

---

---

## **COOPERATION OF ENTERPRISES WITH OTHER ENTITIES IN THE AREA OF INNOVATION ACTIVITY**

***Anna Strychalska-Rudzewicz, Barbara Grzybowska***

Department of Enterprise Economics  
University of Warmia and Mazury in Olsztyn

Key words: innovation, cooperation, clusters.

### **A b s t r a c t**

The paper presents the results of empirical studies on cooperation of enterprises with other entities in the area of innovation activity that involved 156 enterprises from the region of northeastern Poland. It was studied whether enterprises cooperate in the area of innovation with three groups of partners, i.e. their suppliers and buyers, with other enterprises and with scientific institutions (institution carrying scientific research) as well as organizations dealing with transfer of innovations. Attempts were made to obtain an answer concerning the objective of cooperation and its subject. The cooperation was much more frequently undertaken by larger entities and it involved a wide range of partner institutions. Quite frequently other enterprises with the same or similar type of activity were partners. The cooperation occurred most frequently within the chain of supplier-processor-buyer, which is consistent with the global trends. The cooperation with suppliers most frequently focused on searching for new raw materials of better quality than those used so far while that with the buyers focused mainly on obtaining knowledge on expectations and preferences of clients. Unfortunately small and medium enterprises represent a low level of cooperation with innovation transfer institutions. As a consequence, activities supporting that transfer are necessary.

### **WSPÓLPRACA PRZEDSIĘBIORSTW Z INNYMI PODMIOTAMI W ZAKRESIE DZIAŁALNOŚCI INNOWACYJNEJ**

***Anna Strychalska-Rudzewicz, Barbara Grzybowska***

Katedra Ekonomiki Przedsiębiorstw  
Uniwersytet Warmińsko-Mazurski w Olsztynie

Słowa kluczowe: innowacje, współpraca, klastry.

### **A b s t r a k t**

W artykule przedstawiono wyniki badań empirycznych dotyczących współpracy przedsiębiorstw z innymi podmiotami w zakresie działalności innowacyjnej, które przeprowadzono wśród 156 przedsiębiorstw z północno-wschodniej Polski. Zbadano, czy przedsiębiorstwa współpracują

w zakresie innowacji z trzema głównymi grupami partnerów, a mianowicie: ze swoimi dostawcami i odbiorcami, z innymi przedsiębiorstwami oraz z instytucjami naukowymi (instytutami prowadzącymi badania naukowe) i organizacjami zajmującymi się transferem innowacji. Starano się także uzyskać odpowiedź na pytanie, jaki był cel współdziałania oraz czego dotyczyła współpraca. Współpracę tę znacznie częściej podejmowały większe jednostki i dotyczyła szerszego grona instytucji partnerskich. Dość często partnerami współpracy były inne przedsiębiorstwa należące do tego samego lub zbliżonych rodzajów działalności. Współpraca odbywała się najczęściej w łańcuchach: dostawca – producent – odbiorca, co jest zgodne z tendencjami światowymi. Przedmiotem współpracy z dostawcami było najczęściej poszukiwanie nowych surowców, lepszych jakościowo od dotychczas stosowanych, natomiast z dostawcami – poznanie oczekiwań i preferencji klientów. Niestety małe i średnie firmy w małym stopniu współpracują z instytucjami transferu innowacji. Niezbędne są więc działania wspierające ten transfer.

## Introduction

Competitiveness of enterprises, and as a consequence of the entire national economy, is determined to a large extent by innovation, i.e. the rate of finding and implementing innovations (TARGALSKI 1999, BESANKO et al. 2006). Already the classics of economy such as Adam Smith, Alfred Marshall or Joseph Schumpeter appreciated the importance of innovation as the process encompassing technological development and commercial activities. They also noticed the influence of innovation on economic growth. PORTER (1998) believes that national economies dominated by business sectors where companies are less innovative develop slower as concerns employment and added value than economies possessing sectors characterized by a higher level of innovation. That author noticed appearance of a new stage of economic development that he defined as innovation-led growth as different from the earlier growth stage defined as investment-led growth.

Unfortunately, among the European Union countries Poland belongs to the group of countries characterized by the lowest level of innovation (Tab. 1).

**Table 1**

Division of countries into four groups according to their innovation level

Innovation level of countries (I – high, IV – low)			
I	II	III	IV
Scandinavian countries, United Kingdom, The Netherlands, Ireland	Germany, France, Austria, Belgium, Luxembourg, Estonia, Slovenia	Spain, Italy, Czech Republic, Hungary, Lithuania, Malta	Portugal, Greece, Latvia, Cyprus, <b>Poland</b> , Slovakia

Source: own work based on WERESA (2005).

According to many authors (BOGDANIENKO 2004, WERESA 2005, KOWALCZYK et al. 2000), proliferation of new ideas and their practical application by enterprises are among the factors determining the innovation potential of the

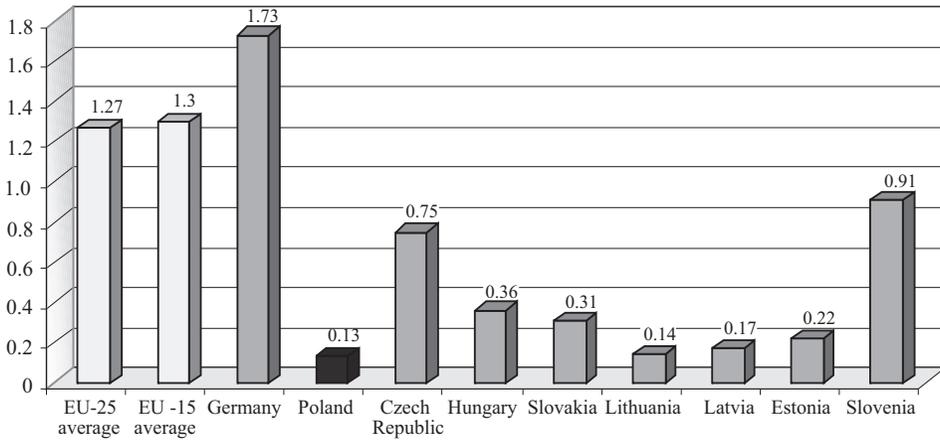
country. Innovation of a company is determined by both its internal ability to generate and implement innovation projects and its ability to find and absorb such solutions that are developed by organizations and institutions dealing with both creating and promoting innovation (SOSNOWSKA et al. 2003, HAFFER 1998). FREEMAN (1991) reports that both empirical and theoretical research confirms the importance of external and internal information networks and cooperation for success of innovation. YOUNG, LAN (1997) believe that the ability to cooperate also depends on the willingness of enterprises and their internal capacity as well as whether their institutional environment supports or obstructs creating innovation. As a consequence, innovation is a continuous and evolving process determined by institutions, social agreements as well as intensity and scope of organizational interactions (GRABHER, STARK 1997, MORGAN 1997). Increasing costs and risk involved in innovation result in the situation where it is increasingly difficult for an individual company to embark on its own in activities requiring extensive research and development activities. The new paradigm of strategy based on creating value in the process of establishing closer relations with their suppliers, partners and even competitors appears (LEI 2003). As indicated by studies carried out in Western countries innovation of companies increases when they take up cooperation with other entities, particularly in the area of R&D; at the same time that cooperation is treated as a very important source of innovation (MAIRESSE, MOHEN 2001). That relation is also confirmed in studies carried out by the CSO (*Działalność...* 2002). They show clearly that almost 90% of enterprises that cooperated in the field of innovation activity with other entities were innovative enterprises. Data provided by the CSO, however, also show a relatively low scale of that cooperation among domestic companies. Industrial companies that during the years 2001-2003 had cooperation agreements with other entities concerning innovation activities represented 10.5% of the total number of industrial entities<sup>1</sup> (*Nauka...* 2004). At the same time those studies (quoted after HATZICHONOGLU 1997) the relation between participation of enterprises in cooperation agreements and the level of technology they represent is observed, e.g. enterprises from the sector of *Industrial enterprises* belonging to the segment of high technology were more active in making such cooperation agreements.

The need for cooperation, as already mentioned results also from the fact that independent development of innovation requires possessing appropriate competence, resources and capacities. Unfortunately, domestic enterprises usually treat scientific research as the area on which it is possible to save and

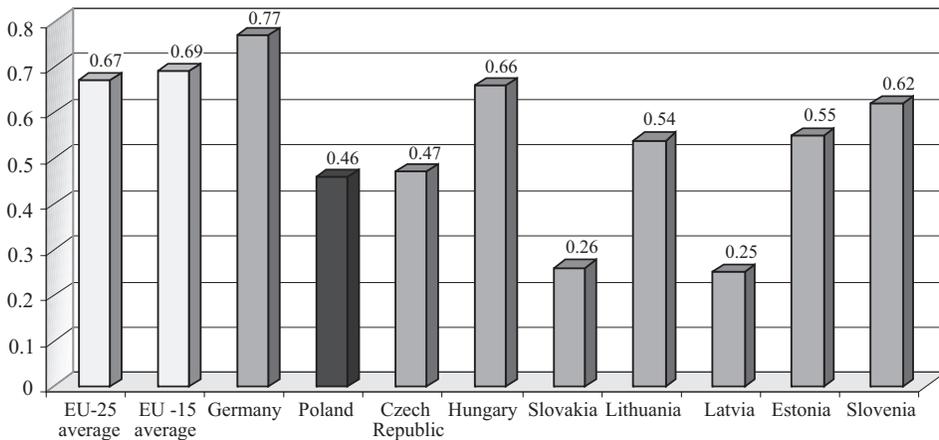
---

<sup>1</sup> The data covers business entities in sections: Mining, Industrial processing and Generation and delivery of power, gas and water in which the employment exceeds 49 persons.

not as the activity that can generate profits. According to JASIŃSKI (1997) the one of the main weaknesses of Polish economy, as compared to countries developed from the point of view of innovation processes, is the rudimentary R&D potential within Polish enterprises. The above is confirmed by the results of studies presented in the *European Innovation Scoreboard* (2004). They indicate that R&D expenses of enterprises in Poland expressed as % of GDP are the lowest among the new EU member states (Fig. 1).



**Fig. 1.** R&D expenditures of enterprises as % of GDP in Germany and new EU Member States  
 Source: own work based on the *European Innovation Scoreboard* (2004).



**Fig. 2.** Budget R&D expenditures as % of GDP  
 Source: Own work based on the *European Innovation Scoreboard* (2004).

The level of budget R&D expenditures in Poland as % of GDP is significantly higher than expenses of enterprises for that purpose (Fig. 2), although it is still below the weighted average for the EU Member States.

The research financing structure in Poland suggests that enterprises should cooperate closely with external entities dealing with widely understood R&D activities, especially because, according to JANASZ (2004), innovation projects implemented on the basis of cooperation between different entities have much better chances of succeeding.

### Goal and methodology of studies

Extending the knowledge was the main goal of empirical studies. It was attempted to obtain answers to the following questions:

1. What typed of innovations are implemented by enterprises covered?
2. With whom did the covered enterprises establish cooperation in the area of innovation?
3. What was the goal of cooperation and what did the cooperation cover?

It was investigated whether the enterprises cooperated on innovation with the main groups of partners, that is:

1. their suppliers and buyers.
2. other enterprises.
3. scientific institutions (institutions conducting scientific research) and organizations dealing with innovation transfer.

Conclusions from the studies can also indicate those elements of cooperation that should be streamlined by applying the specific elements of support, e.g. within the frameworks of regional innovation policy implementation.

Empirical studies concerning cooperation of enterprises with other entities in the area of innovation activity covered 156 enterprises from the region of northeastern Poland. Those enterprises, according to their business activity, were divided according to the principles of Polish Business Activity Classification (PKD) into sections: A – agriculture, hunting and forestry (number of enterprises – 6), D – industrial processing (number of enterprises – 139) and F – construction (number of enterprises – 11). On the other hand, on the basis of year average employment the covered enterprises were divided into small ones – employing fewer than 50 employees (representing 39% of the group covered), medium ones employing up to 250 persons (32% of enterprises covered) and large ones employing over 250 persons (29% of enterprises covered)<sup>2</sup>.

---

<sup>2</sup> That division is consistent with the provisions of the Act of November 19, 1999 *Business activity law*, DzU 2002, No. 1, item 2, art. 54. In classification employment only was considered because covered enterprises in their majority did not provide information on characteristics of other,

Answering the closed questions included in the questionnaire the respondents had the possibility of indicating more than one answer and as a consequence the sum of answers in the structure does not add up to 100%. The question concerning the subjects of cooperation was the open question and the enterprises could define on their own the subject of that cooperation in their case.

For the purpose of the study the *sensu largo* definition of innovation was assumed stating that innovation is what a given subject (in our case the enterprise responding) considers new.

### Types of innovation implemented by enterprises covered

The group of enterprises covered was dominated by section D entities dealing with industrial processing. They represented almost 90% of the covered population of enterprises. Entities belonging to subsection DA – production of food products, beverages and tobacco products had the largest share in that group (35%).

Enterprises covered carried activities aiming at development and implementation of innovations. Those innovations had the form of new products, new processes or changes in the so-called business model (e.g. strategy change, entry into new markets, etc. – Tab. 2). The declarations by the covered group of enterprises indicate that they carry out very active innovation policies and that they do not restrict their activities to one type of innovation only. In the structure of innovations implemented in case of section F enterprises (construction), domination of process innovations is clearly visible. Such innovations were reported by over 90% of respondent enterprises. The largest number of product innovations was implemented by section D enterprises (industrial processing). Implementation of process innovations was probably

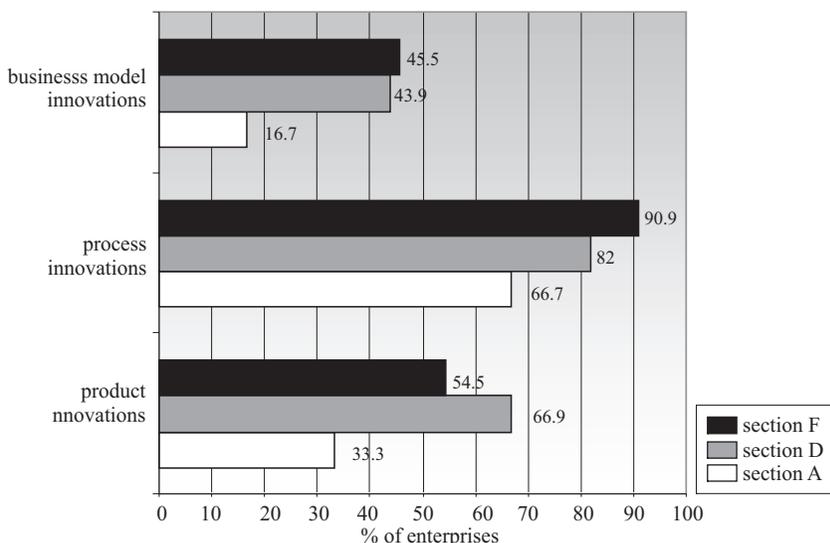
**Table 2**  
Percentage of answers confirming cooperation of enterprises covered in the area of innovation with their suppliers and buyers

Cooperation partners	Enterprises		
	Large	Medium	Small
Suppliers	80.0	84.0	71.4
Buyers	82.2	76.9	69.6

Source: Own work based on studies.

quantitative criteria of classification (net revenues from sales of goods, services and financial operations and total assets).

a consequence of attempts at increasing the productivity of production process, and in particular, decreasing the unit costs; it could also result from the need to increase the quality level of products.



**Fig. 3.** Types of innovations implemented by enterprises covered (% of enterprises covered)  
 Source: Own work based on studies.

The questionnaire did not define the degree of innovation of implemented product innovations, although it should be assumed that the innovations represented in their majority modifications of existing products that are innovations from the point of view of the implementing enterprise (JUCHNIEWICZ, GRZYBOWSKA 2004, JOKIEL, MARCISZEWSKA 2002). The enterprises opted relatively the most rarely for innovative changes related to improvement of their market activities. However, almost 43% of the enterprises covered embark on such activities, which should be considered a highly positive phenomenon. The large gap between what is declared by the enterprises (high percentage of implemented innovations) and statistical studies concerning innovation level in Poland could result from the fact that in those later studies not all activities are treated as innovations<sup>3</sup>. On the other hand, the enterprises covered by our study probably understand innovation in the wide sense of that term (*sensu largo*), treating all new things implemented as innovations.

<sup>3</sup> The innovation is not, e.g. a change of package or addition of new flavor additives, Marketing innovations are not considered. The innovation are technical innovations implemented by the enterprise during the last 3 years.

## **Cooperation of enterprises in the area of innovation**

Literature is dominated by the view that cooperation between entities of different types is of major importance for the process of developing and implementing an innovation (e.g. FREEMAN 1991, GRABHER, STARK 1997, MORGAN 1997, LOVE, ROPER 2004, QUINTANA-GARCIA, BENAVIDES-VELASCO 2004, RONDE, HUSSLER 2005, LIEFNER et al. 2006). However BROUWER and KLEINKNECHT (1996) believe that cooperation occurs mainly in case of weak innovators because participants in it are companies that must share the results of their research with other enterprises. That thesis was not confirmed in studies by LOVE and ROPER (2004) carried out in Germany and the United Kingdom. Considering high innovativeness of German manufacturing enterprises of various size and their extensive cooperation networks, it is impossible, according to LOVE and ROPER (2004), that only enterprises weak in the area of innovation trigger the mechanisms of cooperation.

ARVANITIS and HOLLENSTEIN (1996) suggest that cooperation is a phenomenon characteristic for small businesses as they lack resources to create innovation on their own. That thesis was not confirmed in the carried out studies, which indicate that the number of medium and large enterprises that established such cooperation is larger than that of the small ones. Among small enterprises (with employment of up to 50 people), just over 11% reported that so far they had not been involved in such cooperation. In the other groups of enterprises the share of such enterprises was only around 2%. Also the studies by LOVE and ROPER (2004) did not confirm the thesis by ARVANITIS and HOLLENSTEIN (1996), because no statistical difference was recorded between small<sup>4</sup> and large enterprises and the level of involvement in cooperation.

The vast majority of the respondent enterprises established cooperation in the area of innovation activity with external entities. Embarking on such cooperation they did not limit themselves to just one partner – they carried out cooperation with a number of partners at simultaneously (that applied in particular to large enterprises but also to a few small and medium ones). The cooperation of covered enterprises was generally vertical, along the supply chain (Tab. 2). Enterprises that established cooperation declared that it involved mainly their suppliers and buyers and in case of the small and medium enterprises involved the suppliers more often than the buyers while in case of large ones it involved the buyers more often.

Joint activities are undoubtedly beneficial for all partners as it secures decreasing the uncertainty of sales of products in case of suppliers and satisfying the expectations concerning new products in case of buyers. Empiri-

---

<sup>4</sup> The authors considered that small enterprises were those employing no more than 100 persons.

cal studies carried out by OERLEMANS and MEEUS (1995) also showed that the majority of innovations occur within the supply chain: supplier – processor – buyer. Other organizations are in most cases involved in exchange of information and knowledge. Cooperation within the supply chain is generally of informal nature sometimes supported by contracts with suppliers. BIDAULT et al (1998) noticed, particularly in automotive industry worldwide, an increase of participation of parts and components suppliers in the innovation process. Results of studies by MIOZZO and DEWICK (2004) suggest that the strength of cooperation between organizations in construction industry can play an important role in improvement of economic results in some countries. That covers in particular the links to suppliers and sub-suppliers, universities, government organizations, architects and engineers, clients and international cooperation with other contractors.

Other enterprises conducting the same or similar type of business were partners in cooperation quite frequently. Almost 60% of entities covered participated in such cooperation relations (ca. 54% of small, 62% – of medium and almost 69% of large entities) (Tab. 3).

**Table 3**

Percentage of answers confirming cooperation of enterprises covered with other enterprises in the area of innovation

Cooperation partners	Enterprises		
	Large	Medium	Small
Other enterprises	68.9	62.0	53.6

Source: Own work based on studies.

Sometimes cooperation can also take place between competitors the relations of which evolve according to the win-win principle instead of the earlier win-lose situation (KŁOSIEWICZ-GÓRECKA 2003). In intensive knowledge industries where frequently large outlays on R&D activities are required the enterprises have a better motivation to form alliances in the field of innovation. Many of those alliances are characterized by partners applying strategies of both competition and cooperation (QUINTANA-GARCIA, BENAVIDES-VELASCO 2004). The same company can be both a competitor and a partner (KHANNA et al. 1998). Achieving success in business in the present times required the companies to apply both those strategies simultaneously (LADO et al. 1997). English literature defines the strategy of simultaneous competition and cooperation as the strategy of co-opetition. Studies by QUINTANA-GARCIA, BENAVIDES-VELASCO (2004) in small and medium enterprises from biotechnology sector confirmed the positive influence of co-opetition strategy on the ability to

innovate. Cooperation with direct competitors has positive and important influence on development of product lines. Alliances with direct competitors also had a positive influence on technological diversity (QUINTANA-GARCIA, BENAVIDES-VELASCO 2004). Within the so-called innovation nets where competitors cooperate technological platforms are established that serve creating the architecture for new products that often reach beyond the limits of a given industry. Competitive advantage in innovation nets is based on learning and absorption of new knowledge resources (LEI 2003).

The concept of a cluster that points at the dependence of the company on its location in a region, country or even a part of the world is an example of that approach. According to PORTER (2001) a cluster is a group of enterprises situated in geographic vicinity and other entities dealing with a specific area that are linked to those enterprises and that mutually supplement one another. Well functioning clusters transform into a network of numerous, overlapping and flexible connections between individual people, companies and institutions. In Europe clusters can be found in many countries (e.g. the Italian cluster of leather shoes and fashion goods using computer systems for design of new shoes or the Baltic bioregion of Medicon Valley, etc.). Based on analysis of different clusters (local, regional, national and international), BRODZICKI et al. (2004) conclude that conducting business activity within an effectively functioning cluster has positive effects for productivity level and innovation level as well as processes of learning, absorption and diffusion of innovation.

The importance of cooperation in the context of clusters establishment is an issue that finds no straightforward interpretation in literature. Some scientists present the opinion that cooperation is necessary for success of the existing clusters and establishment of new regional clusters (DEI OTTATI 1994, YOU, WILKINSON 1994, VIPRAIO 1996). Other authors believe that the empirical material acquired so far does not confirm the importance of cooperation and that more material should be collected to confirm the importance of cooperation in the context of establishing local clusters (GROTZ, BRAUN 1997, PANICCIA 1998). The results of empirical analysis carried out by BRENNER (2005) that aimed at investigating whether innovation and local cooperation are linked to establishment of local industrial clusters showed, however, that local cooperation plays a large role in establishment of local industrial clusters. Studies by that author also confirmed that industries with a large number of process innovations show larger dynamics in establishing clusters. A similar relation does not occur in case of product innovations (BRENNER 2005).

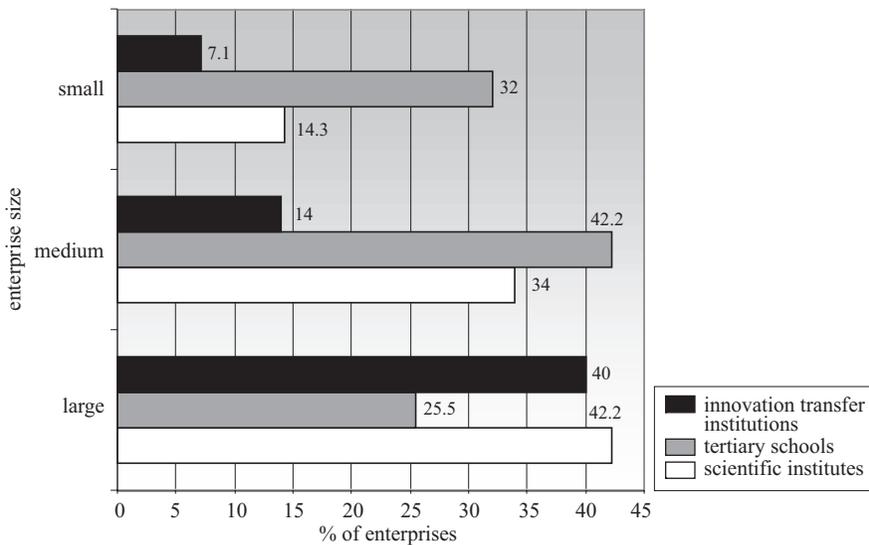
The Gdańsk Institute for Market Economics carried out a study aiming at identification of clusters in Poland (WOJNICKA 2004). As a result of that study it was established that potential exists in Poland for development of

cooperative competition in the form of clusters. The largest number of mature clusters characteristics was presented by pharmaceutical-cosmetic industry accumulations in Warsaw and Łódź and electronics in Warsaw. Slightly poorer results were obtained for other concentration areas of high-tech industries such as pharmaceutical-cosmetics and electronics concentrations in Kraków. Polish economy in its majority consists of traditional industries that are also the major exporters. The Gdańsk Institute for Market Economics extended its analyses also to cover the furniture, textile, leather, food, fish processing, plastics and construction industries. The largest number of characteristics of a cluster was shown by concentrations of food industries in the region of Warmia and Mazury with the center in Olsztyn and in Wielkopolskie, the fish industry in Pomorskie province and two furniture clusters in Wielkopolskie province as well as the textile industry concentration in Bielsko-Biała in Silesia. The other concentrations represent few characteristics of clusters, which applied in particular to leather industry in Radom and Słupsk, plastics in Wielkopolskie and textile companies in Lower Silesia. Construction concentrations are based mainly on service companies and operate almost exclusively in the local markets. Construction companies from Lower Silesia are characterized by a certain level of cooperation but similar to the concentration of Poznań their effectiveness is low as compared to other concentrations (WOJNICKA 2004).

According to BRODZICKI et al. (2004) low propensity of entrepreneurs to cooperate with other institutions and organizations, including other enterprises, is the barrier to development of a system of clusters in Poland. The results of own studies, however, do not confirm that thesis as a large proportion of enterprises (over 50%) cooperated with other entities in the field of innovation. On the other hand, it can be suspected that establishment of clusters would require wider and more extensive cooperation.

The third type of cooperation in which enterprises covered participated was cooperation with research and development type entities (scientific institutions, universities, research and development units) and with organizations focused on innovation transfer. Those entities, however, as compared to the earlier discussed groups, were chosen for partners in innovation activities less frequently (Fig. 4). In Poland, the research and development sphere is much more frequently separated organizationally from enterprises. It consists of structures positioned within tertiary education entities and ministerial research and development institutions responsible to ministries. Private research institutions are few. Such solutions are supportive to traditional, one-way methods of technology knowledge transfer with the supremacy of the mechanism of “pushing” innovations to enterprises without triggering the innovation “pull” mechanism by enterprises. Absence of that “pull” causes

that research programs of R&D entities are subjected more to scientific ambitions of the entity than focused on creating practical solutions matching the expectations from the market (SOSNOWSKA et al. 2003). Among the industries investigated by the Gdańsk Institute for Market Economics high-technology industries such as electronics and information technology as well as pharmaceutical-cosmetics concentrations were characterized by higher intensity of cooperation with various partners, in particular the R&D entities. The relations with the R&D entities are maintained by 70 to 90% of entities from those concentrations while in case of the total population of enterprises that proportion was 20%. In those sectors a positive link between profitability, exports level and product technology advancement and intensity of cooperation with R&D entities was recorded (WOJNICKA 2004). Success in the so-called knowledge intensive industries depends to a large extent on interactions with science.



**Fig. 4.** Cooperation of enterprises with innovation transfer institutions, tertiary schools and scientific institutes

Source: Own work based on studies.

Generally, in the covered population of enterprises the relation between enterprise size and involvement in cooperation on innovation is quite well visible. That cooperation was carried out by larger entities much more frequently and it covered a much wider range of partner institutions, which

could result from a wider range of products offered. That trend is quite common among domestic enterprises. As shown by the studies by CSO, in Poland, similar to other countries, the activity of enterprises related to cooperation in innovation activities is correlated positively to their size measured by number of employees (*Działalność...* 2002).

### **Subject of cooperation**

Establishment of cooperation concerning innovation activities depends to a large extent on specific characteristics of the partners' activities. They are frequently authors of innovative solutions and they help in transferring them to practical applications. They also help enterprises in obtaining knowledge and skills and as a consequence create capacity for improving their market condition and development.

The subject of cooperation between the enterprises covered and the external entities depended on whom that cooperation was with. As already presented earlier, the majority of enterprises cooperated with their suppliers. Those were suppliers of materials, equipment or components used in production processes. In majority of instances the cooperation concerned search for new raw materials (additions), of better quality than used so far, allowing development of product innovations. In a few cases those new raw materials were to allow implementation of new technology as well. Additionally, the cooperation with suppliers quite frequently concerned search for new technological solutions aiming at decreasing the production costs. Occasionally the cooperation involved improving the forms of orders and deliveries rationalizing the procurement processes in enterprises. In addition to direct contacts, mutual communication of entrepreneurs with suppliers occurred quite frequently during fairs and exhibitions, both national and international.

Enterprises covered also maintained active cooperation with buyers of their products. In that case the most frequently declared subjects of cooperation were the willingness to learn the expectations and preferences of the clients. According to the opinions by entrepreneurs, meeting the requirements of the buyers is the condition of market acceptance for products offered. As a consequence, that cooperation also concerned (in a few cases though) embarking on joint advertising activities aiming at reaching a wider group of consumers with the offer and, as a consequence, entering new markets and increasing the volumes of product sales. Generally, however, the main focus was on improvement in quality of products. In case of two enterprises cooperation with buyers was limited to performance of orders only. The enterprises filled orders filed for products with specified characteristics and parameters specified in detail by the buyer and according to the standards specified by the buyers.

Enterprises that established cooperation with other enterprises in the area of innovation did it for the need of exchange of knowledge and practical experience related to development and implementation of innovations. At the same time some enterprises treat it as a good way of searching for credible partners for cooperation. Only one enterprise declared that cooperation concerned joint organization and implementation of advertising campaigns and product promotion campaigns as well as participation in fairs, exhibitions and presentations. Also one enterprise only declared cooperation with other enterprises for the purpose of joint purchase of a license and acquiring the rights to apply a specific technology patented by the owner.

Enterprises covered also cooperated with research and development institutions that frequently were authors of innovation projects. That cooperation takes place with industry institutions (e.g. Meat and Fats Industry Institute, Dairy Technology Institute), specialists of the Polish Academy of Sciences or institutions issuing approvals and certificates. The cooperation involves mainly exchange of information and consultations with specialists concerning technical solutions. Sometimes it also involves performance of specific studies, analyses or expert studies. Quite frequently the cooperation also involves training of employees, assistance in reaching highly skilled and competent persons, and in case of tertiary schools creating opportunities for students to complete their internships in the enterprise. Only in one case the cooperation of an enterprise involved obtaining funds and credit guaranties for implementation of an investment project and assistance in appropriate preparation of documentation necessary to apply for aid funds.

## **Conclusion**

Literature studies indicated that innovation of enterprises increases when they get involved in cooperation with other organizations, suppliers and buyers, other enterprises, research and development institutes, tertiary schools and organizations dealing with transfer of innovations. Cooperation in the area of innovation with other enterprises, including competitors, defined as the strategy of co-opetition, can have a positive influence on development of product lines, diversity of technologies or generally the ability to create innovation. Cooperation of various organizations contributes to development of clusters in which enterprises reach a higher level of productivity, innovation and knowledge absorption.

The studies carried out on 156 enterprises situated in Poland the majority of which belonged to section D (industrial processing) of the Polish Business Activity Classification show, inter alia, that:

1. Larger entities got involved in such cooperation more frequently and it involved a wider range of partner entities.
2. Quite frequently other enterprises belonging to the same or similar sector of activity were involved as partners of that cooperation.
3. Cooperation occurred most frequently within chains of supplier-processor-buyer, which is consistent with global trends. The cooperation with suppliers involved mainly search for new raw materials of better quality than those available so far while cooperation with buyers involved obtaining knowledge on expectations and preferences of clients.
4. Small and medium enterprises are involved in a very low level of cooperation with innovation transfer institutions. As a consequence activities supporting that transfer are necessary.

## References

- ARVANITIS S., HOLLENSTEIN H. 1996. *Innovation, product quality, variety, and trade performance: an empirical analysis of Germany and the UK*. Oxford Economic Papers, Vol. 51, pp. 152-167.
- BESANKO D., DRANOVE D., SHANLEY M., SCHAEFER S. 2006. *Economics of Strategy*. Wiley Higher Education.
- BIDAULT F., DESPRES CH., BUTLER CH. 1998. *The drivers of cooperation between buyers and suppliers for product innovation*. Research Policy, Vol. 26, pp. 719-732.
- BOGDANIENKO J., HAFFER M., POPLAWSKI W. 2004. *Innowacyjność przedsiębiorstw*. Wyd. UMK, Toruń.
- BRENNER T. 2005. *Innovation and Cooperation During the Emergence of Local Industrial Clusters: An Empirical Study in German*. European Planning Studies, Vol. 13, No. 6, pp. 921-936.
- BRODZICKI T., SZULTKA S., TAMOWICZ P. 2004. *Polityka wspierania klastrów. Najlepsze praktyki. Rekomendacje dla Polski*. Instytut Badań nad Gospodarką Rynkową. Niebieskie Księgi 2004. Rekomendacje, 11, Gdańsk.
- BROUWER E., KLEINKNECHT A. 1996. *Determinants of innovation: a microeconomic analysis of three alternative innovation output indicators*. W: *Determinants of Innovation the Message from New Indicators*. Red. A. KLEINKNECHT, Basingstoke, Macmillan.
- DEI OTTATI G. 1994. *Cooperation and competition in the industrial district as an organization model*. European Planning Studies, 2: 463-483.
- Działalność innowacyjna przedsiębiorstw przemysłowych w latach 1998-2000*. 2002. GUS, Warszawa.
- European Innovation Scoreboard. Comparative Analysis of Innovation Performance*. 2004. Commission of European Communities, Brussels.
- FREEMAN C. 1991. *Networks of innovators: a synthesis of research issues*. Research Policy, Vol. 20, pp. 499-514.
- GRABHER G., STARK D. 1997. *Organising diversity: evolutionary theory, network analysis and post-socialism*. Regional Studies, 31: 533-544.
- GROTZ R., BRAUN B. 1997. *Territorial or trans-territorial networking: Spatial aspects of technology - oriented cooperation within the German mechanical engineering industry*. Regional Studies, 31: 545-557.
- HAFFER M. 1998. *Determinanty strategii nowego produktu polskich przedsiębiorstw przemysłowych*. UMK, Toruń.
- HATZICHRONOGLOU T. 1997. *Revision of the high technology sector and product classification*. STI Working Papers 1997/2, OECD, Paryż.
- Innowacje w rozwoju przedsiębiorczości w procesie transformacji*. 2004. Red. W. JANASZ. Difin, Warszawa.

- JASIŃSKI A. H. 1997. *Innowacje i polityka innowacyjna*. Wyd. Uniwersytetu w Białymstoku.
- JOKIEL G., MARCISZEWSKA A. 2002. *Innowacje w małych i średnich przedsiębiorstwach branży spożywczej Dolnego Śląska w przededniu integracji z UE*. Prace Naukowe AE we Wrocławiu, 963.
- JUCHNIEWICZ M., GRZYBOWSKA B. 2004. *Innowacje produktowe i ich uwarunkowania w przedsiębiorstwach przemysłu spożywczego*. Zeszyty Naukowe SGGW, Ekonomia i Organizacja Gospodarki Żywnościowej, 52.
- KHANNA T., GULATI R., NOHIRA N. 1998. *The dynamics of learning alliances: competition, cooperation and scope*. Strategic Management Journal, Vol. 19, 3: 193-210.
- KŁOSIEWICZ-GÓRECKA U. 2003. *Strategie działania rodzimych firm detalicznych w kontekście integracji Polski z Unią Europejską*. Materiały konferencyjne Retail Business Forum – BROG Media Biznesu, Warszawa, 27.11.
- KOWALCZYK B., MAZURKIEWICZ A., TRZOS M. 2000. *Wdrażanie innowacji. Struktury organizacyjne*, Instytut Technologii Eksploatacji, Radom.
- LADO A. A., BOYD N. G., HANLON S. C. 1997. *Competition, cooperation, and the search for economic rents: a syncretic model*. Academy of Management Review. Vol. 22, 1: 110-141.
- LEI D. 2003. *Competition, cooperation and learning: the new dynamics of strategy and organization design for the innovation net*. International Journal of Technology Management, Vol. 26, 7: 694-716.
- LIEFNER I., HENNEMANN S., XIN L. 2006. *Cooperation in the innovation process in developing countries: empirical evidence from Zhongguancun, Beijing*, Environment and Planning, Vol. 38, 1: 11-130.
- LOVE J. H., ROPER S. 2004. *The organization of innovation: collaboration, cooperation and multifunctional groups in UK and German manufacturing*. Cambridge Journal of Economics, Vol. 28, 3: 379-395.
- MAIRESSE J., MOHEN P. 2001. *Special Issue on New Science and Technology Indicators*. STI Review, 27, OECD, Paryż.
- MIOZZO M., DEWICK P. 2004. *Networks and innovation in European construction: benefits from inter-organisational cooperation in a fragmented industry*. International Journal of Technology Management, Vol. 27, 1: 68-92.
- MORGAN K. 1997. *The learning region: institutions, innovation and regional renewal*. Regional Studies, 31: 491-503.
- Nauka i technika w roku 2003*. 2004. GUS, Warszawa.
- OERLEMANS L. A. G., MEEUS M. T. H. 1995. *Innovations in economic networks in the South-East Brabant region*. Cyt w: FABER J., HESEN A. B. 2004. *Innovation capabilities of European nations. Cross-national analyses of patents and sales of product innovations*, Research Policy, 33: 193-207.
- PANICCIA I. 1998. *One, a hundred, thousands of industrial districts. Organizational variety in local networks of small and medium-sized enterprises*, Organizational Studies, 19: 667-699.
- PORTER M. 2001. *Porter o konkurencji*. PWE, Warszawa.
- PORTER M. E. 1998. *Competitive Advantage of Nations*, Free Press.
- Przedsiębiorczość i rozwój firmy*. 1999. Red. J. TARGALSKI. AE, Kraków.
- QUINTANA-GARCIA C., BENAVIDES-VELASCO C. 2004. *Cooperation, competition, and innovative capability: a panel data of European dedicated biotechnology firms*. Technovation, 24: 927-938.
- RONDE P., HUSSLER C. 2005. *Innovation in regions: What does really matter?* Research Policy, 34: 1150-1172.
- SOSNOWSKA K., POZNAŃSKA K., ŁOBEJKO S., BRDULAK J., CHINOWSKA K. 2003. *Systemy wspierania innowacji i transferu technologii w krajach UE i w Polsce. Poradnik przedsiębiorcy*. PARP, Warszawa.
- VIPRAIO P. T. 1996. *From local to global networking*. Journal of Industry Studies, 3: 133-151.
- WERESA M. A. 2005. *Innowacyjność przedsiębiorstw w UE. Różnice na starcie*. Nowe Życie Gospodarcze, 12 (26.06).
- WOJNICKA E. (Instytut Badań nad Gospodarką Rynkową) 2004. *Klasy w Polsce – teoria i praktyka..* Gazeta Innowacje, 21, <http://imik.wip.pw.edu.pl/innowacje21/strona17.htm>
- YOU J. I., WILKINSON F. 1994. *Competition and co-operation: Toward understanding industrial districts*. Review of Political Economy, 63: 259-278.
- YOUNG S., LAN P. 1997. *Technology transfer to China through foreign direct investment*. Regional Studies, 31: 669-680.