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Coopetition as the Factor of Increasing Level of Innovativeness in the SME Sector in Poland

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Keywords: *SME sector; coopetition; cooperation; competitiveness*

Abstract: *Companies in Poland can realize their goals by assuring the necessary organizational conditions and by partially restricting opportunistic behavior within the limits sufficient to take stable competitive actions. In the face of the present financial crisis, innovativeness is one of the basic parameters in evaluation of the SME sector in Poland.*

The goal of the present article is to show that enhanced coopetition of the researched entities with huge holdings or concerns from Poland and with economic entities from the remaining countries of the European Union is a sine qua non of improving the level of innovativeness in the SME sector. The coopetition is defined as a phenomenon of simultaneous cooperation and competition of at least two entities, the aim of which is to better realize their goals or to work towards the common end.

If levels of competition and cooperation are low, companies assume the strategies of the owners of micro-, small- or medium-sized enterprises. Being a condition

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necessary to improve the level of innovativeness in the Polish SME sector, competition is characteristic of the companies whose activities are narrowly specialized.

Introduction

An enterprise's potential is determined by the internal innovative capability as well as access to external sources of innovation such as higher education institutions, research and development units, competitive firms, receivers and suppliers.

The internal innovative potential is largely composed of (Popławski, 2008, p. 150):

- staff (their knowledge, experience, qualifications, manner of management of the available resources, especially access to information),
- research and development (research and development work conducted in customized laboratories),
- technology (computers and ICT technology, machines and equipment, as well as degree of modernity of machines and equipment).

It has been observed so far that the level of innovativeness of Polish enterprises significantly departs from the levels recorded in most European Union countries. Polish firms of the SME sector occupy one of the last places with regard to the percentage of firms implementing innovation. Compared to other EU countries, a number of Polish firms focused on R&D is relatively small in the research and development field.

According to the latest available Eurostat data for 2006–2008, Poland's participation rate of innovation – driven enterprises against the total number of industrial enterprises employing more than 9 people fell to 22% compared to the previous period (2004–2006), hitting the third position down the list of EU countries, ahead of Rumania and Hungary (21.7% each). There is a huge gap between Poland and the leading EU countries. Enjoying the leader status in the innovation field, Germany recorded 72% innovation driven enterprises against the population of firms (Wilmańska, 2010, p. 10).

There is a marked difference in the percentage of innovative enterprises between European and Polish small- sized enterprises, putting Poland at a distinct disadvantage. In the researched countries, Polish small- sized enterprises ranked last, hitting 15%. By comparison, the percentage of innovative small enterprises in the Czech Republic, Slovakia and Hungary was 34%, 20% and 16% respectively, and the rate for Germany was as high as 68%. A slightly higher rate was recorded for Polish medium – sized enterprises, standing at 34%. Poland overtook only three countries, namely

Latvia, Hungary and Romania, whereas Germany turned out to be the highest ranked country (79% of innovative medium-sized enterprises). A not much better score was obtained by Polish large enterprises which ranked fifth (62%). Polish enterprises employing over 249 people overtook its counterparts from such countries as Slovakia, Bulgaria, Hungary and Romania. The best result was achieved by Estonia where over 9 out of 10 enterprises conducted an innovative activity (Wilmańska, 2010, pp. 10-11).

The article aims to prove that the improvement of the innovativeness level in Polish SMS enterprises is conditional upon enhanced coopetition of the researched entities with huge holdings and companies from Poland, as well as with economic entities from the remaining EU countries. Coopetition is defined as a phenomenon of simultaneous coopetition and competition of two entities which strive to better achieve their goals or work towards the common end. (Bengtsson, 2000, p. 411).

Methodology of the research

This paper employs benchmarking and synthesis of the material as a research method. The method made it possible to prove that enhanced coopetition of the researched entities with huge holdings and concerns from Poland as well as with economic entities from the remaining EU countries is a condition necessary to improve the innovativeness level in Polish SMS sector.

The author employed the method of a statistical overlap to quantify the impact of coopetition on the innovativeness level of the researched entities in Poland in terms of innovativeness rate measured for the select joint stock companies quoted on New Connect. The synthesis of the material in turn picks up separated elements to form a research problem which is the low level of innovativeness of enterprises in Poland. In this case synthesizing makes up a holistic cognitive treatment of the analyzed research task in the process of conducting a business activity. Therefore, this part of the research method is a particular combination with the benchmarking of the select economic entities in terms of innovativeness.

This research method is complemented by comparing and contrasting results developed on the basis of data on innovativeness of researched entities. The tool employed in this article is the so-called standardized effect, i.e. the effect expressed in convenient standardized units. Conducting t-tests, the standardized effect for the independent sample is a difference of means divided by the standardized deviation.

Analyzing the power of t test there are the following ranges for the standardized effect (StatSoft Electronic Text Book):

- very weak effect ($E_s < 0,20$),
- weak effect ($0,20 - 0,50$),
- average effect ($0,50 - 0,80$),
- strong effect ($E_s > 0,80$).

Comparison of innovation rates of select firms quoted on New Connect provides a basis for formulation of alternative hypotheses that confirm the fact that coepetition contributes to the increase of innovativeness of enterprises in Poland, making it possible to verify the above hypotheses. However, it does not allow to claim with absolute certainty that the obtained results present the optimal solution. Therefore, both the analysis and synthesis of the material is necessary.

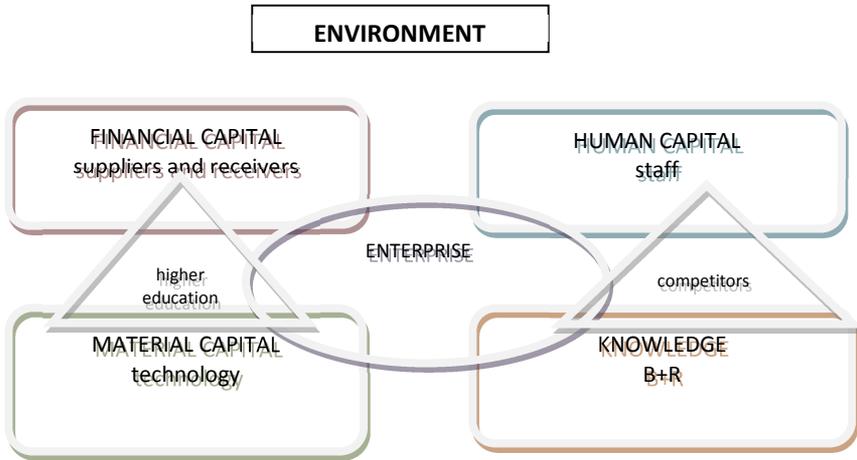
Evaluation of innovativeness level of Polish SMS enterprises in 2006–2012

Innovation is regarded primarily as the implementation of a new or considerably improved product (goods or service) or process, a new organizational method or a new marketing method in business practice, at workplace or in the realm of relations with the environment. Moreover, the new or considerably improved product is implemented the moment it comes out. (cf. Schumpeter, 1960, p. 160; Community Innovation Survey, 2010, Eurostat data).

Considering the above definition, it is legitimate to speak of the innovative potential which is immensely influenced by the environment, i.e. human, financial and material resources as well as know-how. The matrix of the innovative potential is outlined in the drawing below (drawing 1).

The model of the innovative potential depicted above shows that an innovative potential of an enterprise, no matter what the size of the enterprise is, forms an intraorganizational framework that, on the one hand, informs the choice of an appropriate innovative strategy and the internal conditions under which it is practically implemented, on the other. Considering the above, an effective implementation of the strategy consisting in creating and putting innovation into practice should result in obtaining a previously defined competitive advantage by the enterprise.

Drawing 1. Innovative potential of an enterprise



Source: own elaboration based on Popławski (2008, pp. 149-150).

As it was mentioned hereinabove, one of the most common indicators used to measure the level of innovativeness of enterprises is the percentage of entities implementing innovative products or processes. In the EU-27 rating Poland's enterprises rank last on the scale of innovativeness against the total number of enterprises of the industrial sector. Depending on the size of the enterprises in select EU countries, the percentage of innovative enterprises recorded in 2006–2008 is set out in Table 1.

The analysis of the data given in the table makes it clear that the larger the firm is, the more often it conducts an innovative activity. Larger firms enjoy a bigger potential to conduct an innovative activity, having a wider access to better educated employees, bigger financial possibilities and better educated managers at their disposal. Large economic entities function on more demanding markets, where they compete with strong big foreign firms. The competition stimulates innovative behaviour of big Polish firms. Small and medium-sized enterprises, in turn, are characterized by a smaller scope of activities relative to a smaller number of products than their bigger competitors have. Consequently, a room for innovation is, unfortunately, relatively smaller.

Table 1. Percentage of innovative firms in select European countries in 2006–2008

Total		10-49		50-249		>249	
Germany	72%	Germany	68%	Germany	79%	Estonia	92%
Belgium	54%	Cyprus	49%	Estonia	73%	Germany	91%
Estonia	53%	Belgium	47%	Cyprus	72%	Austria	89%
Finland	53%	Finland	47%	Belgium	70%	Finland	87%
Ireland	52%	Ireland	45%	Ireland	70%	Ireland	86%
Cyprus	52%	Estonia	44%	Austria	70%	Sweden	86%
Sweden	50%	Portugal	44%	Italy	66%	Belgium	84%
Austria	49%	Sweden	43%	Norway	65%	Portugal	84%
Portugal	48%	Denmark	40%	Sweden	64%	Spain	84%
Denmark	46%	Italy	40%	Finland	63%	Cyprus	82%
Luxembo- urg	45%	Austria	38%	Portugal	63%	Slovakia	82%
Italy	44%	Holland	35%	Malta	63%	Italy	80%
Holland	42%	Luxembourg	34%	Holland	61%	Denmark	79%
Czech Republic	42%	Czech Republic	33%	France	59%	Luxembourg	79%
Norway	42%	Norway	33%	Spain	59%	Norway	79%
Slovenia	40%	France	33%	Denmark	58%	France	77%
France	40%	Croatia	33%	Luxembourg	57%	Czech Repu- blic	74%
Croatia	38%	Slovenia	31%	Czech Republic	54%	Holland	73%
Malta	37%	Malta	29%	Slovenia	54%	Malta	73%
Spain	34%	Spain	29%	Croatia	48%	Croatia	72%
Bulgaria	29%	Bulgaria	25%	Bulgaria	37%	Lithuania	65%
Latvia	27%	Latvia	23%	Lithuania	37%	Latvia	64%
Slovakia	26%	Slovakia	20%	Slovakia	35%	Poland	62%
Lithuania	26%	Lithuania	18%	Poland	34%	Slovakia	60%
Poland	22%	Romania	18%	Latvia	33%	Bulgaria	59%
Hungry	22%	Hungary	16%	Hungary	31%	Hungary	59%
Romania	22%	Poland	15%	Romania	27%	Romania	45%

Source: Wilmańska (2010, p. 12).

The data presented in Table 1 point to a disconcerting fact that the greatest difference in terms of innovation is between small-sized enterprises in Poland and other European countries. In the whole researched period, i.e. 2006–2008, Polish small – sized enterprises ranked last, standing at 15%. By comparison, the rate of Czech, Slovakian and Hungarian innovative enterprises stood at 34%, 20% and 16% respectively, and the rate for the leading country, Germany, was 68%. A slightly better result was obtained by Polish medium-sized enterprises. With the fourth lowest rate of 34%, they overtook Latvia, Hungary and Romania. Again, the leader country amidst innovative medium-sized enterprises was Germany, standing at 79%. Large-sized enterprises were only slightly better, being the fifth lowest (62%). Polish enterprises employing over 249 outperformed their coun-

terparts from Slovakia, Bulgaria, Hungary and Romania. In this respect Estonia ranked highest, 9 out of 10 Estonian large enterprises conducting an innovative activity (Wilmańska, 2010, p. 10).

It was noted that in 2008–2012 only over 29% Polish enterprises showed innovativeness in the field of products, manufacturing process as well organizational management and marketing. In Germany the percentage was as high as 80%. Lower rates were obtained by Luxembourg (69%), Belgium (62%) and Portugal, Sweden and Ireland (each 61%). Apart from Bulgaria, Poland was among the countries such as Latvia (32%), Romania and Hungary (each 32%). The average for the European Union neared 55% (The Home Broker Analytical Team, 2013).

In conclusion, it needs to be stated unambiguously that innovativeness constitutes the source of competitive advantage of the Polish SMS sector. Innovations introduced into the market both by small and medium-sized enterprises may determine both pace and directions of the economic growth as well as define the form and structure of international cooperation of the researched economic entities.

Coopetition and the development of the SMS enterprises in Poland

Undeniably, one of the ways to increase the capability of enterprises, especially enterprises of the SMS sector, to create innovative solutions is to implement the coopetition strategy that consists in developing market relations with suppliers and clients as well as competitors. Such coopetition sets out to realize a specific undertaking, which is possible thanks to a combination of selected resources and competences of parties simultaneously cooperating and competing with one another.

Therefore, in enterprises whose aim is to effectively compete with market rivals through creating and commercialization of innovations there should be specific mechanisms designed in order to generate innovations. One of the ways of strengthening the innovative potential of these enterprises striving to work out and implement innovative solutions is to develop relationships with other market participants. This type of relations are termed pro-innovative, i.e. orientated towards creation of new solutions through mutual effort.

The impact of coopetition on the innovativeness level of enterprises may be showed by comparing the rates of innovativeness calculated for selected joint stock companies in the medical sector. On the basis of the so-called Innovation Scorecard adopted by the European Commission in 2001, Lis-

bon, out of 17 rates, the author of this paper chose the innovativeness rate that considers the ratio of innovations in small and medium-sized enterprises to the whole population of companies in Poland. The higher the rate, the bigger the innovativeness level of the researched entities against the backdrop of all firms in Poland (Fazlagic, 2009). This paper analyzes economic activities of seven small and medium-sized enterprises quoted on New Connect.

The first analyzed firm is BIOMAX S.A, a production and distribution company registered in Gdańsk. Its main goal is to set up a capital group acting in the field of new biochemical technologies employed in the food, cosmetics and pharmaceutical industry. The company is also involved in the sale of biotechnological products and preparations employed mainly in the food, pharmaceutical and cosmetics industries.

A part of its development strategy, the company conducts research on new technologies and preparations of fish and animal origin, which will be applied in many industries (the sale of technological processes and biotechnological products such as collage and agar). The company also deals with the distribution of biotechnological products through three distribution channels (*Dokument Informacyjny Biomax S.A, 2011, p. 44*):

- traditional market,
- e-commerce,
- MLM (Multi Level Marketing).

Additionally, the company develops commercial relationships with business partners at home and abroad (Asian countries: China, Taiwan, Japan, etc.) The company focuses largely on the distribution of biotechnological products mainly through e-services. Its clients are mainly firms in the food and cosmetics industry. Collagen production is the manufacturing end of the business. The company's major competitors are (*Dokument Informacyjny Biomax S.A 2011, pp. 47-49*):

- Euroimplant S.A., a biotechnological company,
- Pharmena S.A., a production and distribution company,
- Bio Inventions S.A., also a production and distribution company,
- Barentz Sp. z o.o., a company that deals in commerce, marketing and distribution and is operational in the food and non-food industry,
- Regis Sp. z o.o., a leader in the production of functional and spice mixes for the meat industry,
- 3-Helisa Sp. z o.o., a biotechnological laboratory conducting cosmetic research,
- Danisco Poland Sp. z o.o., the world leader in the field of food ingredients, enzymes and ecological solutions,

- Read-Gene S.A. The main spheres of economic activity include chemo-prevention, clinical research and genetic testing,
- Mabion S.A., a firm that uses a new technology to produce humanized monoclonal antibodies.

Yet another firm is Biomed Lublin S.A., one of the most dynamically expanding firms in the SMS sector in Lublin area. The firm operates in the pharmaceutical industry and produces medicinal products for people, the production of which requires the use of modern and innovative technologies. The company competes with the following firms (*Dokument Informacyjny Biomed Lublin S.A.*, 2011, pp. 66-70):

- Merck Sp. z o.o., an international pharmaceutical concern employing around 31,000 people in over 60 countries,
- Krotex Poland Sp. z o.o., a distributor of Swedish pharmaceutical products seated in Warsaw,
- Polpharma S.A., the largest Polish pharmaceutical concern, privatised in 2000 exclusively by means of Polish capital,
- Biotest AG, a multinational, owing factories in 12 countries all over the world and employing over 2,000 people,
- Imed Poland Sp. z o.o., a multinational employing over 9,000 people in 19 countries worldwide,
- Octopharma, a firm seated in Lachen (Switzerland), being one of the three largest firms in the world that fractionates blood plasma,
- Schering Plough Polska Sp. z o.o., a subsidiary of Merck & Co. Inc. that distributes medicines in Poland,
- Production Unit of Serum and Vaccines BIOMED Sp. z o.o., a company seated in Warsaw whose statutory aims include the production and distribution of serum and vaccines and other biopreparations indispensable in prophylaxis treatment, diagnostics and epidemiology.

Further development of Biomed S.A in the sphere of its core activities hinges on preparations produced by (*Dokument Informacyjny Biomed Lublin S.A.*, 2011, pp. 77-80):

- Probiotics Department (Lacid products– in various packages: ampoules, phials, sachets, tablets, capsules),
- Vaccines Department (BCG antituberculosis vaccine, Onko BCG),
- Department of Enzymic Preparations and Suppositories,
- -Department of Blood Derivatives (Gamma anti-Hbs, Gamma anti-D, Histaglobulin).

These products have a huge market potential and the company has a wide range of opportunities to use and increase the domestic and foreign demand for these products.

The core activities of Revitum S.A, Warsaw include conducting diagnostic tests of the organism and selling dietary supplements. The firm specializes in conducting microscopic examination of blood and EAV gravity test (Electroacupuncture according to dr Voll). The firm believes that its e-business activities give the firm an edge over its competitors. A network of offices makes the brand recognizable among clients and builds the trust of prospective clients making a first visit. Such an approach to business is unique in the biomedical sector, making it possible for the company to considerably reduce costs to conduct marketing activities and foster expansion in the Polish market. The issuer also focuses on training professional staff, yet again distinguishing itself in the market of EAV tests conducted in Poland (*Dokument Informacyjny Revitum S.A.*, 2012, pp. 57-59).

Revitum S.A. has a well-defined developmental path. The company's strategic aim is to set up new establishments, forming a network of retail outlets. The company aims to realize its strategy through (*Dokument Informacyjny Revitum S.A.*, 2012, pp. 57-59)

- increasing outlays on advertising to promote the Issuer's services on the Internet;
- expanding the IT system in order to increase the effectiveness of services processes or attract clients;
- educating employees and partners;
- expanding the sales department, especially the Call Centre, which in the Management Board's opinion contributes significantly to an increase in the customerbase.

Swissmed S.A., having its registered office in Gdańsk, deals with a robust sale of their own services designed for individuals and firms. Also it provides services for insured private patients as well as for medical partners and subcontractors. Currently the firm provides services in the following fields (*Dokument Informacyjny Swissmed Prywatny Serwis Medyczny S.A.*, 2011, p. 43)

- primary and specialized health care;
- occupational medicine;
- specialist diagnostics;
- hospital treatment.

The company intends to widen the scope of its services. Before new medical procedures are introduced, an in-depth analysis of the latest trends in medicine is made. In order to provide best quality services the firm keeps up to date with the medical market to obtain best professionals with a wealth of experience.

Polish Medical Holding PCZ S.A, Wrocław, operates in the healthcare market, providing medical services aimed at health protection as well as

manufacturing and distributing all products associated with the process of provision of medical services. Holistically integrated, the company keeps a tight grip on the whole medical cycle independently, starting from the establishment of premises and equipment, through the creation of the market of services and the purchase of external products to the supply of end products. PCZ strategy of development is adjusted to the current situation in the Polish healthcare system. Considering the prevailing situation, especially in the public healthcare sector, the most effective developmental project of PCZ Capital Group is the establishment of a network of highly specialized medical units on the basis of local (powiat, or voivodeship) units that are liquidated, indebted or unprofitable, as well as the purchase of health resorts that are being privatised or sold (*Dokument Informacyjny PCZ S.A. Polski Holding Medyczny*, 2011, pp. 61-83).

PCZ S.A. has been operational in the healthcare sector for over 10 years. Throughout the years the market has developed dynamically and transformed considerably, resulting in the arrival of rival entities. However, thanks to its ideas and strategic plans up till now, the company has always been able to compete effectively and maintain its high market position in Wrocław and in the vicinity of Wrocław. The factors contributing to the company's competitive advantage are (*Dokument Informacyjny PCZ S.A. Polski Holding Medyczny*, 2011, pp. 61-83):

- long term experience, good contracts and relations with clients/ patients. PCZ S.A. along with the Capital Group has been present in the market of private healthcare services for over 10 years and it has always been dynamically expanding. It has a considerable potential for further growth and improvement of its performance;
- an important position in Wrocław market. PCZ along with the Capital Group is now a major operator of private health care services which has developed exclusively on the basis of its own resources, without the investors' (financial or strategic) support;
- complex managerial system supported by international certificates. PCZ S.A. along with the Capital Group is the only Polish medical company and one of three in the general classification which has an integrated management system based on five management systems (ISO 9001, ISO 14001, ISO 27001, OHSAS 18001 oraz BS 25999);
- the Capital Group's vertical concentration. PCZ S.A. along with the Capital Group is the first Polish medical company concentrated vertically;
- complex nature of its activities. The Company along with the Capital Group, conducting an activity that implements a full-range medical cycle from setting up the premises and equipment to building up the mar-

ket of services, obtaining external products up to supplying a product, i.e. medical service to the end customer, i.e. patient;

- well – prepared managers and professional medical personnel. The company employs highly qualified, committed employees, who have been with the company for many years. The employee's know-how guarantees high and well – tested quality of offered services.
- recognizable brand and established position in the health care market. The company has successfully provided its services for over 10 years to patients and clients. Professional and effective, it has been constantly increasing the number of satisfied clients. Acting dynamically, it constantly adjusts its activities to the changing market situation. The rewards it has earned evince that it is trustworthy. It is a research and development company, acting in the field of medical biotechnology and pharmaceutical field, addressing its offer to pharmaceutical and medical sector.

The business model of BLIRT S.A, Gdańsk is a hybrid of a research and development company and a laboratory offering services. Their offer include the sale of biotechnological and analytical products and services, realization of commissioned research and development projects, doing their own commercial research and development projects (*Dokument Informacyjny Blirt S.A.*, 2011, pp. 28-33).

The core activity of Biogened, seated in Łódź, involves largely (*Dokument Informacyjny Biogened S.A. Technologie zdrowia i piękna*, 2011, p. 88):

- production and distribution of generic medicines and medical products,
- development, production and distribution of dermocosmetics and dietary supplements.

The firm deals with manufacturing, distributional and promotional activities. The firm offers the following products: (*Dokument Informacyjny Biogened S.A. Technologie zdrowia i piękna*, 2011, p. 88):

- generic products available on prescription in the field of psychiatry, neurology and oncology,
- non-prescription drugs,
- dietary supplements,
- dermocosmetics sold only in pharmacies.

Considering the level of innovativeness of the researched joint stock companies and their cooperative and competitive environment it is essential to weigh up and compare the innovativeness rates of each of them. Basing on Table 2, the author of this paper emphasized the impact of competition of the researched medical companies on their innovativeness.

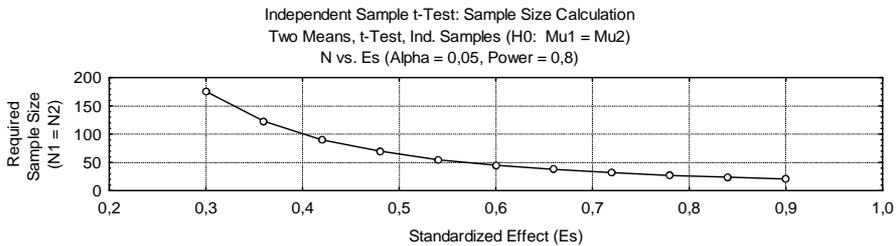
Table 2. Rates of innovativeness calculated for select medical companies in 2010–2011 (data in %)

Itemization	2010	2011
BIOMAX S.A.	52,4	58,3
BIOMED S.A.	51,6	52,8
REVITUM S.A.	38,6	34,7
SWISSMED S.A.	37,2	36,5
PCZ S.A.	48,7	49,8
BLIRT S.A.	32,2	39,1
BIOGENED S.A.	36,4	35,9

Source: *Dokument Informacyjny Biogened S.A.* (2011, p. 105), *Dokument Informacyjny Biomax S.A.* (2011, p. 70), *Dokument Informacyjny Biomed Lublin S.A.* (2011, p. 111), *Dokument Informacyjny Blirt S.A.* (2011, p. 61), *Dokument Informacyjny PCZ S.A. Polski Holding Medyczny* (2011, pp. 110-111), *Dokument Informacyjny Revitum S.A.* (2012, p. 75), *Dokument Informacyjny Swissmed Prywatny Serwis Medyczny S.A.* (2011, p. 102).

The analysis of the above data shows that in 2010 the highest innovativeness rate was recorded in Biomax S.A., and the lowest one in Blirt S.A. Similarly, in 2011 the highest innovativeness level measured by innovativeness rate was recorded in Biomax S.A. Revitum S.A. had the lowest innovativeness rate for 2011. The above data confirm that the innovativeness rate between 10% and 30% is indicative of the fact that firms cooperate with one another only to a certain extent, vying with one another for the client's attention by means of new products and services. Quite a contrary situation occurs when the innovativeness rate exceeds 50%. On the basis of Table 2 the author has conducted t-student test for independent trials. The data is presented in the chart 1.

In the context of testing statistical significance, the author has formulated a hypothesis that coopetition does not improve the innovativeness of firms of the Polish SMS sector, which is the opposite of what the author wanted to prove. The analyzed case evidences a very weak standardized effect caused by the fact that most researched companies has an innovativeness rate below 50% as the standardized effect is -0,1495 at the critical value $t=1,9617$. The power of the test for the required number of trials $N=704$ (the number of the researched medical companies along with cooperating and competing firms) at the level 0,8000 testifies to the reliability of the alternative hypothesis which states that a sine qua non for the improvement of innovativeness of the researched entities is enhanced coopetition with huge holdings as well as with minor business entities operational in the domestic and foreign market.

Chart 1. Correlation between the standardized effect and innovativeness rate in select medical companies in 2010-2011

Source: Own elaboration based on *Dokument Informacyjny Biogened S.A.* (2011, s. 105), *Dokument Informacyjny Biomax S.A.* (2011, p. 70), *Dokument Informacyjny Biomed Lublin S.A.* (2011, p. 111), *Dokument Informacyjny Blirt S.A.* (2011, p. 61), *Dokument Informacyjny PCZ S.A. Polski Holding Medyczny* (2011, p. 110-111), *Dokument Informacyjny Revitum S.A.* (2012, p. 75), *Dokument Informacyjny Swissmed Prywatny Serwis Medyczny S.A.* (2011, p. 102).

The validity of the alternative hypothesis is corroborated by the fact that descriptions of the economic activity conducted by the researched medical companies confirms that Biomax S.A., focusing largely on the distribution of biotechnological products has developed a large-scale cooperation with various firms, competing simulatenously with many business entities from Poland and abroad in terms of new products. It is verified by the fact that Biomax's innovativeness rate exceeded 50% for 2010–2011 on the basis of the information document issued by the company. A similar situation was in case of Biomed S.A. The remaining researched entities have established cooperation with other firms to a smaller extent. Information contained in documents issued by the companies does not prove that the companies conducted extensive competition in terms of applying innovative solutions as far as introduction of new products and services in the domestic and foreign market is concerned.

Conclusions

The problem of a low level of innovativeness of small and medium- sized enterprises (SMEs) in Poland is considerably important. As it was mentioned in the introduction the level of innovativeness of Polish enterprises significantly departs from levels recorded in a majority of European Union countries. According to the latest Eurostat data for 2006–2008, the rate of

participation of innovation – driven enterprises against the total number of industrial firms employing over 9 people for Poland fell to 22% compared with the previous period (years 2004–2006), which constituted the third lowest result in the European Union, placing Poland only ahead of Romania and Hungary (21.7% each).

There is a huge division between Poland and the leading EU countries (Wilmańska, 2010, p. 10). Considering the above, the author of this paper has analyzed the economic activity of seven small and medium-sized enterprises of the medical sector quoted on New Connect in terms of innovativeness rate calculated as the ratio of a number of innovations in SMEs to the total number of enterprises. In order to establish whether coopetition has contributed to an increase in the level of innovativeness, thus improving their competitiveness, t-student test for independent trials was performed.

In the context of testing statistical significance by means of this test, attempts were made to confirm the validity of the alternative hypothesis that coopetition has a positive influence on the innovativeness level on the SMEs in Poland. In the analyzed case there was a very weak standardized effect caused by the fact that in most researched companies innovativeness rate did not exceed 50 %, evidencing a low level of innovation introduced by Polish small and medium-sized enterprises. The standardized effect of -0,1495 at the critical value $t=1,9617$ and the power of the test for the required high number of trials at the level of 0,8000 corroborates the validity of the alternative hypothesis that enhanced coopetition is a sine qua non for improved innovativeness of the Polish SMEs.

Descriptions of the economic activity of the entities outlined in this paper confirm the findings that entities cooperating and competing simultaneously with each other and other entities from Poland and abroad in terms of innovative solutions in 2010–2011 recorded an innovativeness rate exceeding 50%. The case in point Biomax S.A., Gdańsk and Biomeded S.A., Lublin. As far as other companies are concerned, the enhanced coopetition aimed at cooperation and healthy competition in terms of innovativeness might contribute to the increase in the level of their innovativeness, the example being Blirt S.A or Biogenerated S.A.

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