

Gajowiak, Malgorzata

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Asset sources of competitive advantage of SMEs from high-tech sector in the region of Greater Poland

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**Asset sources of competitive advantage of SMEs
from high-tech sector in the region of Greater Poland**

Małgorzata Gajowiak

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Małgorzata Gajowiak
malgorzata.gajowiak@put.poznan.pl
Poznan University of Technology, Faculty of Engineering Management, Chair of economic sciences.
ul. Strzelecka 11, 60-965 Poznań

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Abstract: The article tackles the question of the ever growing importance of soft factors of production in the process of competitive advantage for contemporary enterprises. This condition has resulted of turbulent environment characterized by increasing competition, generalized uncertainty and information asymmetry. Based on the above assumption during 2013-2014 a research project was carried out on the role of intangible resources in the process of gaining advantage over competitors in high-tech companies from Greater Poland. The study was complete for the given population and was conducted using the CATI method. On the basis of responses to the questions in the survey, one can conclude that these companies implement modern management paradigm and its activities are based largely on soft resources which are impossible to be copied and on skills in the form of human capital, propensity for learning and the social capital of employees. The findings of the project can serve as a valuable clue for those companies which at the moment do not represent a prospective approach to achieving entrepreneurial categories in practice.

Introduction

Market environment of modern enterprises is referred to as the economy of discontinuities characterized by the asymmetry of information, generalized uncertainty and chaos. Zygmunt Bauman identifies it even with the "liquid world" on the grounds that "sustainability got devalued, while transitoriness has been rapidly gaining in value." (Bauman, 2001, p. 161) These features have been further exposed by the current economic crisis (Mączyńska, 2010, p. 200), which - as noticed by Roubin, N. and Mihm, S. - "[...] made it clear to everyone that the coming years more deserve to be called the years of "extreme volatility" than of "great moderation." (Roubin & Mihm, 2011, p. 335) This instability is undoubtedly associated with changes initiated already in the twentieth century and which are reflected in, among others, the information revolution, the liberalization of economies and the related processes of internationalization and globalization, as well as in an increased competition from the so called emerging countries and – most importantly - rising commodity and environmental barriers.

In the face of such increasing difficulties in the implementation of the idea of sustainable and balanced growth both in terms of macro and microeconomics, changes in the rules of organizing and functioning of modern enterprises also become necessary (Bąkowska, 2014, p. 87; Avella & Fernandez & Vazquez, 2001, pp. 139-157; Tracey & Vonderembse & Lim, 1999, pp. 1319-1350; Liu & Liang, 2014, pp. 1019-1037). These entities need a new business philosophy and the development of new value in a globalizing and integrating market and making such arrangements or regulatory actions that will create a new value for customers and businesses, raise their competitive position, as well as limit the uncertainty and risk (Janasz, 2012 p. 54; Burnad & Bhamra, 2011, pp.5581-5599; Ismail & Poolton & Sharifi, 2011, pp.5469-5487; Teece, 2007, pp. 1319-1350). As noted by Machaczka, J. "the challenges faced by contemporary organizations draw attention to the need to take into account (in shaping competitive advantage) not only quantitative factors, but also qualitative indicators of competitiveness." (Machaczka, 2014, p. 7) Thus, contemporary management paradigms are gradually being redefined and broaden with such strategic and intangible elements as: knowledge, skills and experience, or human capital, as well as trust, loyalty and credibility - collectively referred to as social capital (Libertowska, 2011, p. 177). In addition, the importance of creativity and innovativeness has been growing, as well as high flexibility and seamless adaptation to the environment

(see Brillman, 2012; Easterby-Smith & Lyles & Petraf, 2009; Eisenhardt, 1989, pp. 532-550; Kogut & Zandar, 1992, pp. 383-397).

The main purpose of this article is to present the results of the research on the factors influencing competitive advantage of small and medium size business entities from high-tech sector located in the Greater Poland region. The analysis sought to ascertain whether these entities acting in a turbulent environment attach greater importance to the role of material resources, or perhaps they value the intangible ones, which are rare, inimitable and impossible to replace?

Factors of competitiveness - theoretical background

As noted by W. Szymanski, the globalization of economy and the opening of national borders for external entities "lift competition to the role of a general determinant of development." (Szymanski, 2011, p. 45) This concept embodies in itself the process by which entities compete with each other in order to gain new customers and thus increase their profits. Therefore, in order to successfully compete, these companies must demonstrate high competitiveness (Sliwinski, 2012, p. 20). This feature is broadly defined in literature; however, it can be assumed that competition is "an ability to build main skills more cheaply and more quickly than the competitors. Such skills generate new products, which are better than those of competitors'." (Hamel & Prahalad, 1999, p. 86) Thus, this means that the company is able to achieve competitive advantage over other companies using these skills and resources.

It is not disputed that competitiveness of enterprises depends on both the external and internal factors. The first are generated by the environment and their operators have no influence upon them or such an influence is considerably reduced. These elements may constitute a macro-environment, which is the set of conditions for the functioning of a company resulting from the fact that it operates in a certain country, and thus in a specific political or legal system. Moreover, they can create a meso-environment by specifying the terms for functioning and growth of an enterprise in a specific industry in a given geographic market (Gierszewska & Romanowska, 2003, p. 34 and 92). The factors of macro and meso-environment are presented in the table below.

Table 1. Macro and meso-environment factors

Macro-environment	Meso-environment
Economic factors (e.g. GDP, interest rates, inflation, employment rate, exchange rate)	The impact of buyers and customers in the industry (including the degree of concentration in the supplier sector in relation to the recipient sector, monopolistic position of the supplier or customer)
Political and legal factors (such as antitrust law, environmental law, tax law, labor law)	The threat of an emergence of new products and substitutes (attractiveness of the sector, barriers to entering the sector, the possibility of reprisals from the manufacturers of the sector)
Technological factors (state spending on R & D, business expenditure on R & D, new products, new discoveries in technology transfer)	The rivalry between competitors (competitive structure, strategic partnerships)
Socio-cultural factors (lifestyle change consumer activity, the size of an average family, regional migration, birth rate)	Regulatory factors (regulatory agencies, interest groups)

Source: Wright P. & Kroll M.J. (1998, p. 31); Porter (2006, pp. 253-272); Griffin (2005, pp. 81-87).

However, in contrast to the macro and meso factors, the micro-economic ones shape competitiveness of companies from the inside. At this level competitiveness of a company is created and all of the basic factors that determine it. Generally, these factors are divided into resource and strategic ones. The first group includes the resources and skills of employees. As Sliwinski, R. notes, skills combined with resources constitute a company's competitive potential, which determines the achievement of better or worse market outcomes. Competitiveness of resources and skills means, therefore, that it is not only the acquisition of a set of resources, but also their ability to compete with the resources and skills of competitors (Sliwinski, 2012, pp. 33-34).

The second group includes strategic factors which cover the methods of defining the market, adopted business model, corporate vision and mission, as well as the right action strategy (Sliwinski, 2012, p. 33).

However, due to the high complexity of management processes and the rapid pace of change, the researchers of competitiveness more and more often explore the idea that the sources of business success in competitive markets should not be sought in the adoption and implementation of appropriate market strategy (*market based view*), but in the possession and skilful management of a set of strategic resources (*resource based view*) (Bendkowski, 2012, p. 20; Terzivski, 2010, pp. 509-533; Thun, 2008, pp. 370-382), which allow to increase the effectiveness and efficiency of a company's market activities (see Barney, 1991, p. 99).

It is worth noting here that the asset sources of competitive advantage are commonly divided into those of tangible and intangible character. The division discussed here has been suggested by de Wit, B. and Meyer, R. According to these authors, the first group consists of tangible assets such as land, buildings, and materials - collectively called physical capital. It also consists of financial resources. The intangible assets are divided into relational resources and competences (Wita & Meyer, 2007, pp. 162-165). Based on the extensive literature in the field of economics and management, Sliwinski, R. made a detailed statement of enterprise assets divided into those of tangible and intangible character. This distinction is presented below.

Table 2. Distribution of assets

Assets	
<i>Tangible:</i>	<i>Intangible:</i>
Physical capital: machinery, buildings, materials, means of transport, telecommunications and information technology infrastructure.	Competence: expertise, core competencies, quality of products and processes.
Financial capital	Relational: formal relations, informal relations; access to resources, jobs and information;
Human resources: staff, leader.	Organization: organizational structure; organizational culture, coordination activities, functional systems / architecture processes, information systems, optimization processes.
	Legal: purchased intangible assets, produced intangible assets
Combinations of tangible and intangible assets: company reputation and entry barriers.	

Source: Śliwiński (2012, p. 36).

It should be noted that at present intangible factors are considered crucial in the long-term and sustainable development of enterprises, and even for the economy as a whole. The growing unpredictability of the management sphere results in the fact that intangible, ineffable resources (depending on the circumstances and embodied in the people) are all gaining importance (Hayes & Upton, 1998, pp.8-25; Teece & Pisano & Shuen, 1997, pp. 509-533). Moreover their valorization is justified by Grudzewski, W.M. who states that "the economics of intangible resources works differently than in the case of tangible ones. In particular, this applies to the law of diminishing marginal effects. The increase in the use of the intangible factor [...] leads to an increase in the marginal benefits from its use" (Grudzewski et al., 2009, p.13). In addition, intangible resources are difficult to imitate, so they cannot be copied or replaced (compare Barney, 1991; Grant, 1996; Jashapare, 2006) and this can determine the winning edge over competitors.

Evaluation of resources and skills in the high-tech SME sector in Greater Poland

The research problem

Within the framework of the project undertaken in the period from May 2013 to November 2014, titled "The role of intangible assets in shaping competitive advantage of high-tech companies in Greater Poland"¹ a survey of small and medium-sized enterprises from the high-tech sector was conducted. All the participants were located in the Greater Poland region. The basic research problem was to identify the extent to which these entities use the soft factors of production in acquiring the superior position over their competitors. Among other things, the study was looking for responses to the following questions:²

¹The study is carried out with a MSc.Eng. A. Libertowska under a grant titled "DS - Young faculty" at the Faculty of Management, University of Technology funded by the Ministry of Science and Higher Education.

- 1) Based on what resources / skills do small and medium-sized high-tech companies build the sources of competitive advantage to gain market position?
- 2) Do they base their innovative activities on the conscious use of hard factors and not attributing soft factors with any decisive role?
- 3) Do these entities value intangible factors?
- 4) And, if so, which ones are treated by the managers of these companies as the most important in shaping competitive advantage?

Attempts to answer these questions appear extremely important in the face of increasing frailty, inconsistency and instability of existing social-economic and geo-political systems, which force companies to continuously modify the conduct of their businesses (Gajowiak, 2013, p. 73). Thus, there is a need to base it not only on tangible factors in the form of physical and financial capital, but also on the intangible factors of production responsible for competitiveness. As underlined by Janasz, W. "companies predominantly attach importance to the current efficiency, represent the traditional approach, while too little business entities select a strategy which is characterized by changes, innovation and flexibility - the so called prospective approach." (Janasz, 2012, p. 37) For this reason, the study focused on the high-tech enterprises, which are generally the units focused on pro-innovation activities. Thus, the identification of factors responsible for shaping competitive advantage can become a guideline for other entities as to what resources and skills shape competitive advantage.

The sample and methodology of the study

The selection of subjects for the study was complete and was a result of at least a couple reasons. Firstly, SMEs are the largest group of companies in Poland (about 99.8%), hence their state and prospects of further development illustrate to the greatest extent the potential of entrepreneurship, innovativeness, and thus competitiveness. Secondly, these entities also feel the barriers to the conduct of their businesses the most. Thirdly, the "industry of high technology, due to high intensity of the processes of research and development is a specific sector, the analysis of which provides not only information on the impact of R & D, but also on competitiveness and the ability of the economy to absorb the results of the work in the fields of science and technology" (competitiveness of the sector ... 2009, p. 3).

The choice of the territorial scope was due to the fact that the region of Greater Poland from 2008 to 2012 significantly differed compared to other provinces in the country in terms of the size of investment in innovative activities and R & D activities of small and medium-sized industrial and service enterprises, as well as in terms of the largest number of significant concentration of people employed in high-tech industries (Analysis of differentiation ..., 2010, p. 16.; Perspektywy rozwoju..., 2006, p. 111).

The analysis of data obtained from the statistical office indicated that 215 entities met the criteria for selection defined in the project. The study was complete for the given population. Finally, the participation in the study (using CATI technique, i.e. Computer-Assisted Telephone Interview) was accepted by 44 entities (maneuverability at 20%), of which 32 were small (10-49 employment level), and 12 medium-sized (50 to 249 employees) companies. These companies represent the following sections of PKD (Polish Classification of Activities): J³(up 30 companies), then C⁴ (10 entities), and section M⁵ (only 4). The largest companies (up to 30 entities) are located in the city of Poznań.

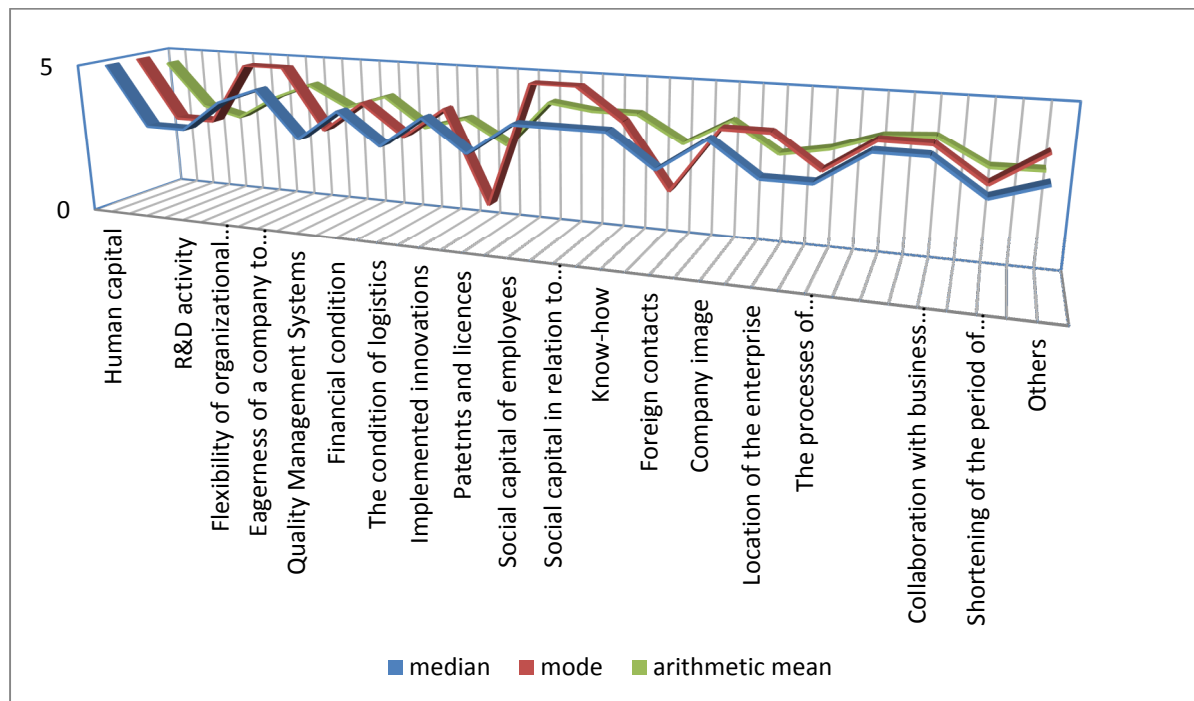
²The study omitted large companies that run on completely different principles of functioning in comparison to the SMEs. In addition, the specificity of the industry indicates that these are companies with large capital, often foreign, and therefore, their autonomy in decision making regarding the data for research is limited. The classification of areas of advanced technologies has adopted a methodology set out by Eurostat, based on statistical reporting of the Member States, candidate countries associated with The European Free Trade Association (EFTA) and third parties. According to this classification, the high-tech industries in accordance with the Polish Classification of Activities (PKD 2007) include the following (Science ... 2012, p. 180-181, based on Eurostat data): production of basic pharmaceutical products and medicines and other pharmaceutical products (C 21), manufacture of computer, electronic and optical products (C 26), manufacture of aircraft, spacecraft and related machinery (30.3 C), activities related to the production of films, video and television program production, sound recording and music (J 59), broadcasting (J 60), telecommunications (J 61), activities related to software and consultancy and related activities (J 62), services in the field of information (J 63), scientific research and development (M 72).

The main research tool was a survey consisting of 27 questions divided thematically into two parts. The first concerned the degree of innovation and competitiveness, the other - social capital of an organization.

Key factors of competitive advantage of SMEs

The basic premise of the study was that the companies predisposed to build competitive advantage not only by means of the so-called hard factors, but also by powerful intangible resource management (especially important in turbulent environments), are companies belonging to the high-tech sector. Opportunities to improve the conditions for the development of advanced technologies in Poland "should be associated with the development of small and medium-sized enterprises operating in the high-tech sector. These entities should in fact constitute a natural link between science and business environments, facilitating the application of the latest scientific business practice." (Mizgajska & Wściubiak, 2008, pp. 275-289) Therefore, the questionnaire consisted of 21 questions about the resources and skills, which in the opinion of managers of these companies allow one to gain a competitive advantage. Distribution of the respondents' replies is provided in the chart below.

Chart 1. The importance of the resources and skills to shape competitive advantage



Source: own study based on empirical research results.

³ Companies in this section represent the following: Production of motion pictures, video and television program production, projection of movies, Television programming and broadcasting, Wireless telecommunications activities except satellite telecommunications, Wired telecommunications activities, Software activities, Consultancy regarding IT, Management of IT devices, Other services in the field of information technology and computer data processing; Management of websites (hosting) and similar activities, Data processing; Management of websites (hosting) and similar activities, Web portals.

⁴ Companies in this section, in turn, represent the following: Production of medicines and other pharmaceutical products, Manufacture of electronic components, Manufacture of electronic circuit boards, Manufacture of computers and peripheral equipment, Production of (tele) communications equipment, Production of consumer electronics, Manufacture of instruments and appliances for measuring, testing and navigation, Manufacture of optical instruments and photographic equipment, Manufacture of air and spacecraft and related machinery.

⁵ Companies in this section represent the following: Research and experimental development on natural sciences and engineering, Research and development in the field of social sciences and humanities.

Based on the above chart, it is understandable why the managers of the analyzed companies on a scale from 1 (lowest rating) to 5 (highest rating), attributed the highest score to the following:

- human capital ($m_e=5$, $d=5$, $\bar{x}=4,63$);
- tendency of a company to learn ($m_e=4,5$, $d=5$, $\bar{x}=4,18$);
- social capital of workers ($m_e=4$, $d=5$, $\bar{x}=4,13$).

These factors can therefore be considered a set of determinants, which in the highest degree allow the creation of competitive advantage for small and medium-sized enterprises in the high-tech sector of Greater Poland. In addition, these results indicate that the analyzed entities primarily enhance intangible resources so difficult to imitate and follow. The first tangible factor in the form of company's finances has been positioned sixth. It should also be noted that the analyzed subjects (over 80%) also indicated that their financial situation compared to the industry average and the biggest competitor is at the level of good or very good. The table below presents a summary of tangible and intangible resources and skills responsible for shaping competitive advantage according to their priority given by the respondents of the survey (based on the above-mentioned statistical measures).

Table 3. The weight of intangible and tangible assets

Intangible assets	Tangible assets
1.Human capital	1.The state of company's finance
2.Company's eagerness to learn	2.Implemented innovations
3.Social capital of employees	3.Quality management system
4.Social capital in relation to business partners	4.Company's location
5.Flexibility of organizational structures and activities	5.Machines, production equipment
6. Know-how and corporate image	
7.Cooperation established with partners	
8. Collaboration established between employees	
9. Research and development activity	
10. Shortening the period of the commercialization of results	
11. The processes of organizational learning	
12. Patents and licenses	

Source: own study based on empirical research results.

High importance assigned to human capital clearly demonstrates that small and medium-sized entities are aware that in the face of both potential opportunities and new dangers (that are emerging in a globalized economy) knowledge, skills and experience of employees as the basic attributes of this capital are crucial in the fight against competitive market. This approach is consistent with the concept of a *knowledge-based economy* which, from a microeconomic perspective, assumes that knowledge remains an undisputed source of competitive advantage of most businesses, including those of small and medium size (Kozminski 1996). Moreover, according to Edvinsson, L. and Malone, M.S. human capital embodies the dynamics of an intelligent organization through its creativity and innovativeness (Edvinsson & Malone, 2001, p. 34). It is also worth noting that until recently the area of knowledge management was dominated by a technical approach that assumed that it is a measurable asset, and thus possible to be codified and stored. However, as noted by Bendkowski, J. "[such an] approach has not produced the expected results in addition to high expenditure on the maintenance of information infrastructure and employees disillusioned by existing initiatives in the field of knowledge. This approach showed that technology alone was not able to overcome the barriers to knowledge transfer." (Bendkowki, 2012, p. 10) For this reason, social orientation has gained importance. It assumes that knowledge is created in the process of mutual interaction and group learning. As added by the quoted author, "the main element of knowledge management system is the man, as a carrier of tacit knowledge. The process of knowledge creation is a cognitive activity. As a result, individuals produce tacit knowledge externalized within the context-specific human interactions." (Bendkowki, 2012, p. 10)

On the other hand, in the opinion of the respondents the second most important (also in this case an intangible production factor) is a company's eagerness to learn. This resource becomes crucial in the context of the acquisition of competitive advantage in a situation where continual changes in economic systems cause "the future to become increasingly vague, and the present – unsatisfactory." (Mączyńska, 2010) Therefore, a specific challenge faced by enterprises today is the relentless "creative destruction" in thought

and action, which has already been addressed by Schumpeter, J.A. who identified it with the impact of the implementation of innovations, when "better behavior forced the destruction of the old." (Schumpeter, 1995, p. 192) According to Szymanski, W., "rapid change means rapid obsolescence of ideas, experiences, parts of knowledge, decisions, because the conditions that were the basis of their adoption have changed. A role of sensitivity at all levels of decision making has been growing, and therefore the analysis of earlier decisions' ageing, the analysis of undermining the sense of previously taken decisions - due to the fact that the predicted conditions under which they were made did not come true in practice, or have been substantially changed." (Szymanski, 2012, p. 19) Therefore, the weight of organizational learning also increases. It is a process in which the acquired knowledge increases the ability to both solve current problems, as well as undertake more effective actions (Rokita, 2005, p. 105; Zott, 2003, pp. 97-125; Wang & Ahmed, 2007, pp. 31-51). Thus, it allows a high flexibility of operation (Bendkowski, 2012, p. 18). Similar conclusions have been reached by Senge, P.M. who stated that organizations that are able to build competitive advantage in the future are those who can take a fresh look at the place and importance of social capital of a given organization, and those, who will learn to use the involvement of employees and their ability to learn in a right way (Senge, 2002; Chen, 2008, pp. 380-390; Wang & Cheng & Lin, 2013, pp. 2667-2679).

It is worth mentioning the fact that managers of the analyzed companies recognize the importance of their employees' social capital - their mutual relationships based on, *inter alia*, trust, loyalty, or even credibility (compare Lauzikas & Dailydaite, 2015, pp. 37-51) in the process of gaining competitive advantage. And although a deficit of social capital in Poland is still widely observed and J. Hausner even states bluntly that "our development suffers from a lack of social capital," (Hausner, 2010, p. 64) the fact that it is valorized in terms of the organization is quite encouraging. Even more so with the fact that a number of studies confirm its positive impact on economic activity (Knack & Keefer compare, 1997; Fukuyama, 1997; Coleman, 1990; Granovetter, 1973; Lin, 2000, McKeever & Anderson & Jack, 2014 Nahapiet & Ghoshal, 1989 ; Adler & Kwon, 2002; Januszek, 2004; Skawińska, 2011; Matysiak, 1999; Gajowiak, 2012). In particular, from microeconomic perspective the following aspects are especially significant:

- halting or even eliminating the opportunistic behavior of company members;
- reducing the need for management intervention and the involvement of management structures in the course of transactions;
- encouraging to a greater responsibility in economic interactions;
- allowing for innovative approach formation that may allow to obtain competitive advantage;
- forcing an individual to make choices that are beneficial to all employees. This capital does not allow obtaining benefits at the expense of the common interests of the entire team;
- providing access to resources, including tacit knowledge and its rapid diffusion between employees (Gajowiak, 2010, pp.14-15).

It should also be noted that - as noted by Grzanka, I. - social capital allowing access to important information and other strategic resources has a significant impact on the ability of companies to adapt to changes, including both challenges and opportunities emerging in the environment. The more possibilities for interaction between employees, the more social capital is created, "which results from the fact that new knowledge accumulated by a company creates new opportunities in the environment." (Grzanka 2009, p. 126) Thus, it seems true that knowledge and values shared by people slowly replace three elementary principles of competitiveness, i.e. cost advantage, higher quality of goods and services and the speed of response to customer needs. Thus, the idea of social capital becomes crucial in solving specific problems - in particular the relationship with customers, employees and between employees themselves or with the outside world (Grzanka 2009, p. 91. Moreover, as Lauzikas, M. and Dailydaite, S. underline, social capital is the driving force of innovative behaviors, and its absence may be a significant drag (Lauzikas & Dailydaite, 2012, p. 85-97).

Identifying the factors responsible for the development of competitive advantage of modern enterprises, it should also be noted that the least assessed intangible assets are patents and licenses. Among the reasons for this state of affairs the following can be identified: the lack of need for company managers to purchase a patent, or licenses and the cost of such actions (the process of patenting / or licensing and security charge / license). This does not mean, however, that these companies do not introduce any innovation. According to the study, the implementation of innovation is a second key tangible factor enabling the gain of competitive advantage. In addition, according to the research, most companies have implemented product innovations (more than 32%), and then process innovations (29%), as well as marketing and organizational innovations (about 18%). Moreover, over the next two years more than 80% of them are planning to implement further innovations. In addition, over 36% of companies spend at most 5% of their revenue on R&D and 23% of companies over 5%. This fact is significant because Poland still significantly lags behind in comparison to

other EU countries in terms of innovation in general, as well as the level of expenditure on R&D. According to the report by Innovation Union Scoreboard 2013, the expenditure of private companies on R&D accounted for (during the year under review) only 0.23% of GDP, while the EU average is at the level of 1.27% of GDP (Innovation Union Scoreboard 2013, p. 71).

Summary

In the turbulent environment in which businesses operate today, the need to look for new ways to gain competitive advantage and thus attract and retain increasingly demanding customers, is also recognized by small and medium-sized entities of the high-tech sector located in Greater Poland.

Based on the gathered survey results, it becomes apparent that these companies base their business on competitive market supported by both hard and soft factors. However, they assign greater importance to the development of competitive advantage due to the latter ones. This approach, in the opinion of many researchers, becomes justified against the challenges these companies face on a daily basis. High complexity of economic processes, increased competition, chaos, fast variability, or a lack of boundaries are all forcing companies to modify the way they operate and support their activities on those elements which help to reduce uncertainty and unpredictability, as well as help to reduce opportunistic actions.

Thus, the managers of the analyzed companies who are aware of these challenges provided the highest score to the following: human capital, company's eagerness to learn, social capital of employees. The tangible factor in the form of corporate finance scored only sixth among the set of twenty-one resources and skills. A skillful use of intangible assets, which are inimitable, extremely rare and valuable, results in the fact that these companies claim to be intelligent organizations, which are commonly identified with the highest stage of the process of improvement of modern organizations. Celebrating knowledge, skills, experience, willingness to learn and the basic attributes of social capital in the form of trust, loyalty and reliability of employees enables these companies to enjoy high flexibility and fast adaptation to the changing rules of the game in a competitive market.

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