

Anna BRZOZOWSKA, Judyta KABUS
Częstochowa University of Technology
annabrzozowskapcz@gmail.com, judytakabus@interia.pl

DETERMINANTS OF ENTERPRISES' INNOVATIVENESS IN THE LIGHT OF EMPIRICAL STUDIES – CASE STUDIES OF AUSTRIA AND POLAND

Abstract. Currently, innovativeness is a key to the success of every enterprise. It is an important element of a company's organisational culture and should be included in long and short-term plans of actions. Both a company and the entire economy must develop innovative marketing solutions, offer products and services perceived as modern, and change the organisation and the occurring processes to reduce unnecessary costs and become more competitive. Innovative activities require a very consistent and long-term strategy as well as financial outlays, and they take time. The aim of this paper is to show the importance of innovativeness in the functioning of companies. The authors attempt to compare the specificity of the implementation of innovation policies in Poland and Austria. Special attention was given to the discussion on innovativeness of Polish and Austrian enterprises.

Keywords: innovativeness, enterprise, patent, development

1. Introduction

In the current conditions of the market, which is defined by its participants and analysts as unpredictable and turbulent, it is very difficult to achieve growth and maintain it for a longer period. Therefore, on the one hand, enterprises have ceased formulating long-term plans, while on the other hand, they have started to search for new sources that would allow them to achieve success [34]. Good, highly qualified staff at each level, an appropriate materials base and counterparties may determine success, but today the above-mentioned elements are regarded as insufficient, as it is innovativeness that has become the priority in conquering markets and achieving success. Moreover, innovativeness must apply to individual companies as well as entire national economies. Both a company and the entire economy must develop innovative marketing solutions that will attract the customer, offer products and services perceived as modern, and change the organisation and occurring processes to reduce

unnecessary costs and become more competitive [8]. Today, innovativeness should be a key to success. It should become an important element of a company's organisational culture and be included in long and short-term plans of actions.

“*Innovation* is an iterative process initiated by the perception of a new market and/or new service opportunity for a technology based invention which leads to development, production, and marketing tasks striving for the commercial success of the invention. This definition addresses two important distinctions: the ‘innovation’ process comprises the technological development of an invention combined with the market introduction of that invention to end-users through adoption and diffusion [1], and the innovation process is iterative in nature and thus, automatically includes the first introduction of a new innovation and the reintroduction of an improved innovation. The primary focus of *process innovations* is the efficiency improvement of the production process for *product innovations*” [2].

“*Innovativeness* is most frequently used as a measure of the degree of “newness” of an innovation. Highly innovative products are seen as having a high degree of newness and “low innovative” products sit at the opposite extreme of the continuum” [1].

In this paper must be emphasized that product innovativeness does not equate to firm innovativeness. Firm or organizational innovativeness has been defined as the propensity for a firm to innovate or develop new products [6]. It has also been defined as the propensity for a firm to adopt innovations [2].

In general, innovation is connected with the introduction (implementation) of a product or process, which is new or significantly improved in relation to previous ones; innovation may also be the adoption by a company of solutions functioning on the market that are novel to it [31].

It is undisputed that although innovation is necessary for everyone who is thinking about building their position in the market, it is not something that appears suddenly. Innovation activities require a very consistent and long-term strategy, which takes time to be implemented, and such activities always entail costs. Therefore, innovations require time and financial investments. Which is why innovation leaders are usually large companies that have employees or entire departments dedicated to innovation and sufficiently large financial resources to be used to search for innovations [9]. The lack of an appropriate financial basis constitutes one of the main barriers encountered by companies interested in innovation.

The aim of this paper is to show the importance of innovativeness in the functioning of companies. The authors attempt to compare the specificity of the implementation of innovation policies in Poland and Austria. Special attention was given to the discussion on innovativeness of Polish and Austrian enterprises.

2. Drivers of Polish and Austrian innovativeness

Polish innovativeness is a very topical issue: its significance, even priority, in the activities of companies and enterprises is often highlighted. In the near future, it must become an important element of any policy pursued by a company. Innovation, to be effective, must be comprehensive [5]. It cannot focus on innovative products, as it must also involve certain changes in the sphere of the organisation of an enterprise in a broad sense [15]. Thus, the key is a comprehensive approach to innovations, as only the sum of activities may bring expected effects. Moreover, innovativeness must also teach Polish companies openness and the ability to take risks.

It is also important that a company realises how it perceives itself in terms of innovativeness – whether it is non-innovative, not very innovative, or experienced in innovation and whether it perceives itself as an innovation leader (Fig. 1).

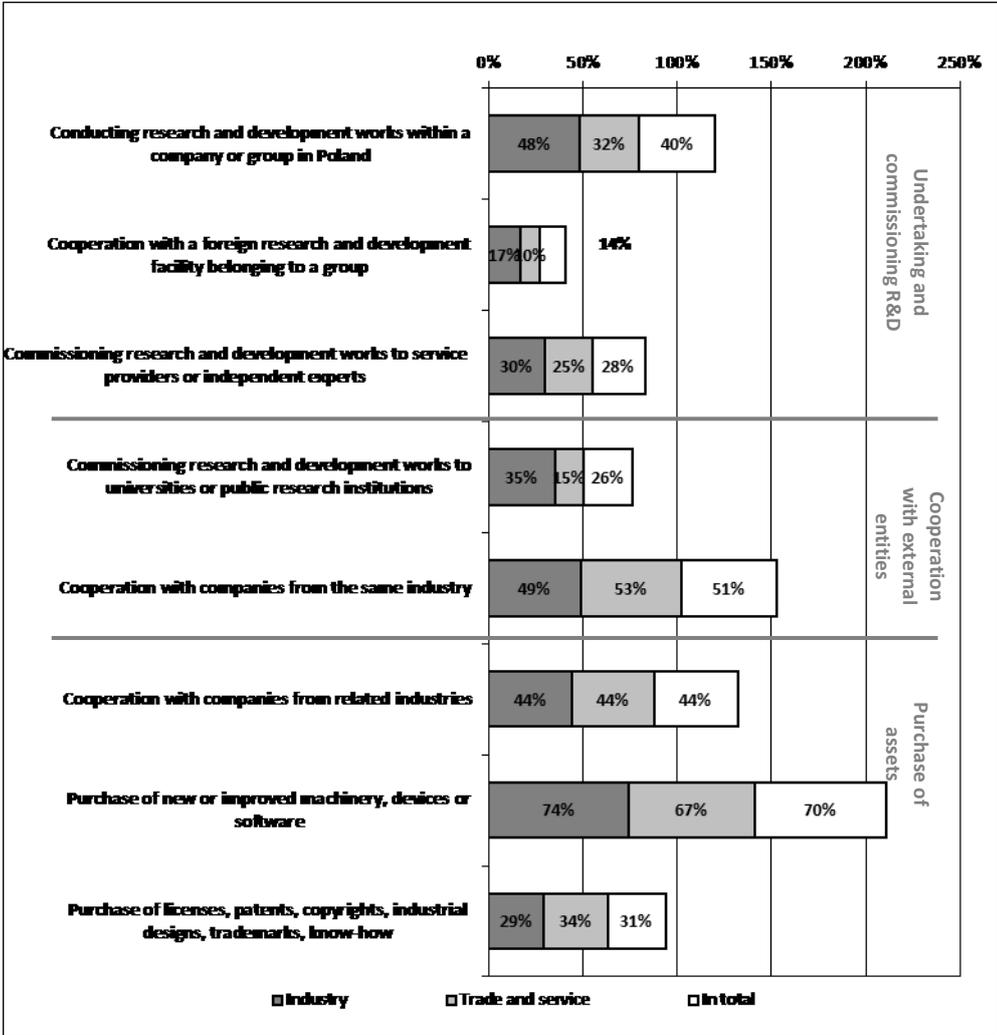
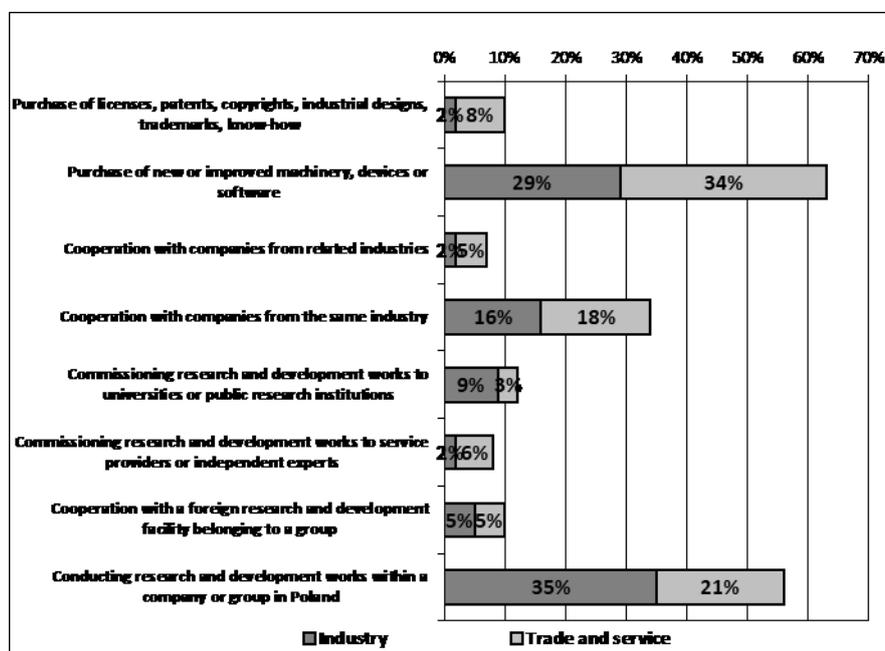


Fig. 1. Activities undertaken in Poland to create innovation
 Source: Our own work based on KPMG in Poland. Innovative maturity of enterprises in Poland.
 KPMG cutting through complexity, kpmg.pl.

Companies rarely admit that they are non-innovative (in studies, 10% of industrial companies and 14% of commercial companies defined themselves as non-innovative); they are reluctant to do so even when they have not conducted such activities. Companies that are not very innovative undertake some activities in this area, but these are sporadic in nature and do not have the form of a defined or even a signalled strategy. Such companies make up 32% on the Polish market in the industry sector and 42% among commercial and service companies. Experienced in innovations are companies that treat innovativeness as an important objective of their activities and possess instruments that allow them to effectively work on innovation. However, innovation leaders (14% of industrial companies and 10% of commercial and services companies) are distinguished by one important characteristic – the innovations they implement bring significant and real benefits [25].

Effective innovation-oriented activities are more often recorded by companies that operate beyond the Polish market, exporting their products or services, but this seems obvious, as only excellent, innovative products or services have a chance of becoming known in foreign markets [32].

The subject of innovativeness is equally popular in other European Union countries. We face serious challenges, i.e., climate change, energy scarcity, and demographic changes, etc. [11]. These challenges mean that research and development are very important. What is more is that research, technology and innovations have an impact on the creation of safe jobs. This means that research and development have never been more important.



N = 360 (A total of 190 industry and 170 trade and service companies that in recent years have conducted innovation activity and indicated its dominant form).

Fig. 2. Dominant forms of innovation activity in Poland

Source: Our own work based on KPMG in Poland. Innovative maturity of enterprises in Poland. KPMG cutting through complexity, kpmg.pl

Innovation involves the application of research findings, new products, services and processes that will allow social problems to be solved, bringing tangible benefits. Innovations make our lives easier, better and more comfortable [19].

In Austria, the approach to innovativeness significantly differs from the Polish one. Innovativeness is, first and foremost, treated as a process of raising awareness and a foundation of the country's future. The adjective "innovative" has for several years been used in the colloquial language to describe something as "new" and "modern". If the word is used in a professional context, it has another important aspect – economic success [16].

Austria shows strength in the area of national systems of research and innovation, in which a key role is played by innovative entrepreneurship and higher education. The Austrian economic sector has very high rates of research and development investment and leads the way in filing patent applications. The country also has a well-developed sector of higher education, which is closely cooperating with industry/business [30].

The federal government has created appropriate legal frameworks that foster research.

Austria is also an attractive place for international companies, such as Infineon. This enterprise is investing in research and development in Austria. Within the last year, Infineon allocated 219 million Euro for research, becoming the most powerful research company in the country.

The potential of the entire society is recognised in research, technology and innovation. Therefore, the government allocates large amounts of money for education. It promotes talent, provides children with opportunities of development and helps the youth to choose their careers well [33].

Innovation is very actively promoted by the Ministry of Transportation, Innovation and Technology as well as the Austrian Agency for Research Promotion.

Thanks to large investments in research, development and technology, Austria is currently leading the way in several research areas (e.g., every third solar panel is produced in Austria, and the Austrian method of tunnelling is used to build most tunnels). Despite the economic crisis, Austria succeeded in remaining among the top countries showing market innovativeness, and it has not decreased investment in development. Austria is in the top group of innovation leaders, together with Germany, Denmark, Finland and Sweden. This group of countries was named strong innovators. These countries are above the EU average.

3. Overview of Polish and Austrian empirical studies in the aspect of enterprises' innovativeness

In 2013, comprehensive studies were conducted on the innovativeness of Polish enterprises. In these studies, commissioned by KPMG, representatives of the managerial staff

in Polish enterprises (chairmen, vice-chairmen, directors, members of boards of directors and managers responsible for development, quality management, marketing or sales) were asked about the importance of innovation in the activity of their companies [35]. Almost 500 large and medium-sized companies representing industry, trade and services were analysed. The basic aim of the study was to determine the scale of innovation activity of these enterprises and to understand the importance of innovation for their development. The studies showed that 78% of enterprises worked on various types of innovations, and 60% of enterprises from the sector of industry worked on innovations in the area of products and services, while 46% of services and commercial companies concentrated on organisational innovation. These studies also showed that almost one half of the companies perceived their strategic objective in innovativeness, although only in every 10th enterprise could a person responsible for innovation be found among members of boards of directors [17]. Innovativeness is very often achieved as a result of cooperation with external institutions – the study shows that 51% of companies cooperate in this respect with other entities from their field. What is important is that these activities are evaluated positively. Investments were more profitable in industrial companies – almost 90% of those surveyed indicated better effects. The innovation market is prospective: over 80% of companies plan to increase their investments in this area in the future, and 83% of companies predict expansion of activities connected with the purchase of modern machinery, devices or software. Every sixth enterprise in Poland wants to concentrate on expanding cooperation with external institutions. Studies showed that companies concentrated more on the adoption of existing practices from the market than on developing new ones – this approach was confirmed by 65% of companies. The Polish economy lacks recognised leaders – only 17% of industrial companies and 13% of commercial and services companies are experienced players on the market of innovations or leaders in this area. Enterprises that are not very innovative, or even non-innovative, still constitute the majority [21].

Studies of the Polish market focusing on innovativeness, its development, and recognition of this problem show that the majority (78%) of medium-sized and large companies concentrate on innovation to a varying extent, with the industrial companies (62% of the companies surveyed) concentrating on product and process-related innovations, while organisational innovations represent the domain of trade and services (46% of all the innovations) [26]. Companies note that investment in innovations leads to improvement in the quality of products and services, allowing a positive image of the brand to be built, which results in increased sales of products or services and strengthened competitiveness [28]. Naturally, there are companies that, despite being aware of the importance of innovation, do not undertake innovation-related activities, as they do not have sufficient financial resources for innovativeness but also think that this is not necessary or indispensable for the profile of their activity or scale (there is a strong belief that innovations are the domain of large

companies) [18]. Innovation refers to both company strategies and organisational culture in a broad sense.

Main innovation works include purchases of new machinery and devices as well as software with better parameters. Fewer companies see the possibility of innovations in intangible assets, i.e., licences, copyrights or industrial designs. What is important is that innovation is very often an effect of cooperation. Competition between companies does not prevent them from working together on innovations and implementing them. Companies note that such activities are profitable and effective; it is especially visible in the case of commercial and services companies [8].

A large segment of works on the implementation of innovation is research and development. They are commissioned to external institutions or conducted by companies themselves. Polish industry is largely supported in this area by universities and public institutions, but less by commercial institutions [31]. Trade and services companies rely less on cooperation with external institutions in the area of innovation and more often approach commercial institutions [23]. However, every industry regards cooperation with various entities as necessary and beneficial. A mark of success is to earn one's own, satisfactory return on such investment. This is visible particularly in the case of industrial companies. Innovations most often improve the quality of products and services, from which the brand of a company usually benefits as a whole, whereas service or commercial companies note improvement in the quality of customer service. In the long-term, this contributes to a visible increase in sales and improved competitive position. A benefit of implementing innovations, which can be received by a company, is a decrease in investment costs, although this is, according to entrepreneurs, the most difficult goal to achieve [7].

According to the latest report "Innovation Union Scoreboard 2017", Poland, which has an innovation index of 54,8, belongs to a group of countries with moderate innovativeness, called "moderate innovators". It is ahead of Ukraine (28,9), Romania (33,8), Macedonia (44,2) Bulgaria (47,5), Croatia (54,7). In comparison with 2016 and 2015, Poland remained in the group of moderate innovators [29].

Switzerland is the leader in the general classification. In 2014 and 2015 Sweden was the leader of innovation in the general classification. The fastest developing innovators include Malta, Latvia, Bulgaria, Ireland, Great Britain and Poland.

Poland is below the EU average for most indexes. Its weaknesses include the share of foreign postgraduate students outside the EU, the number of patent applications in the area of social changes/challenges, R&D expenditure incurred by business, revenue from licences and patents sold abroad, and newly graduated PhD students.

However, its strengths (above the EU average) include investments in innovativeness other than R&D, the share of the population who have completed higher education and the share of those with at least secondary education. The index of the community design is at the level of the EU average.

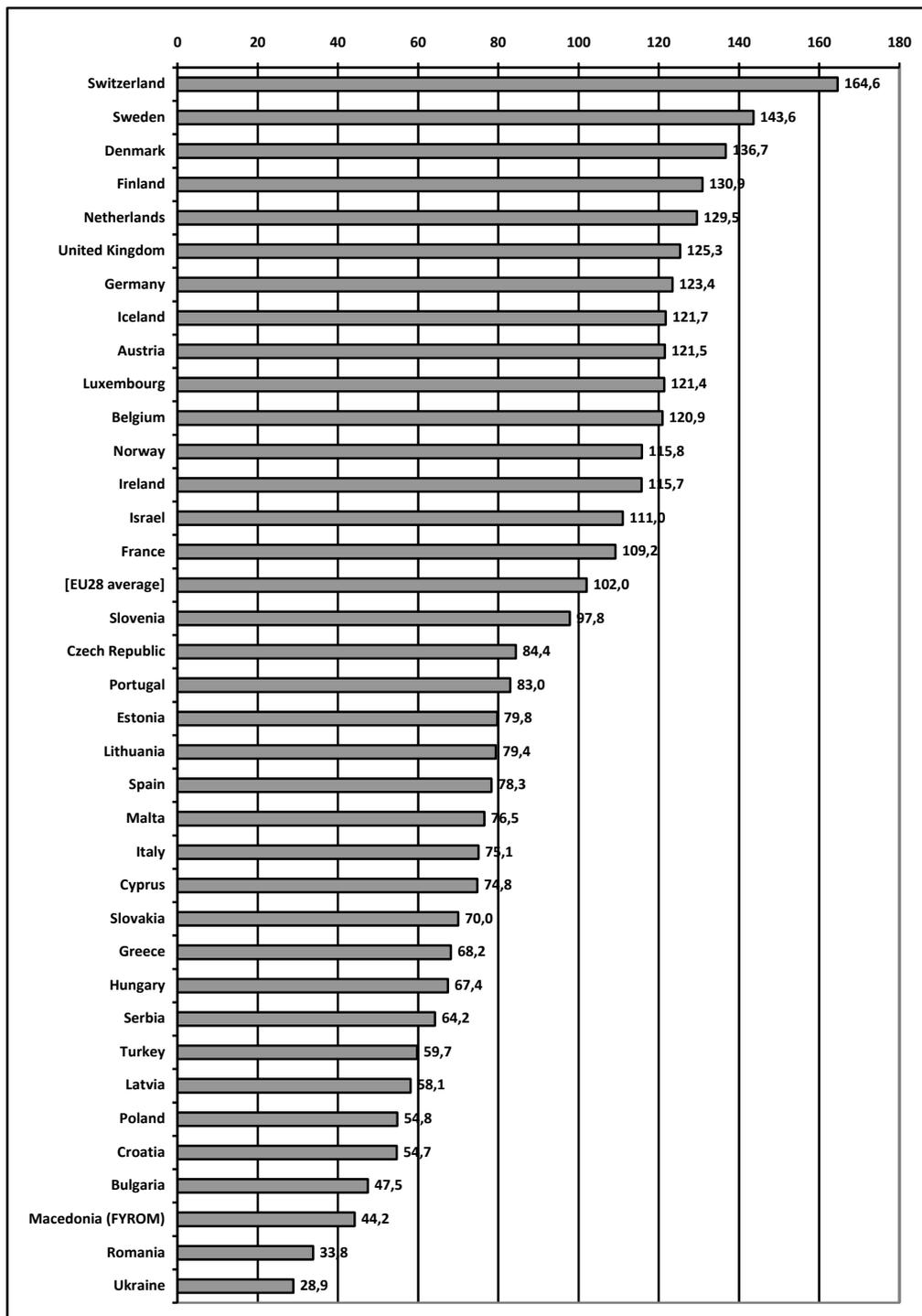


Fig. 3. Innovative potential of EU countries

Source: Our own work based on *Innovation Union Scoreboard 2017*.

A high growth rate was observed for the following indexes: community designs, community trademarks, R&D expenditure in the enterprise sector and the share of the population who have completed higher education.

A negative growth rate was recorded in the following areas: cooperation in the area of innovation between SMEs and other entities, internal innovations in the SME sector, share in

the sales of innovative products, product- and process-related innovation activity, marketing and organisational innovations, and newly awarded PhD titles.

Poland is a moderate innovator. Innovativeness is rather unstable. An increase in innovativeness was recorded in 2007 and 2011. A decrease occurred between 2012 and 2013, whereas 2014 saw another increase compared to other EU countries [20].

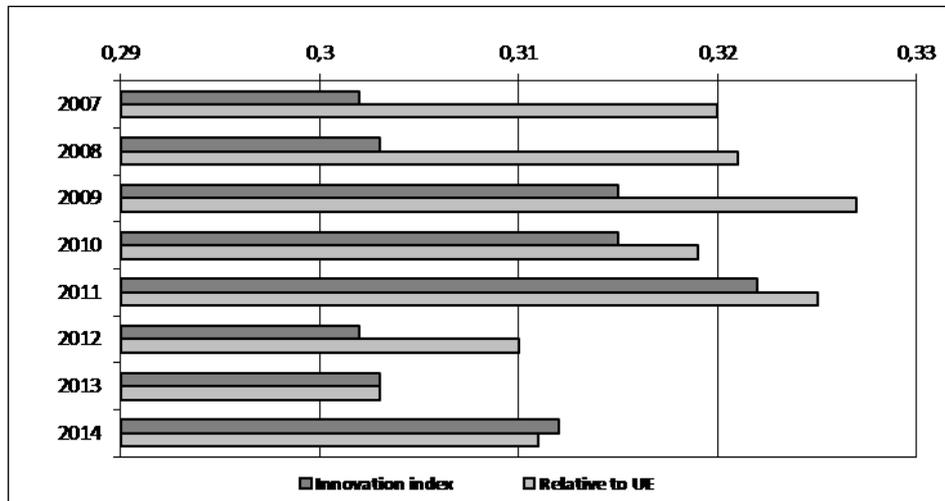


Fig. 4. Increase in Polish enterprises' innovativeness versus other EU countries between 2007 and 2014

Source: Our own work based on *Innovation Union Scoreboard 2016*, p. 65.

Research, technological development and innovations are key factors of Austrian companies' competitiveness on the global market, determining the prosperity of the entire country [4]. The Austrian government created conditions fostering the development of innovativeness. Since 1998, we have recorded increased expenditure on research and development as well as investments in the development of science and education. In this context, one of the basic and universal indexes used to evaluate innovativeness of economies is the so-called GERD (*Gross Domestic Expenditure on Research and Development*) in relation to GDP. The report published by Eurostat shows that Polish companies spend only 0.38% of the GDP for research and development. Meanwhile, companies from Austria (3.76% of GDP, almost 2.5 billion was invested in research in 2014), Germany, Belgium and Denmark drive innovation in this sector [24]. The statistics in the report included expenditure on research and development, understood as amounts allocated for the development of knowledge databases, including the knowledge of societies and their members and the use of knowledge databases for developing new devices, products and services.

A high level of expenditure on R&D in Austria is, to a large extent, a result of a good level of economic development. Austrian structures of industrial production are characterised by the participation in high tech products and large involvement of foreign investors in conducting research and development work. We can also observe that the sphere of science in Austria shows considerable interest in conducting applied research and development work

[22]. The cooperation between the sphere of business and the world of science is functioning well; therefore, expenditure on research and development in this country is also connected with the use of private capital to finance research and development, particularly in the pharmaceutical, IT and office equipment industries. In Austria, a large part of funds for the development of innovativeness come from foreign investors, which to a large extent allowed this country to achieve its position as a leader. In Poland, budgetary appropriations constitute the dominant source of financing. Funds coming from enterprises constitute only one third of the outlays. On average, 50% of funds are allocated by enterprises in the EU for this sphere of activity [3].

A high level of investment in research and development implies an impressive level of innovation. Obtained patents are a measurable effect of expenditure incurred for R&D. Based on the commonly used measures of innovativeness of economies in the form of three types of indexes, i.e., the number of patent applications, the number of patents granted and the number of patents cited, Austria is one of the leading EU countries in terms of filed patent applications and registered patents [14]. AVL List GmbH (development of propulsion systems and combustion engines) was at the top for the fifth consecutive year. In 2010, the company Siemens AG Austria held the second position. In third place came the Zumtobel Group (light industry), which has patents for 22 inventions. In 2010, the Zumtobel Group was represented for the first time in the ranking of Austrian inventions [3].

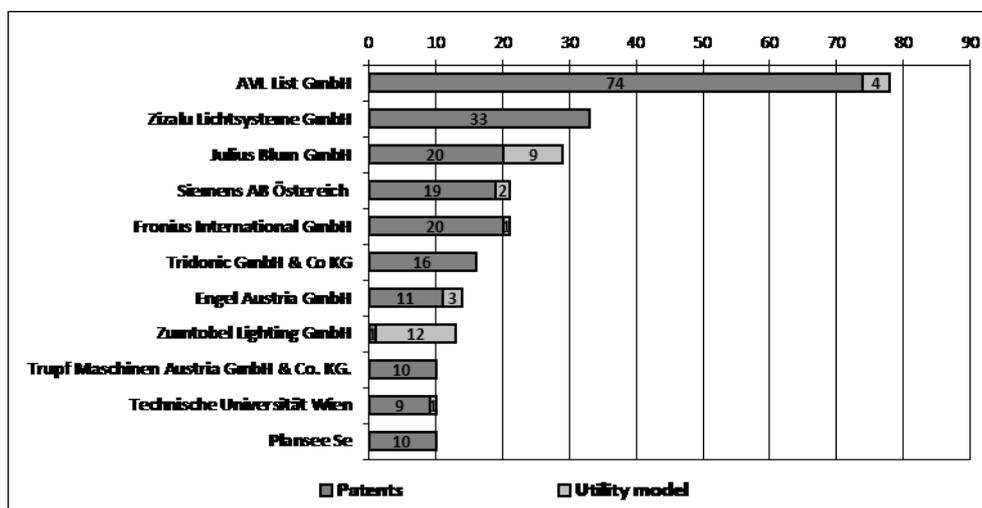


Fig. 5. Ranking of inventions in Austria. Inventions registered by Austrian companies in the Austrian Patent Office

Source: Own work based on Austrian Patent Office www.patentamt.at [access date: 10.10.2016].

In 2014, the second position in terms of implemented innovations was occupied by Zizala GmbH (lighting), while Julius Blum (furniture and assembly tools) came third. AVL remains in the top position with 74 inventions.

Due to the specificity of the Austrian economy, most inventions are in the field of working practices and transportation (25.5%), engineering (18.6%), including lighting and heating (15.7%). Patents held by Austrian companies reflect the stability and attractiveness of the localisation of companies in Austria. Austrian companies are competitive in the international arena [13].

Statistics of the Austrian Ministry of Transportation, Innovation and Technology show that 96% of Austrian companies see potential in innovativeness. Enterprises take advantage of financial possibilities to improve qualifications of their employees and invest in technology. According to studies conducted by the Ministry, investment in development and innovations not only increases the effectiveness of companies but also leads to significant increases in employment [12].

Since 1998, Austria has been strongly supporting the creation of new patents and the implementation of new solutions in the area of organisation and management of organisations. However, Austrian companies led the way in innovativeness among EU countries until 2009 (Austria occupied the sixth position next to such powers as Germany or Sweden, but now it has fallen to 11th place. It is behind France – see Fig. 1) [14]. For Austria, 2010 was a critical year. The overall economic crisis slowed down the overall pro-innovation tendencies in EU countries. However, the strong Austrian economy maintained the innovation trend at a relatively high level compared with its neighbours. To this day, it has been maintaining the position of European leader in this area, and its dynamics of innovation development is 5% higher than that of other EU countries.

Small and medium-sized enterprises constitute a large share of Austrian companies. In 2013, there were 324,709 registered companies operating in the market. Between 2012 and 2014, 54% of Austrian companies released new or significantly improved products, improved processes in a company, organisational innovations, marketing innovations or innovative activities aimed at the optimisation of processes occurring in enterprises [10].

Discussing the innovativeness of Austrian enterprises, one cannot overlook the biotechnology sector. Austrian enterprises in this sector are also among international leaders. They develop vaccines and new pharmaceutical active substances to combat diseases that are harmful to humans. A significant number of companies are engaged in research, making up 21% in the biotechnological industry [27].

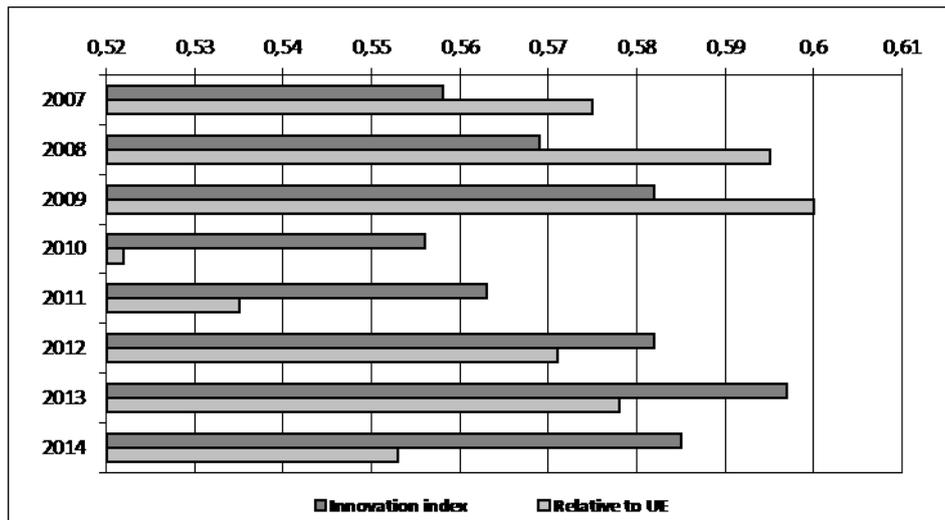


Fig. 6. Increase in Austrian enterprises' innovativeness compared to other EU countries between 2007 and 2014

Source: Own work based on *Innovation Union Scoreboard 2016*, p. 64.

Austrian pharmaceutical companies are primarily small and medium-sized enterprises, with large companies constituting only 10%. The largest biotechnological enterprises in Austria include, among others, Baxter, Amgen and Novartis [32]. An example confirming that Austrian enterprises are among the best in the world is Vienna-based start-up Apeiron. In 2010, the company signed a license contract with the international pharmaceutical concern GlaxoSmithKline regarding new drugs that are used to cure lung failure as well as for other diseases.

Another example is a company established in 2006 as a spin-off of Vienna Veterinary University, Marinomed Biotechnologie GmbH, which develops natural materials used as medicines for immunological system diseases and allergies as well as infectious diseases. The first product of the company was an antiviral nasal spray, which in 2008 was approved as medicine across the EU. Another success story from Austria is the company Apomedica. The production of anti-cold balsam Luuf®, which started in the 1960s, initiated the growth of this thriving company, which has extended its activity far beyond Austria. Currently, Apomedica is a leading supplier of high quality pharmaceutical products. Excellent infrastructure and proximity of emerging Eastern markets have created ideal conditions for biotechnological enterprises in Austria. Research facilities, start-ups and well-known enterprises from the biotechnological industry are concentrated in Vienna. There is great potential in the area of life sciences that can be exploited in cooperation with universities and research facilities.

Conclusion

There is no doubt that in future years, innovativeness in Poland will determine all activities of individual companies, with the scale of innovation activity growing. This will result from the fact that companies themselves have noted that innovation is a measurable benefit, but innovation activities will also be forced by the market – we can see strong pressure on innovativeness both from Polish decision-makers and the European Union. The focus will still be mainly placed on activity in the area of products or processes, while less noticeable innovations will be related to organisational and marketing issues.

We can also observe an overall trend showing that companies that have already implemented innovation programmes or strategies will in the future improve successful activities, in which innovations have already been implemented. This undoubtedly shows to some extent the innovative maturity of Polish companies, but the Polish market, or the economy, is only at the beginning of its way to innovation. An increase in innovation activities or their maintenance at the current level will be ensured by the intensification of research and development – within companies and with the support of the public sector.

Austria is a strong country in terms of innovativeness. Unquestionably, it is a leader in the areas of pharmaceuticals, furniture and lighting techniques. Austrian small and medium-sized enterprises are among the most prosperous in the EU. They have a long tradition and are renowned for the implementation of innovative projects. Enterprises use the assistance and co-financing from the Ministry, take advantage of financial possibilities to increase knowledge and ensure the development of employees, and invest in technology. The use of the latest technologies allows them to make significant savings.

Austria shows strength in the area of national research and innovation systems. The Austrian economy shows very high R&D intensity and leads the way in filing patent applications. It also has a well-developed sector of higher education, which is closely cooperates with business. The innovativeness of Austrian companies is reflected not only in creating or releasing new products, but it is also visible in the management and organisation of the structures of an enterprise.

The most innovative and unconventional activities always pose the highest risks and may cause measurable losses, but in case of success, they bring real profits and long-term benefits. Although innovativeness is difficult to measure and comprises a range of different aspects of the activity of companies, it is necessary that entrepreneurs recognise it as an indispensable element of functioning in the market, or even surviving, as innovativeness determines competitiveness, and the achievement and maintenance of advantage among similar entities and profits.

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