc. in the three subsequent years preceding the survey (2012-2014). The research assumed that a sample would consist of 230 economic entities from the SME sector operating in the Lodz-Warsaw corridor and meeting the criteria adopted in the research pertaining to age, scale of enterprises, cooperation with other business entities or R&D entities, business environment and local government. The entities included in the study were randomly selected with the use of random number generator from the group of 3500 companies contained in the REGON GUS database. After analysing the obtained data and their consistency, 150 units were adopted for the synthetic analysis, which constitutes 65% of the studied population. The survey was conducted based on the interview method, using an anonymous questionnaire, with the owners or co-owners of the enterprises or their main managers. The original data obtained as a result of the research were subjected to statistical analysis and statistical comparative analysis.

The sample was dominated by companies referred to as micro-entities (employing fewer than 10 people). They accounted for 56% of the total sample. The share of small companies (employing 10-49 people) was 30% and medium-sized companies (employing more than 50 people) accounted for 14% of the total sample. The

average age of the surveyed enterprises was 19.9 in 2015, i.e. they were mature companies. Companies with more than 10 years of market presence prevailed (65.3% of the analysed sample), while the share of new companies (up to five years of activity) was 12.1%.

The research involved companies from four sectors: pharmaceutical and cosmetic, vegetable and fruit, logistics as well as clothing and textile. The majority were the companies from the fruit and vegetable sector (41.3% of the total sample). Other sectors had comparable shares (from 18 to 20%).

In the spatial structure of the surveyed companies' sales market, the national market prevails (47.6% of total revenues), followed by foreign markets (24.3% of total revenues). Local markets (the district, called *powiat* in Polish, in which the company operates) and regional markets (the voivodship in which the company operates) have similar shares, constituting respectively 13.9% and 14.2% of total revenues.

## **4. Results of empirical research**

### **4.1. Cooperation of enterprises in the field of innovation: its scope and intensity**

The occurrence of all kinds of contacts of an economic, institutional, informational nature, etc., taking the form of contractual and/or non-contractual contacts, regular or sporadic contacts, and contacts yielding financial or non-financial results in the field of innovation, was adopted as a criterion of cooperation between enterprises and their different partners.

The surveyed companies, as part of their business activities, cooperated with a whole range of different partners, including primarily other business entities (customers, suppliers). From 84.2% of companies (customers) to 54% of companies (suppliers) cooperated with this group of partners. Units of the R&D sphere and economic groupings constituted a smaller percentage of partners (26.7% and 21.3% respectively). Only one in seven companies cooperated with business environment institutions and local government units. A minimal percentage of companies cooperated with clusters (4.7%).

In terms of the territorial scope of cooperation between the surveyed companies and other entities in the framework of their business activity, cooperation mainly concerned the national market, followed by the foreign and local market. Cooperation with other entities located only in the Lodz-Warsaw functional area concerned 34% of companies.

The distribution of the surveyed companies according to cooperation with other entities, broken down into entities located in the Lodz-Warsaw functional area and located outside this area, varies. Most of the indications concern partners located in the functional area. The biggest difference can be seen in the case of cooperation with suppliers, R&D units, business environment institutions and local government units. Only in the case of cooperation with other companies, a larger percentage of

indications concerned companies located beyond the functional area. The above-presented situation may indicate greater intensity of cooperation between companies and partners located in the functional area, which can have an impact on a different assessment of benefits of cooperation.

When it comes to the subject of cooperation of enterprises in the field of innovation, commissioning of expert opinions, studies and analyses prevails as well as exchange of knowledge, experience, information and training, i.e. soft forms of innovation activities, inexpensive, strengthening the capacity of enterprises to absorb knowledge and technologies. In this field, enterprises cooperate more often with partners located only in the functional area than only with partners outside the functional area (the percentage of responses is 58.8% and 45.5% respectively). The biggest difference is visible in the case of commissioning expert opinions, studies and analyses, exchange of knowledge, experience, information and training as well as undertaking joint projects (table 1).

**TABLE 1**

**The subject of cooperation in the field of innovation between enterprises and their partners (% of companies)**

Subject of cooperation	Functional area	Outside functional area
Commissioning expert opinions and analyses	49.0 (23.5)	17.3 (10.1)
Exchange of knowledge, training	47.1 (29.4)	37.4 (12.1)
Joint projects	29.4 (17.6)	20.2 (9.1)
Purchase of new technologies	17.6 (7.8)	13.1 (7.1)
Total	58.8 (29.4)	45.5 (13.1)

The percentage of responses indicating high intensity cooperation is given in brackets.

Source: own elaboration.

For further analysis, the division of companies into two groups was assumed. They were divided according to the intensity of cooperation measured by the frequency of contacts with other partners in the framework of conducted business activity, i.e. companies with low intensity (sporadic contacts) of cooperation (80.7% of all companies) and companies with high intensity (regular contacts) of cooperation (19.3% of all companies). Companies cooperating with other entities located only in the functional area were characterised by much higher intensity of cooperation compared to companies cooperating with other entities located only outside the functional area (29.4% and 13.1% respectively).

High intensity cooperation in the field of innovation takes place mostly in the case of exchange of experience, information and training as well as commissioning expert opinions, studies and analyses in both surveyed groups of enterprises. However, this cooperation is greater in the case of companies cooperating with partners located only in the functional area in comparison with companies coope-

rating with partners located only outside this area in all of the distinguished categories of the subject of cooperation.

In order to determine the mutual dependence of the subject of cooperation in the field of innovation and its intensity, Pearson's C contingency coefficient was applied (table 2). The conducted analysis shows that in the opinion of business managers, the analysed relationships are statistically significant, except for the purchase of new technologies in the case of companies cooperating with partners in the functional area. Coefficients of dependence are high for the exchange of knowledge and training (for companies cooperating with partners from the functional area) and for commissioning expert opinions and analyses (for companies cooperating with partners from outside the functional area). In other cases, the coefficients reach a moderate level. This may mean that undertaking cooperation in the field of innovation in all areas (possibly with the exception of the purchase of new technologies) depends on the intensity of contacts between the surveyed companies and their business partners or others. There was no significant difference in the discussed relationship for companies cooperating with partners located only in the functional area compared to companies cooperating with partners located only outside this area.

**TABLE 2**  
**The relationship between the subject of cooperation in the field of innovation and its intensity (measured by Pearson's contingency coefficient)**

Subject of cooperation	Functional area	Outside functional area
Exchange of knowledge, training	0.535**	0.404***
Purchase of new technologies	0.129	0.424***
Commissioning expert opinions and analyses	0.332**	0.524***
Joint projects	0.370**	0.429***

\*, \*\* and \*\*\* denote significance at 0.1, 0.05 and 0.01 level of significance respectively.

Source: own elaboration.

Contacts with producer groups, customers, suppliers and clusters located in the functional area are of the greatest importance for cooperation of enterprises in the field of innovation. In the case of companies cooperating with partners located outside the functional area, contacts with producer groups, customers and suppliers are important. A clear difference in favour of companies cooperating with partners located in the functional area (table 3) can be seen in the case of cooperation with clusters and producer groups. This is probably due to the proximity of these partners.

**TABLE 3**

**Importance of particular business partners for cooperation  
in the field of innovation\***

<b>Business partners</b>	<b>Functional area</b>	<b>Outside functional area</b>
Producer and capital groups	4.36	3.86
Distributors/Customers	4.30	4.35
Suppliers	4.04	4.12
Clusters	4.00	2.67
Units of the R&D sphere	3.71	3.57
Business Environment Institutions	3.40	3.00
Non-Governmental Organisations (NGOs)	3.36	3.67
Companies in the same industry	3.32	3.62
Local Government Units	3.22	3.00

\* – assessment on a scale of 1-5 points, where 1 point – low importance and 5 points – high importance

Source: own elaboration.

#### **4.2. Selected characteristics and results of cooperation of enterprises in the field of innovation**

The level of intensity of cooperation between the surveyed enterprises and entities located in the functional area or outside the functional area shows some variation due to company development factors, the subject of cooperation between companies and other entities, the motives of and barriers to cooperation, the nature of relations existing in a given industry, the assessment of regional support and results achieved (table 4). Enterprises cooperating with entities located in the functional area, compared to companies cooperating with entities located outside the functional area, much more often plan further development of cooperation within the functional area. They also obtain results of cooperation in the form of innovation more often, and the main barrier to cooperation in their case is bureaucracy. These companies operate in industries characterised more by cooperation than competition. The relatively most favourable conditions for shaping the intensity of cooperation of enterprises located in the functional area occurred in entities focused on the exchange of knowledge and information, commissioning expert opinions, and maintaining high quality of products or services.



TABLE 4

**Basic differences in characteristics of selected groups of enterprises cooperating within the functional area (% of companies)**

Selected features	High intensity of cooperation	Low intensity of cooperation
Dominating subject of cooperation	Exchange of knowledge, training (100.0)	Commissioning expert opinions (86.7)
Dominating motive of cooperation	Market opportunities (40.0)	Market opportunities (46.7)
The main factor of enterprise development	High quality of products/services (73.3)	High quality of products/services (46.7)
The main barrier to enterprise development	Labour costs (37.5%)	High taxes (27.3%)
The intention to develop cooperation within the functional area	80.0	40.0
Assessment of public (local) support	4.1 pts.*	3.7 pts.*
Dominating relations among companies within the industry	Cooperation and competition (53.3)	Cooperation and competition (60.0)

\* average rating on a scale of 1-5 points

Source: own elaboration.

TABLE 5

**Results of cooperation in the field of innovation according to the subject of cooperation within the functional area (% of companies)**

Description	Financial results	Non-financial results
Exchange of knowledge, training:		
a) high intensity of cooperation	80.0	66.7
b) low intensity of cooperation	88.9	55.6
Purchase of new technology:		
a) high intensity of cooperation	100.0	75.0
b) low intensity of cooperation	60.0	40.0
Commissioning expert opinions and analyses:		
a) high intensity of cooperation	75.0	66.7
b) low intensity of cooperation	76.9	53.8
Joint projects:		
a) high intensity of cooperation	80.0	88.9
b) low intensity of cooperation	50.0	50.0

Source: own elaboration.

The assessment of results obtained by the surveyed companies through cooperation shows that cooperation with entities located in the functional area generates much greater results in the field of innovation than cooperation with entities located outside the functional area – such results were recorded by a twice higher percentage of companies from the first group (table 4). Financial results obtained through cooperation are similar in both groups of companies (more than half of companies).

Enterprises cooperating only with entities located in the functional area record varied results of cooperation according to the level of cooperation intensity (table 5). Companies with high intensity of cooperation, compared to companies with low intensity of cooperation, show results in the field of innovation as well as financial results much more often.

## 5. Conclusions

The conducted analysis of the research results confirms the assumption that the intensity of cooperation in the field of innovation of Polish small and medium-sized enterprises with other economic entities depends on their location in functional areas. Companies cooperating with other entities located in the Lodz-Warsaw functional area were characterised by much higher intensity of cooperation compared to companies cooperating with other entities located only outside the functional area (31.4% and 13.1% respectively).

These companies plan further development of cooperation within the functional area much more often, they operate in industries characterised more by cooperation than competition, and the main barrier to cooperation in their case is bureaucracy, while for those cooperating with entities from outside the functional area the main obstacle is the current economic situation. The most favourable conditions for shaping intensity of cooperation of enterprises located in the functional area occurred in the case of entities focused on the exchange of knowledge and information as well as commissioning expert opinions and maintaining high quality of products or services.

Proximity of enterprises and other entities located in the functional area and the resulting cooperation positively influence financial results obtained through cooperation, and the vast majority of enterprises characterised by intense cooperation with other entities fulfil their innovation potential. This indicates a dependence between cooperation and innovativeness of enterprises which are located in the functional area and have partners there.

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