

CORPORATE INNOVATIVENESS AND THE COMPETITIVENESS OF THE POLISH ECONOMY IN A PERIOD OF ECONOMIC CRISIS

Ewa Szymanik

Department of Microeconomics

Cracow University of Economics

Rakowicka 27, 31-510 Cracow, Poland

Abstract

The paper presents the impact of innovative companies on the competitiveness of the economy. It shows the situation in Poland and the main problems faced by Polish companies, as well as the relationships between their innovativeness and the competitiveness of the national economy, also during the recent economic crisis, stressing that through the use of innovative solutions, the Polish economy has managed to escape the hard sting of the recent slump.

Key words: *company innovation, competitiveness of the national economy, international trade, European Union, crisis*

1. INTRODUCTION

"Every innovation is born and develops in three stages. First, an idea or a project, i.e. an invention is born in the creator's mind; out of a realised idea, a work (Latin *ars*) or action (*opus, actum*, Greek *praxis*) arises, i.e. an innovation in the strict sense of the word. When the work finds appreciation with consumers, it is diffused in the form of imitative, duplicated works (Latin *imitatio*, Greek *mimesis*) used by the society. Works of a creative, innovative nature create culture in the strict sense of the word, whereas reproductive, diffused works contribute to the development of civilisations. Civilisations, in turn, create the ground for the new creative acts." (Labuda, 2008, p. 229)

These observations by G. Labuda cast a somewhat different light on the problems faced by almost every economy today i.e. on innovativeness and competitiveness. The main task which countries set themselves is economic growth and development, but they both depend to a significant extent on the ability to create and use the fruit of research, new ideas, concepts and inventions in practice. This ability to absorb broadly defined innovation often translates into higher sales generated by the company, the betterment of the company's situation relative to that of the competitors, better sales opportunities, including in foreign markets, and stimulation of others to follow suit. The more of these activities in the country, the more it affects the competitiveness of the whole country on a global scale.

Nowadays, reconstruction of the economy based on knowledge, treated today as a major economic resource substantially shaping the formation of companies', regions' or countries' competitive advantages is a precondition for development. This knowledge is broadly understood – it does not necessarily have to be formalised and confirmed by relevant documents e.g. university diplomas and course completion certificates. Indeed, it may also result from practice and mean another, better way of producing something or a more efficient use of available, broadly defined, tools. All of these socio-economic processes and phenomena are intertwined on the basis of feedback and interactions: knowledge – management – innovation – entrepreneurship – competitiveness – economic growth (Targalski, 2008, p. 7).

The aim of this paper is to examine the extent to which Polish companies are innovative and whether the changes in this characteristic translate into an improvement in the competitiveness of Polish exports to the European Union. The author's empirical studies covered industrial products (groups 3, 5-9 SITC) from 2006-2012, and the choice of period was determined by the availability of data on the innovativeness of Polish companies derived from studies by PARP and Eurostat. In order to compare competitiveness, the study used the most popular measures of RCA and IIT, showing the relative advantages and similarity of structures in national economies.

2. INNOVATION – THEORETICAL ASPECTS

The concepts of innovation and innovativeness are intuitive, vague and – like competitiveness – difficult to define precisely. One of the ways of understanding innovativeness was introduced at the beginning of the paper, but it is not exhaustive. Many authors have tried to find the most appropriate definition or description of the phenomenon. Schumpeter emphasised the need for broad interpretation of the issues because its effects are not merely the result of technical innovations, but also of organizational-production related ones. He described innovation as:

- launching of the production of new or improved existing products,
- use of a new or improvement of an existing manufacturing process,
- implementation of an innovative method of sale or purchase,
- opening of a pioneering market,
- introduction of new raw materials or semi-finished products
- application of a new organisation of production.

Schumpeter distinguished three consecutive stages in the innovation process: invention, innovation and diffusion. He also required that for new products or processes to be regarded as innovations they must have an economic value, i.e. that they must have a wide range of buyers.

Ph. Kotler (1994, p. 322) provides a simple, brief definition – an innovation is a good (or idea) perceived by someone as new. This definition is similar to the one formulated by H.G. Burnett who argues that an innovation is constituted of any idea or thing which is new because it is qualitatively different from existing known forms (Burnett, 1997, p. 10).

Poland's Central Statistical Office defines innovative activity as a series of activities of a scientific (research related), technical, organisational, financial and commercial nature whose aim is to develop and implement innovations. On the other hand, innovation is constituted of the implementation of a new or significantly improved product or process, or a new organisational or marketing method into business practice, workplace organisation or relations with the environment (customers, competitors, partners), although implementation occurs when a product is introduced to the market, and the processes are actually used by the company (CSO Form, 2009).

According to the *Oslo Manual*, innovation takes place when a company launches a new or improved product or when it uses improvements in the production process (*Oslo Manual*, 2005).

A. Francik implies that innovativeness is the ability to respond to changes in the environment and the ability to initiate original and imitating behaviours related to or not related to signals from the environmental, using explicit and implicit knowledge (Targalski, 2008, p.11). According to the author of this paper, this definition requires complementing – a new idea may encounter some obstacles to its introduction, including associates' reluctance to apply it, but ultimately it cannot be rejected by consumers (the market), since then it would not be an innovation. These doubts, however, confirm once again how complex the task of defining this notion is.

3. TYPES OF INNOVATION AND ITS DETERMINANTS

Pertinent literature identifies several types of innovative solutions. For each individual type the individual determinant of innovativeness plays a different role.

On the basis of a criterion relating to products, technologies and processes one can distinguish the following types of innovative solutions (Nowacki, 2010, pp.30 – 31), (Wziątek – Kubiak, Balcerowicz, November 2009, pp. 14 – 15):

- product innovations, which signify the production by a company of a new product or a change in its properties, involving mainly modernisation, but also a change in design, trademark or acquisition of a patent,

- technological innovations which improve a product's properties, the manufacturing process or the delivery system, with an improvement of aesthetics or appearance not being considered to constitute innovation,

- process innovations, which involve improving or introducing new manufacturing methods and technologies. It is hard to agree with Nowacki, who merges technological and process innovation, as the latter entails change in methods of production, which subsequently entails changes in the cost of production, which are the most common reason for the introduction of new production processes. Another reason may be the dependence of the introduction of new products on the application of innovative processes e.g. in order to improve product quality.

Process innovations may be either radical or incremental. Radical innovation generates a new market eliminating an existing market from the economy or substituting it with another market (or other markets) (for example, mobile phones replaced pagers). This kind of innovation generally originates in research, often basic research (chemical reactions as a basis for the introduction of tooth implants). In addition, it provides an additional impetus for supplementary innovation, such as the ability to complement a mobile phone with additional features.

Because the essence of incremental innovations involves expansion and supplementation of the use of new solutions, one must certainly agree with Wziątek - Kubiak and Balcerowicz who argue that complementary innovations (expansion) are a better name for this kind of innovation. They consist of a wide range of product and process modifications, additions and improvements. It is difficult to determine their boundaries.

As noted, radical innovations usually occur in new businesses, and supplementary ones in an already existing market. The latter are a means to remain competitive in the short term, whereas radical innovations favour long-term viability.

- marketing innovations, which are sometimes the subject of a separate classification, a division into technological and non-technological innovations, meaning the use of new or improved solutions in a product's appearance, its packaging, promotion, pricing, market positioning and business model resulting from a new marketing strategy,

- organisational innovations which, by the same token as those above, boil down to changes in the organisation of business operations, jobs, relationships within the company and relations with the external environment.

Both kinds of innovation often arise from the introduction of other changes, especially in technology.

Another kind of classification of innovation involves their division on account of the degree of a product's or technology's novelty. One can distinguish novelty at the following levels:

- global (international), i.e. the original launch onto the market,
- national (new product in the country),
- corporate.

A division of innovation into global (equivalent to international) and local innovation is highly similar to the above classification.

The importance of innovativeness in the long-, medium- and short-term is stressed by Bal-Wozniak, who analyses its different types and emphasises that the importance of each of these depends on the time horizon considered (Juchniewicz, 2006, pp. 551-556), and one can only agree with the view.

Each novelty has its source. There are many factors that determine the introduction of new ideas and improvements. These are most commonly divided into internal and external determinants (Nowacki, 2010, p. 31), (Wziątek – Kubiak, Balcerowicz, November 2009, pp. 16 - 25), (Sosnowska, Poznańska, Łobejko, Brdulak, Chinowska, 2003, pp. 15-19). The former include in particular: a company's innovation strategy, innovation planning, management's leadership skills, degree of marketing involvement, proprietary research & development, stimulation of employee creativity, accumulation of human capital and the ability of its broad deployment, empowered and unempowered knowledge resources. They can result from: the nature of the entrepreneur e.g. openness to innovation, desire to

distinguish himself from the environment, his experience (knowledge of foreign languages, acquired occupational skills, experience in the running of the company), the team (proper organisation, a sense of unity of interests, general working conditions and pay), the immediate economic environment (competitors' innovativeness, interaction with customers, macroeconomic conditions), company's location (possibility of contact with R & D institutions, the need to comply with environmental standards), former and current results of the company's activity (the value of exports, liquidity, liabilities to suppliers), company's legal and financial standing (tax law, protection of intellectual property rights, conditions underlying borrowing and repayment of loans). These factors may affect innovativeness both directly and indirectly.

External determinants arise in both the domestic and international environment and include the results of scientific and technical research, the purchase of know-how, licences, material transfer of technology, joint actions, knowledge gleaned from external sources (scientific publications, conferences and their likes), fairs and exhibitions, broadly understood recruitment, external consultancy, consumer behaviour.

However, these factors alone are not enough to ensure a company's modernisation, and thus, modernisation of the economy. Opportunity for innovation to occur at all appears when an entrepreneur realizes what his company can improve, as well as how to apply this knowledge in practice, which means the execution of certain moves, actions necessary to implement an innovative idea. Of course, perseverance and adequate financial resources are also important. This means that there has to arise simultaneously an ability and an inclination to innovate. The main characteristics of innovative companies are deemed to include: conduct of a wide range of research and development and relatively high R&D budgets, ability to continuously generate innovation (creativity), systematic implementation of new solutions, constant launching of new products onto the market, high degree of ability to absorb external innovations, relatively high proportion of new products and/or technologies in the overall volume of production (or services), ability to predict the future and forward thinking, flexibility, ability to exploit the company's potential to maintain a significant competitive edge, full use of the team's potential, passion for diversity (Zakrzewska – Bielawska, 2011, p. 40).

Company innovativeness is strongly correlated with a company's size. Empirical studies indicate that large companies are much more inclined to pursue innovate activities, whereas small companies focus primarily on supportive modifications (Wziętek – Kubiak, Balcerowicz, November 2009, pp. 4 – 10). The strengths and weaknesses of the latter companies in this area are shown in Table 1.

| Strengths | Weaknesses |
|---|---|
| <p>1. Ability to respond quickly in order to immediately adapt to changing market requirements</p> <p>2. Lack of bureaucracy; dynamic managers react quickly to new opportunities opening up and are willing to take risks</p> <p>3. Effective informal network of communication, rapid response to internal problems</p> | <p>1. Problems with raising capital – innovation can pose a disproportionately large financial risk;</p> <p>inability to spread the risk across the portfolio of projects</p> <p>2 In some areas, the economies of scale significantly restrains development; companies are often unable to offer the entire set of complementary products</p> <p>3. There may be difficulties in raising external capital indispensable for rapid growth; managers sometimes may be unable to cope with more complex organisational structures</p> <p>4 Frequent difficulties in applying for patent protection of the company's own innovations</p> <p>5 Problems with complex regulations; transaction costs involved in complying with them are relatively high</p> |

Table 1. Small companies' strengths and weaknesses in the field of innovations

Source: A. Masternak – Janus, *Innowacyjność MŚP w Polsce i wybranych krajach UE*, w: red. Zakrzewska – Bielawska A., *Wyzwania rozwojowe małych i średnich przedsiębiorstw. Innowacje – technologie – kryzys*, Difin, Warszawa 2011, p. 30, abridged

There is little doubt that innovative companies are much more dynamic than those that are not innovative. Pertinent literature claims that this additionally translates into their performance, because they generally are characterized by higher productivity measured in terms of the ratio of added value to the number of employees, bigger size (which is associated with relatively higher added value), higher sales per employee, twice higher value of investment outlays (per employee) and very high export growth and its rate (measured as the ratio of exports to total sales) (Pietrzyk, 2006, p. 41).

4. COMPANY INNOVATIVENESS IN POLAND

According to Eurostat ([http //epp.eurostat.ec.europa.eu](http://epp.eurostat.ec.europa.eu)) approximately 52.9% of EU's businesses reported innovation activity in 2010. The majority of such companies are established in Germany (79.3%), Luxembourg (68.1%), Belgium (60.9%) and Portugal (60.3%), with Bulgaria (27, 1%), Poland (28.1%), Latvia (29.9%), Romania (30.8%) and Hungary (31.3%) tailing off. Most innovations were reported in the industry, with services occupying the second place. This trend has persisted for several years.

The small innovativeness of Polish companies compared to the EU average is caused by a number of reasons. One of them is the extremely low (compared to the EU average and the OECD average) expenditure on research and its share in the GDP. According to OECD data ([http:// stats.oecd.org](http://stats.oecd.org)) for 2010, the percentage share of R&D expenditure in GDP for selected EU countries followed a similar pattern as in the past. The average for the EU-27 amounted to 1.91%. The largest part of GDP devoted to R&D was reported in Finland (3.88%), followed by Sweden (3.4%). Germany, one of the largest and wealthiest countries, spends 2.82% of its GDP on R&D. Poland with a mere 0.74% occupies the third lowest place. Only Greece (0.6% - 2007 data) and Slovakia (0.63%) spend less. The above seems to indicate that the EU's R&D target of 3% of its GDP in 2020 will be unattainable for Poland, the more so that because of the crisis, economic growth forecasts for the whole of the European Union and its Member States are not optimistic, which will, amongst others, affect Poland's foreign trade and thus the development of the Polish economy. According to "The Economist" (May 2013) in 2013 the estimated GDP growth for the Eurozone area was negative and amounted to -0.5%, despite optimistic forecasts for Germany and Austria, where GDP was expected to increase by 0.7%, as the still unresolved problems of Greece (down 5.5%), Italy (down 1.5%) and Spain (down 1.6%) continued to have a major impact on the entire Eurozone area. Although Poland with its 1.4% growth (the highest of the presented countries) does not look bad against the general backdrop, yet it is still too small a growth in terms of needs. This will certainly have an impact on innovativeness.

Such low spending on research and development means a reduction in Poland's ability to generate radical innovation, with the obvious implication that domestic companies will most likely focus on extension innovations, which do not however generate more income and do not enhance competitiveness, because "(...) there is a fundamental difference between an innovative approach and an innovative company. The first generates a lot of ideas, the other – a lot of money." (Andrew Sirkin, April, 2004, pp. 91-92).

As already mentioned, the crisis affects not only Polish innovative companies. For most of them the main problem is finding the funds with which to finance innovative products. Loans are the primary source of funding, but the Eurozone is struggling with an increase in the cost of borrowing. There are evident differences between different countries – countries which are stronger economically, e.g. Germany and France, cope better, without raising interest rates, while weaker ones, e.g. Spain and Italy have to pay higher interest rates, which significantly slows their growth and, as a result, reduces innovativeness ("The Economist", May 2013). From this angle, the possibilities in Poland are improving in the wake of the reduction in interest rates by the Monetary Policy Council in May 2013.

What are the key determinants of corporate innovativeness in Poland? One of them has already been mentioned above – it is R&D spending. Polish companies spend little money on R&D, even though they have the opportunity to benefit from the financial support under the 2007-2013 Innovative Economy Operational Programme. According to data as at 26 September 2013, (<http://www.poig.gov.pl>) the managing authority approved the financing for projects worth 44.43 billion, representing 103.49% of the allocation for the program, but even that is still not enough. Not every company has managed to take advantage of this opportunity, but there is a chance that with the improvement in the global economy also Polish entrepreneurs will introduce innovations more boldly because 9 September 2013 saw the beginning of social consultation on the 2014-2020 Smart Development Programme whose goal is to collect opinions and comments on the proposed directions of support within its framework. Many authors also note that in terms of use of external support to fuel the development of innovation, the size of the company is important – the bigger the company, the more likely it is to benefit (Zadura – Lichota, 2010, p 43), (Szuba, 2006, p 86), (Eurostat, 2008, pp. 87 - 88 and 107-108) and (Eurostat, 2013, p 35) and the trend is permanent.

Table 2 presents the percentage of innovative companies benefiting from public support measures for development in EU Member States.

| Country | Companies which did not receive public support | Sources of public funds | | | Framework Programme 7 | Companies which do not use public support |
|---------------|--|-------------------------|-----------------|-------------|-----------------------|---|
| | | Local government | State subsidies | EU | | |
| Belgium | 22.6 | 15.2 | 9.4 | 5.9 | 2.3 | 44.6 |
| Bulgary | 16.1 | 0.5 | 7.9 | 9.9 | 0.9 | 64.7 |
| Cyprus | 42 | 2.6 | 37.8 | 9.8 | 2.3 | 5.5 |
| Czech | 24 | 2.9 | 12.7 | 16.4 | 5.9 | 38.1 |
| Estonia | 24.5 | 1.7 | 17.6 | 11.3 | 2.1 | 42.8 |
| Finland | 32.5 | 6.5 | 30.6 | 5.8 | 1.7 | 20.2 |
| France | 46.1 | 13.3 | 41.5 | 9.1 | 2.1 | - |
| Spain | 26.9 | 16.9 | 14.2 | 2.6 | 1.3 | 38.1 |
| Holland | 34.1 | 13 | 32.6 | 3.9 | 1 | 15.4 |
| Lithuania | 35.8 | 2.8 | 6.3 | 34 | 3.7 | 17.4 |
| Luxembourg | 16.8 | 0 | 15.9 | 3.3 | 2 | 62.1 |
| Latvia | 14.3 | 0.9 | 4 | 13.8 | 4.8 | 62.2 |
| Malta | 19.4 | - | 16.7 | 8.1 | 0.5 | 55.3 |
| Germany | 21.6 | 8.5 | 14.2 | 4 | 3.2 | 48.5 |
| Poland | 19.6 | 3.5 | 5.6 | 15.6 | 3.1 | 52.6 |
| Portugal | 24.1 | 2.5 | 19.2 | 6.8 | 1.7 | 45.7 |
| Romania | 9.3 | 2.2 | 6.1 | 4 | 1.4 | 77 |
| Slovakia | 15.5 | 0.4 | 4.3 | 12.7 | 1.9 | 65.2 |
| Slovenia | 31.3 | 3.5 | 25.2 | 15.3 | 4.2 | 20.5 |
| Hungary | 34.3 | 1 | 19.5 | 20.6 | 2.1 | 22.5 |
| Italy | 29.2 | 20.3 | 9.7 | 2.9 | 0.5 | 37.4 |

Table 2. Innovative companies benefitting from public support measures (as a percentage of all innovative companies – 2010)

Source: Eurostat, *Science, technology and innovation in Europe*, 2013, p. 79 and author's own research. Data for countries not included in the table are not available.

France's surprising score (over 100%) may be indicative of local entrepreneurs' high ability to absorb public aid or combine funding from various sources but may also imply a printing error.

Poland uses public funds at a relatively small level, which may be due to still insufficient awareness among entrepreneurs.

Human capital is yet another determinant of innovativeness. However, despite the fact that ever more people in Poland boast higher education, which in itself is conducive to innovativeness, one should ponder its very quality (the problem is being raised increasingly by companies employing young staff¹). Implemented innovations are one of the measures of the values of education. Unfortunately, the results reported by companies are not optimistic either – despite an increase in the level of education and staff participation in various types of training, the number of implemented innovations is small. Requirements that certain procedures be applied may be one of the reasons. Many employees (and their managers too) fear to implement new solutions, as in the case of failure they might face grave consequences, including the loss of job.² This attitude undoubtedly discourages the introduction of innovative ideas, thereby limiting opportunities for the exploitation of new ideas, which in turn may mean decreased future competitiveness of the company, and eventually of the entire economy. It must therefore be taken into account that, as A. Knap-Stefaniuk believes, an innovative company also needs to exhibit conducive organizational culture and a creative management style (Knap- Stefaniuk, May 2010, p. 5). This is also confirmed by PARP's observations revealing that at the micro level very much depends on attitudes, willingness to acquire knowledge and personal involvement (Zadura – Lichota, 2013, p. 8).

The next factor involves cooperation with other entities. If one skips the issue of the use of EU funds which has already been discussed, the major partners in such cooperation are: other companies within the capital group, suppliers, customers, competitors operating within the same industry, consultants and private research institutes and universities (Wziątek - Kubiak, Balcerowicz, November 2009, p. 42). However, in our country, this last type of cooperation is rare. Use is made most frequently of trade fairs, exhibitions and conferences of various kinds.

Innovativeness applies to various fields. Generally, it is divided into product and process, organizational and marketing innovativeness. The most common area where it is introduced is product or service improvement. Research carried out by the CSO and PARP reveals that Polish companies introduce more new processes, i.e. improve production methods. The latest crisis has restrained this activity however. While in 2008-10 innovative industrial companies introducing new products or improving the production process accounted for 18.1% of the total number of companies and service companies accounted for 13.5%, in 2009 -11 the figures were 16.9% and 12.3 % respectively, and organisational improvements were introduced by 8.3% industrial companies and 9.1% service companies compared to 13% and 15.2% for the previous period. The share of companies that applied marketing innovations, remained at a similar level (7.9% and 7.8%) (CSO, 2012). Eurostat data shows that technological innovations (process and product innovations) are pursued most actively by German, Italian and the UK companies, while the lowest activity is revealed by Cypriot and Maltese companies, which may be due to the size of their economies.

The main areas in which innovative solutions appear are presented in Table 3.

¹ Author's own research

² Author's own research

| Country | diversity of offer | Product modernis | Entry into new | Quality improvem | Streamlin ing | Increase in product | Improve ment in | Drop in unit cost | Reduction in unit | Eco-innovatio |
|---------------|--------------------|------------------|----------------|------------------|---------------|---------------------|-----------------|-------------------|-------------------|---------------|
| Austria | 50.3 | 41.1 | 49.1 | 58 | 33.3 | 28.8 | 21.1 | 19.4 | 21 | 19.9 |
| Belgium | 49.7 | 38.7 | 41.2 | 47 | 27.6 | 27 | 14.7 | 20.1 | 14.7 | 16.2 |
| Bulgaria | 40.9 | 29.9 | 39.8 | 45.9 | 28.7 | 27.1 | 28.9 | 25.9 | 21.2 | 20.7 |
| Cyprus | 68.8 | 76.1 | 64.2 | 84.1 | 75.2 | 72.4 | 50.4 | 46.8 | 36.3 | 36.8 |
| Czech | 49.2 | 31.9 | 33 | 44.7 | 27.7 | 24.2 | 16.1 | 25 | 19 | 15.1 |
| Estonia | 40.3 | 38 | 36.5 | 46.5 | 28 | 32.5 | 17.3 | 25.3 | 18.9 | 12.9 |
| France | 58.8 | 35.9 | 61.3 | 48.1 | 24.1 | 26.7 | 21.3 | 24.5 | 18.5 | 21.3 |
| Spain | 35 | 28.2 | 35.6 | 43.2 | 33.6 | 36.1 | 20.9 | 24.8 | 18.1 | 19.2 |
| Ireland | 47.9 | 30.3 | 55.3 | 52.6 | 33.8 | 30.2 | 30.1 | 40.2 | 34.9 | 23.2 |
| Lithuania | 42.8 | 44.1 | 41.3 | 54.7 | 37.7 | 37.6 | 31.1 | 32.4 | 27.5 | 26.2 |
| Luxembourg | 74.8 | 33.4 | 53.1 | 69.8 | 38.2 | 33.7 | 24.5 | 25.5 | 16.7 | 23.7 |
| Latvia | 49.6 | 44.5 | 53.6 | 57.5 | 29.7 | 31.8 | 27.8 | 31.7 | 31.5 | 26.6 |
| Malta | 41 | 19.8 | 33.8 | 44.6 | 27.9 | 21.6 | 23.9 | 24.3 | 20.3 | 17.7 |
| Poland | 49.4 | 39.5 | 43 | 49.6 | 24.8 | 31.8 | 25.4 | 21.8 | 21.3 | 21.5 |
| Portugal | 39.8 | 30 | 42.1 | 50.8 | 32 | 34.2 | 34 | 35.4 | 27.2 | 26 |
| Romania | 57.9 | 40.9 | 46.7 | 67.3 | 38.1 | 41.1 | 37.6 | 27.9 | 30.4 | 29.8 |
| Slovakia | 54.8 | 40.6 | 41.6 | 60.3 | 46.4 | 30.8 | 31.9 | 24 | 29.3 | 24.4 |
| Slovenia | 72.8 | 46.3 | 55.2 | 66.3 | 38.1 | 35.1 | 33.9 | 43.6 | 37.2 | 39.2 |
| Sweden | 54.8 | 40.6 | 41.6 | 60.3 | 46.4 | 30.8 | 31.9 | 24 | 29.3 | 24.4 |
| Hungary | 61.4 | 47.8 | 66.4 | 68.2 | 46 | 35.6 | 33 | 25 | 34.5 | 34.9 |
| Italy | 43.4 | 26.4 | 33.4 | 51.3 | 24.6 | 24.3 | 27.3 | 15.3 | 14.4 | 16.8 |

Table 3. Major types of product and/or process innovations (percentage of companies in which these were introduced) in 2010

Source: Eurostat, *Science, technology and innovation in Europe*, 2013, p. 78. Data for countries not included in the table are not available.

One should note the category of "eco-innovation", which occupies a relatively high place in the ranking. Many companies have opted for them because of environmental regulations. Most often changes involve reduction in soil and water contamination or air pollution and noise pollution. Probably the percentage of companies introducing environmentally friendly solutions will grow due to the ever stronger environmental awareness among consumers.

The table shows that Polish companies attach the greatest importance to improving the quality and diversity of their offer, and then entering new markets or finding niches and product innovation. There are no major disparities between different types of innovation, which may indicate that many companies have espoused comprehensive development, making upgrades in different areas at the same time.

Innovative activities often face a number of barriers. These can be divided into four groups: cost related, know-how related, market related and others. They do not differ between countries. Research shows that Polish entrepreneurs identify the following main obstacles: shortage of financial resources (company's own and external sources of funding), difficulties in accessing market information, lack of suitably qualified staff, lack of experience in the field, problems with identifying market needs, finding partners for cooperation, lack of specialised equipment, insufficient support from regional business and innovation support institutions and difficulties associated with patent protection. According to Polish entrepreneurs, the first of these is believed to be most important. It involves both the lack of appropriate resources within the company or capital group, and the unavailability of external resources and excessive costs of innovation (in relation to company's potential) (Wziątek – Kubiak, Balcerowicz, November 2009, pp. 44-45) and (Zakrzewska – Bielawska, 2011, p. 50).

Uncertain demand for new products is the next gravest obstacle. Polish entrepreneurs view this as an important barrier, but on the other hand, in the opinion of a large part of companies there is good access to information about the market and technologies (Wziątek – Kubiak, Balcerowicz, November 2009, pp. 44-45) and (Zakrzewska – Bielawska, 2011, p. 50). Apparently, companies either cannot use or are afraid to use the information available in order to develop a strategy for enhancing their competitiveness.

A relatively small percentage of companies complain about a shortage of qualified staff. This can be seen as further proof that Polish entrepreneurs do not perceive the risks that are engendered by stagnation and underestimate the importance of human capital (Wziątek – Kubiak, Balcerowicz, November 2009, pp. 44-45) and (Zakrzewska – Bielawska, 2011, p. 50). On the other hand, due to the crisis a mechanism known from hysteresis could be at work here – entrepreneurs do not invest in human capital, considering that if the best kept their job in times of an economic crisis, then it means that their knowledge is sufficient and there is no need to raise it, especially in the face of perhaps other planned investments.

The feature that stands out from the results of many studies is a high degree of Polish companies' resilience to external influences, which may be due to their distrust of potential partners or to their engrained assumption that for an innovative activity to become successful, the same must be under the full control of the entity which is behind it. Today, however, the so-called open innovation approach whose main rule is "Keep home only what you need, influence – as much as you can" (Chesbrough, 2003) is gaining more and more importance. This means that you must maintain direct control over intellectual property rights and R&D activities (which does not exclude cooperation with other companies or outsourcing) and spend a large proportion of your own resources on investing activities, but at the same time you should also disclose some of them and share them, benefiting to a wide extent from external ideas that may be better or inspiring for further internal innovative activities. At the same time it is important to remember about an important channel for the transfer of knowledge – migrant workers.

At the end of this part of the paper one should also mention a very important issue – prevalent attitude towards innovation in the society. Research and development must benefit the economy and the society in the form of increased prosperity, and in the case of companies it must improve their financial performance. If this is missing, the implementation of innovative solutions may encounter resistance.

5. INNOVATIVENESS AS A SOURCE OF COMPANY'S AND ECONOMY'S COMPETITIVE ADVANTAGE

Nowadays, the appearance of new solutions means that a company that is not trying to develop, may fail because competitors will be better. There is consensus on that among both practitioners and economic theorists. It is believed that innovation generates improvement and modernisation of manufacturing processes, increased productivity, efficiency and quality of work, and hence, an increase in the quality of products and their competitiveness, an increase in the overall efficiency and effectiveness of the company and an increase in export capacity (Grudzewski, Hejduk, 2001, pp. 451-

452), which means that innovativeness also enhances the competitiveness of the economy. Other authors argue that companies' innovative competence initiates the development of new industries and new markets. The creation of such key competences precedes current products and technologies by some 5-10 years. Their source is not so much the new technology, but rather a new, future-oriented concepts for creating and satisfying consumers' needs. They assume that the pace of social change resulting in the emergence of new areas and needs increases and hence profound changes in traditional sectors follow. As immutability and ossification will not bring the company success, companies should strive to achieve a leading position through the creation of new products and needs. The above considerations, therefore, indicate that innovativeness is the cornerstone of the creation of core competencies and enhancement of companies' competitiveness (Hamel, Prahalad, 1999, p. 14). On the other hand, a single entrepreneur is not interested in improving otherwise rather abstract economic indicators, but in real economic profit, maintaining the profitability of the company and being competitive against local rivals. These activities can be carried out at different levels of innovation – the problem lies in the fact that the introduction of the most beneficial innovations in the long-term may be incompatible with maintaining profitability in a relatively short period of several years (Zadura – Lichota, 2013, p. 12). Therefore a problem appears of how to help support improvement in the situation at both the micro and macro levels.

The goal of any business should be to not only to gain a competitive advantage, but also to maintain it, and even increase it. This is illustrated by the diagram of the cause and effect chain presented by R. Nowacki (2010, p. 20): company's resources, skills and market opportunities affect its competitiveness *ex ante*, which translates into competitive strategies used, from which stems the use of specific instruments. These help create a competitive advantage that determines the company's competitive position, which subsequently determines the company's market opportunities.

Research carried out by R. Nowacki reveals that companies are aware of this close relationship between innovation and competitiveness. In the group of companies that claim to be very innovative, over 40% say they are highly competitive, and a further 33% believe their competitiveness to be only somewhat lower. No company admits that its competitiveness is lower than that of its competitors. It is different in the case of companies whose innovativeness is very low. Of these, almost a half also point out a limited, lower than competitors', ability to compete in the market, and a mere 3.7% consider their competitiveness to be very high, linking it with qualities other than innovativeness. This relevant relationship is also confirmed by the fact that the perception of innovativeness as average results in the same opinions on competitiveness (Nowacki, 2010, pp. 184 - 185).

The main sources of competitive advantage in Polish companies are: product price, product quality, variety of product offering, product modernity, company's innovativeness, customer relationships, intensity and quality of promotion, reputation, business support from the parent, cheaper sources of funding, distribution system, ability to respond quickly to the changing environment, competent management team, skilled workforce, size of the company, its market share and growth prospects (Zakrzewska – Bielawska, 2011, p. 44), (Kołodziejczyk, M. Pawłowska, May 2006, p. 30) and (Nowacki, 2010, p. 23).

How do these opinions on companies translate into the competitiveness of the Polish economy? One way to assess this phenomenon is to analyse the IIT indicator and the RCA index, acknowledged to be the most popular metrics, although subject to many drawbacks (e.g. see Nehring, 2004, pp. 19-37). The IIT indicator examines the similarity of economic structures, while RCA explores relative advantages which are revealed. Their analysis, supplemented by other quantities, such as market share, allows determining the competitive position of the economy.

The RCA index computed by means of the logarithmic method allows determining the existence (or lack of the same in the case of negative values) of a relative advantage in the export of a country's good. The IIT ratio, expressed as a percentage, shows the extent to which economies are close to each other in the exchange of a given type of goods. The closer its value is to 100%, the higher is the similarity of structures, and hence of opportunities for trade and competitiveness.

The results of the author's research are shown in Table 4.

| Country | 2006 | | 2007 | | 2008 | | 2009 | | 2010 | | 2011 | |
|---------------|-----------|-----------|-----------|-----------|-------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|
| | RC A | IIT | RC A | IIT | RCA | IIT | RC A | IIT | RC A | IIT | RC A | IIT |
| Austria | - 0.16 | 92.2 4 | - 0.15 | 92.3 5 | -0.14 | 92.8 4 | - 0.06 | 97.2 7 | - 0.03 | 98.5 7 | - 0.14 | 93.0 1 |
| Belgium | - 0.09 | 95.7 2 | - 0.17 | 91.7 | -0.18 | 91.1 2 | - 0.06 | 96.8 9 | - 0.14 | 92.9 9 | - 0.06 | 97.1 4 |
| Denmark | 0.35 | 82.7 5 | 0.36 | 82.3 9 | 0.45 | 77.9 2 | 0.43 | 79.0 3 | 0.54 | 73.6 6 | 0.42 | 79.2 |
| Finland | - 0.86 | 59.6 9 | - 0.85 | 59.8 8 | -0.82 | 61.0 1 | - 0.71 | 65.8 2 | - 0.61 | 70.6 3 | - 0.55 | 73.2 4 |
| France | - 0.02 | 99.1 2 | - 0.01 | 99.3 9 | 0.12 | 94.1 1 | 0.3 | 84.9 2 | 0.31 | 84.8 6 | 0.24 | 88.1 2 |
| Greece | 0.91 | 57.5 8 | 0.93 | 56.5 | 1.28 | 43.6 2 | 1.5 | 36.4 4 | 1.15 | 48.2 4 | 0.68 | 67.1 5 |
| Spain | 0.24 | 99.2 7 | 0.3 | 85.1 6 | 0.1 | 95.1 6 | 0.22 | 88.9 1 | 0.9 | 57.9 | 0.26 | 86.8 6 |
| Holland | 0.11 | 91.4 1 | - 0.02 | 99.1 1 | -0.01 | 99.5 6 | 0.11 | 94.4 9 | 0.13 | 93.6 3 | 0.11 | 94.6 7 |
| Ireland | - 0.42 | 79.2 | - 0.69 | 66.9 9 | -0.7 | 66.1 9 | - 0.81 | 61.6 7 | - 0.77 | 63.2 1 | - 0.83 | 60.8 1 |
| Luxembourg | - 1.04 | 52.2 8 | - 0.49 | 76.2 2 | 0.18 | 91.2 8 | - 0.33 | 83.6 3 | - 0.48 | 76.4 7 | - 0.49 | 76.1 7 |
| Germany | - 0.08 | 96.0 8 | - 0.16 | 92.0 7 | -0.17 | 91.7 1 | 0.04 | 97.9 | 0.04 | 98.2 5 | 0.02 | 99.0 2 |
| Portugal | 0.4 | 80.2 7 | 0.21 | 89.6 4 | 0.14 | 92.8 7 | 0.3 | 84.9 6 | 0.34 | 83.1 9 | 0.23 | 88.7 3 |
| Sweden | 0.24 | 88 | 0.21 | 89.6 5 | 0.24 | 87.9 | 0.27 | 86.5 1 | 0.35 | 82.9 | 0.29 | 85.6 5 |
| Great Britain | 0.5 | 75.4 1 | 0.42 | 79.3 5 | 0.46 | 77.3 2 | 0.67 | 67.8 9 | 0.71 | 66.0 7 | 0.79 | 62.5 2 |
| Italy | - 0.23 | 88.5 8 | - 0.24 | 88.0 7 | -0.32 | 83.9 5 | - 0.14 | 92.9 2 | - 0.13 | 93.5 2 | - 0.18 | 90.8 4 |
| Cyprus | 2 | 23.8 4 | 1.86 | 27.0 4 | 1.58 | 34.2 | 3.26 | 7.4 | 1.25 | 44.6 1 | 0.35 | 82.7 |
| Czech | 0.35 | 82.6 3 | 0.28 | 86.2 1 | 0.24 | 87.8 4 | 0.11 | 94.3 | 0.32 | 84.2 | 0.38 | 81.0 9 |
| Estonia | 1.74 | 29.9 6 | 1.75 | 29.5 8 | 1.59 | 34.0 1 | 1.5 | 36.5 4 | 1.47 | 37.2 9 | 1.66 | 31.7 9 |
| Lithuania | 0.71 | 66.0 4 | 0.85 | 59.9 8 | 0.85 | 69.2 2 | 0.59 | 71.2 6 | 0.46 | 77.4 4 | 0.6 | 70.9 4 |

| | | | | | | | | | | | | |
|----------|-----------|-----------|-----------|-----------|----------------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|
| Latvia | 1.54 | 35.2 7 | 1.41 | 39.2 4 | 2.5 | 15.2 1 | 1.37 | 40.5 3 | 1.35 | 41.1 2 | 1.24 | 45.0 4 |
| Malta | 0.25 | 87.5 8 | - 0.34 | 83.2 4 | -0.62 | 69.9 8 | - 0.54 | 73.6 8 | - 0.61 | 70.5 6 | 0.44 | 78.1 7 |
| Slovakia | 2.28 | 98.6 2 | - 0.04 | 97.9 3 | 0.01 | 99.5 9 | - 0.05 | 97.6 1 | 0.11 | 94.6 5 | 0.02 | 99.2 8 |
| Slovenia | - 0.62 | 70.0 4 | - 0.65 | 68.7 4 | -0.52 | 74.6 5 | - 0.45 | 77.8 8 | - 0.42 | 79.1 1 | - 0.31 | 84.8 1 |
| Hungary | 0.14 | 93.2 8 | 0.11 | 94.5 2 | 0.19 | 90.4 | 0.19 | 90.3 9 | 0.32 | 83.9 4 | 0.24 | 88.3 3 |
| Bulgaria | - | - | 0.6 | 71.0 3 | 0.52 | 74.5 4 | 0.57 | 72.0 9 | 0.35 | 82.6 1 | 0.04 | 98.0 4 |
| Romania | - | - | 0.87 | 59.0 2 | 0.91 | 57.5 | 0.68 | 67.4 2 | 0.45 | 78.1 3 | 0.57 | 72.0 5 |
| EU-27 | 0.16 | 98.4 8 | - 0.01 | 99.8 8 | - 0.00 1 | 99.9 9 | 0.12 | 93.8 9 | 0.16 | 92.0 1 | 0.14 | 92.9 9 |

| Country | 2012 | |
|---------------|-------|-------|
| | RCA | IIT |
| Austria | -0.29 | 89.54 |
| Belgium | -0.01 | 95.32 |
| Denmark | 0.54 | 73.44 |
| Finland | -0.36 | 82 |
| France | 0.28 | 86.06 |
| Greece | 0.75 | 64.41 |
| Spain | 0.03 | 98.54 |
| Holland | 0.12 | 94.15 |
| Ireland | -1.04 | 52.14 |
| Luxembourg | -0.65 | 68.51 |
| Germany | 0.07 | 96.77 |
| Portugal | 0.14 | 92.95 |
| Sweden | 0.25 | 87.36 |
| Great Britain | 0.93 | 56.63 |
| Italy | -0.23 | 88,67 |
| Cyprus | 0.25 | 87.79 |
| Czech | 0.45 | 77.71 |
| Estonia | 2.13 | 21.31 |

| | | |
|-----------|-------|-------|
| Lithuania | 1.06 | 51.62 |
| Latvia | 1.48 | 36.98 |
| Malta | 0.1 | 94.95 |
| Slovakia | 0.09 | 95.34 |
| Slovenia | -0.33 | 83.86 |
| Hungary | 0.31 | 84.89 |
| Bulgaria | 1.35 | 41.05 |
| Romania | 0.96 | 55.37 |
| EU-27 | 0.19 | 90.35 |

Table 4. Aggregate values of RCA and IIT for groups 3,5-9 in 2006–2012.

Source: Author's own calculations based on data from the yearbook *Rocznik statystyczny handlu zagranicznego*, GUS, Warszawa, various years. For 2006 – UE-25

The table shows that the innovativeness of Polish companies, even if still low relative to other countries, translates into a relatively high competitiveness of our economy. This competitiveness is somewhat volatile, resulting from a number of factors, as described earlier. Undoubtedly, one of them is the still ongoing economic crisis, which Polish companies are concerned about. It has led many of them to severely restrict innovative activities in this period. The significant deterioration in the IIT index across the entire EU in the years covered by the study is associated with constraints arising from the above, although it should be noted that in the last year covered by the study there are already clear signs of slow improvement. What is important, though, is that with respect to our main trading partner, Germany, there are practically no changes for the worse. Larger fluctuations can be noted in countries struggling with internal problems, i.e. Greece, Italy and Spain with the latter two being Poland's major partners. There is a good chance that an improvement in the condition of these economies will significantly influence Poland's competitiveness, which can already be noted in relation to Spain.

6. CONCLUSIONS

The analysis leads to several conclusions. The first of these clearly emphasised by all theoreticians and practitioners is that large companies are more willing and more likely to implement innovations. This paradigm is important from the point of view of the competitiveness of the Polish economy since these companies often sell their products abroad. The second conclusion is clearly optimistic – companies perceive a clear link between innovativeness and competitiveness, but mainly limit themselves to thinking on the national plane, rarely contemplating expansion into other countries. However, this is their short-term planning, typical of times of uncertainty, and in the long term, they do not rule out that they may expand operations. This means that although the competitive position of the Polish economy is not very high, this does not determine negatively its chance to improve in the future as long as companies change their way of thinking, i.e. as long as innovativeness starts addressing development planning, because so far, according to many companies, the main innovative challenge involved merely either maintenance or strengthening of their market position. Unfortunately, process innovation which constitutes the majority of innovative activities in our country is not conducive to enhancing international competitiveness. This in turn demonstrates a fairly conservative attitude on the part of many companies, fearing radical change. This attitude may result from the aforementioned relatively reluctant approach to innovative developments in the field of human capital, and hence, a slowdown in the introduction of innovative solutions in other manifestations of companies' activities. Such conservatism is not always the result of management dragging its feet; sometimes, especially in large companies with foreign capital, moreover, the most active ones in terms of technological innovation

and use of the fruits of R&D, this reluctance may be fuelled by a fear of breaching procedures, as was already mentioned.

Another conclusion relates to innovation in times of crisis. As companies report problems with finding resources to be one of the major barriers to their development, this translates into a reduction in expenditures on innovative changes - the effects can be seen clearly if we trace the indicators of international competitiveness. This is of course short-termism, although it is hard to blame companies that they fear for their very survival. Fear of uncertainty in demand for new products inhibit innovations and this, in turn, means that only few of these appear, thereby slowing down market expansion, including expansion of export activities, and thus is a barrier to increasing the competitiveness of Polish foreign trade. In addition, a significant group of small innovative companies do not export at all, limiting their activities to the internal market, which also translates into a negative impact on the performance of the Polish economy on the international stage. There are, however, positive changes, rare as they still are, of Polish companies which are pioneers globally in the implementation of innovative technologies (e.g. a company operating in the market for recycling and recuperation of energy from community waste (*Innovativeness as a source of competitive advantage*, 2013) on the transnational market. An increase in the number of companies introducing eco investments is also an important phenomenon (Baczko, 2011). They can bring about a significant increase in future competitiveness of the Polish economy due to the increasingly strong drive towards being environmentally friendly, although their number is still relatively low and they have been in business for too short to consider their influence to be significant.

Unfortunately, the innovative gap between Poland and our EU partners is being bridged very slowly indeed (Baczko, 2012), which translates into a rather low competitiveness of the Polish economy. Polish companies lack confidence to compete in foreign markets. Although the crisis has had a relatively small impact on our economy and has not caused a deterioration of our trade with the EU, the reduced spending on business development has clearly inhibited the gap bridging. Research conducted by PKPP Lewiatan indicates however that companies which have decided to innovate and have experienced the results of their investment, declare that they will always make such investments (*How innovative companies cope with the crisis*, 2013) (although according to research for the Corporate Value Index 2013 companies in their majority still consider quality as the most important for the company) (*Polish companies are committed to quality, global companies to innovation*), which warrants optimism about (distant) future.

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