CONDITION AND PROSPECTS OF INNOVATIVE ACTIVITY IN THE STEEL INDUSTRY IN POLAND

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Abstract

Polish steel industry makes good use of the macroeconomic conditions of the Polish economy. GDP grew by 4.3% in 2011. The main stimulus for growth came from the investments in infrastructure, high domestic consumption and export. They had a positive impact on the steel industry in particular. Steel consumption in Poland increased by 11% in 2011 reaching the level of 11 million tons. The membership in the EU and access to structural funds have created a number of opportunities for the steel industry.

The beneficial situation in steel production (a rise of 10%) and in its domestic consumption (a rise of 11%) have significantly improved the financial situation of steel companies. The financial result was positive, the rate of return amounted to 3.5%. A significant cost discipline of enterprises greatly contributed to the result. The cost optimization has its limits, and thus this aspect of building competitiveness is slowly running out. Innovative activities constitute a key element of development. Innovation rarely occurs in isolation; it is a highly interactive process of cooperation in the growing and diverse network of stakeholders. Enterprises gain knowledge from many sources through partnerships, alliances and joint ventures or through acquisition of knowledge in the form of agreements for conducting R&D or purchased licenses. The cooperation is becoming a means to extend the scope of development projects, a way to complement the enterprise's competence. A new period of research funding and regional activities at the level of regional innovation strategies offer new prospects for innovation.

Keywords: innovation, cooperation for innovation.

1. STATE OF POLISH STEEL INDUSTRY

Poland's economy was growing at a relatively high and stable rate. The Gross Domestic Product grew by 4.3% in 2011 (0.4 percentage points higher than a year earlier). The main drivers of growth were investments, domestic demand, and exports. 2011 saw the metal industry in Poland growing very rapidly. Manufacture of metal products in 2011 was higher by 18.5% than in 2010 (structural metal products as high as 24.8%) while metals shipments increased 12.0%. The manufacture of machinery and equipment in Poland reported a decline for the third year in a row. In 2011 it was lower 3.6% as compared to the previous year. The automotive industry in Poland is one of the key sectors of the national economy. The automobile industry shipments in total (including all types of vehicles, spare parts and engines) increased by 13.6% in 2011 compared with the previous year. Production of passenger cars in 2011 in Poland was lower than the number realized in 2010 by 5.6%. The decrease in the output was due to lower sales of new passenger cars in Europe and to reduced number of cars manufactured in the factories of Fiat (-12.3% in Poland). The two other major producers: Opel and Volkswagen, produced more cars than last year, up 9.6% and 18.6%, respectively. There was also an increase in the production of trucks (up 15.2%) and public transport vehicles (up 11.5%). The home appliances market in Poland, after two years of stagnation, recovered by several percentage points. In 2011, manufacturers of large equipment and household appliances in Poland have produced 4.0 million units of washing machines (up 0.2%), 1.7 million units of refrigerators and freezers (down 6.3%), and 1.2 million cookers (up 1.2%). There are currently 25 factories of home appliances.
Approximately 80% of Polish production is exported. Poland is one of the leading manufacturers of white goods in Europe.[1] The SWIP index (Steel Weighted Industrial Production), linking levels of manufacturing activity in the steel-consuming sectors with domestic consumption, rose 14.8% in 2011 compared to 2010, and was the highest since 2007. Buoyant economy and high investment expenditure to infrastructure projects resulted in greater activities in the construction and construction related industries. The first phase of infrastructural projects created opportunities for the development of many fields associated with the production of investment and consumer goods. The second phase regarding investments to energy and railway industries is yet to come. It will require new materials and new services. New needs for metal processing, specially products and designs may significantly contribute to increased demand for steel products. [1] This is, however, a significant challenge for manufacturers. It must be faced if the Polish steel industry is to take advantage of the opportunity. Currently, there is a potential to make it happen. It should be noted that despite the slowdown inside the Union market, manufacturers in Poland have managed to meet the challenges caused by fluctuations in the market and what’s more, in spite of the global trends, to increase domestic steel production. Several factors contributed to the situation: high domestic demand driven by timely realized steel-consuming infrastructure investments and good condition of the metal industry. Steel consumption in Poland in 2011 increased to 11.0 million tons. The increase in steel consumption, contributed positively to its production, which increased by 10% y / y. This led to better utilization rate of steel production from 65% to about 70%. In 2011 Poland produced 8.8 million tons of crude steel, almost 10% more than in 2010. Polish participation in the total EU steel production amounted to 5% and remained at the same level as in 2010. The share of the steel melted in the converter process for the first time in three years was higher than that of steel produced in the electric process. In the production structure of crude steel of different types, there have been few insignificant changes. In the total amount of crude steel melted in Poland, non-alloy steel constituted 94%, and alloy steel 5.9% , whereas corrosion resistant steel 0.1%. Production of hot-rolled finished products, amounted to 7.5 million tons in 2011, an increase of over 9% compared to 2010. The production structure of hot-rolled flat products amounted to 34.4% and long products to 65.6% (4.93 million tons). In the group of long hot-rolled products production of bars amounted to 2.2 million tons, an increase of 12.9%. As for hot-rolled flat products, the main products were strip, with the production at the level of 1.8 million tons. As for cold-formed products, a minor decrease was recorded in 2011 against 2010 for all types of products.

Good situation in steel production with an increase of 10%, and concurrent increase of 11% of domestic consumption, have significantly contributed to improving the financial situation of the steel companies. Revenues were higher than in 2010 by almost 29%. The financial result was positive with profitability of 3.5%. Such result can also be attributed to the increasing cost discipline of companies. Cost optimization is a basic strategy to remain competitive in the market. Unfortunately, there must be a limit to such activities because the cost structure of production is already close to optimal. In order to improve the competitive position of the dwindling opportunities of cost reduction, an increase of activity in the field of innovation becomes a necessity.

2. INNOVATIVE ACTIVITY AS A MODERN CHALLENGE

Ongoing globalization, the greater impact of competition, escalating crisis phenomena and also new opportunities for cooperation all pose new challenges in the field of management. They apply to both large organizations (often powerful corporations) as well as small and medium-sized enterprises. These challenges are often associated with changes in the management at strategic and operational level. The dynamics of enterprise management systems of the organizations shows their desire to increase the competitiveness and efficiency. A sign of the ongoing changes are primarily the new rules and the structure of business models (being a description of the business idea), where the specific role is played by different
forms of innovation. Thus, such business models which are able to generate and diffuse innovation are becoming more and more important. Determining their role and significance in the adopted and implemented policies and operational activities carried out by the enterprises often decide about achieving by a company a competitive advantage and revenue. Building a competitive advantage is increasingly possible because of the ability and effectiveness of the company to introduce various types of innovation, both own solutions as well as the innovations applied due to their transfer or diffusion. Thus, in recent years the issue of the business models construction capable of applying innovation has been of great interest of both practitioners and theoreticians of management. Certainly the interest is connected with the policy aimed at innovation growth which is pursued by all developed countries.

Innovative activity means engaging of enterprises in all kinds of scientific, technical, organizational, financial and commercial activities which lead or are intended to lead to innovation. Some of these activities are of innovative character, while others are not new, but they are necessary to implement innovation. Innovation activities also include research and development (R & D), which is not directly related to the creation of a specific innovation [2]. The easiest way to define innovation is to say that it is implementation of new ideas into practice [3]. The "Oslo Manual" defines two types of innovation: product innovations and process innovations that can be understood as the introduction of a new product, process or substantial improvements in products or processes. Such innovations are introduced if a new product is brought into the market (product innovation) or used in the production process (process innovation). [4]

Innovation is the path to new solutions and is the phenomenon associated not only with creativity but also the ability to apply innovation. It is an attribute of competitive entities whose competitive advantage is based on innovation. These can be very different types of innovation. An opportunity to build competitive advantage is related to the distinction of two main types of innovation, i.e.:

1) Incremental innovation – these are mainly innovations aimed at improving products and production processes. They are usually introduced systematically, allowing for a gradual increase or maintaining competitiveness. They can be considered as a factor which continuously and linearly affects the growth of competition.

2) Radical innovation - this type of innovation creates not only new technologies and products but also new business concepts. Its abrupt, almost revolutionary nature often ensures relatively constant competitive advantage while creating new conditions for competitiveness. [5]

Building of a competitive advantage is more and more often possible because of the ability and effectiveness of a company to introduce various types of innovation. There is an increasingly visible trend of cooperation, building pro-development partnerships between companies, research institutions and self-government for the diffusion of innovation [6].

In one of the major studies on the construction of business models A. Afuah [7] presented an enterprise's business model as a set of activities, methods and time needed for their implementation, using own resources to create the highest value for the customer and ensure the position for taking over values. The author claims that innovations can be applied practically in all of its elements and they are necessary for creating value for the customer. Using the previously presented division of innovation into radical and incremental G. Hamel states that the business model is the result or a form of the innovative business concept created by him (business concept innovation) [8]. To use a business model to carry out radical (revolutionary) innovation, it should be treated as a whole composed of many co-working elements. G. Hamel proposes such a model as a configuration of four main components:

- basic strategy,
- strategic resources,
- communication and relationships with customers,
- the value of the network [9]

In the functioning of the steel companies in Poland, innovative activity corresponding with presented business model components can be identified. Such innovation activity constitute research & development. In the scope of cooperation between steel industry and technical universities numerous research projects have been conducted. Most of the studies concern the increase of production efficiency and improvement of the finished products quality. However, the studies related to new types of products are more and more significant. As a result, the development of the steel industry has an increasing impact on the behaviour of final customers of the branches who use steel to generate investment and consumer goods. Listening to customer needs and the development of valuable, long-term relationships is becoming a key factor of success. It should be noted that in the last 10 years Poland has become an attractive location for numerous large factories belonging to multinational corporations of such industries as household appliances, audio/video devices, automotive, machinery and equipment, computers and others. Domestic steel metallurgy and related industries, as suppliers and partners, have thus entered the group of industries which are considered important to the state of national economy. Steel companies have begun to participate in the value chains of these industries. The result of listening to the market needs also contributed to the significant share of the Polish steel industry in the development of EU-financed infrastructure. Poland has successfully used its EU membership, including access to structural funds. The first stage of implementation of infrastructure projects in Poland, co-financed by the EU, created an opportunity for the development of many new areas related to production of investment and consumer goods with the use of steel. The second stage, relating to the investments in power generation and railway is ahead of us, providing the chance for further development of the processing industry and services connected with that industry. Investments in technology and specialist products for the needs of the second stage will include both solutions regarding functionality of products in accordance with customer requirements, as well as proactive measures to enhance functionality of the solutions involving these products. Many valuable solutions may arise if industry expectations and suggestions of R & D centres are confronted at the same time. However, this is a difficult task because when creating specialized products, it is essential to use a wide range of the latest technologies. Being aware of the great challenges facing the industry the initiatives of building networks for effective development are undertaken.

Polish Steel Technology Platform (PSTP) is an example of the cooperation network. It was established in December 2005 in Katowice. About 40 entities declared participation in the Platform, half of which are steel mills and industrial companies, and the other half are scientific organizations and associations working for the steel industry in Poland. The strategic objective is: a sustainable development of the Polish steel industry, in accordance with the guidelines adopted for this industry in Europe, and at the same time adapted to domestic circumstances and realities. The key tasks of the Platform are:

- Identifying common development problems of the pre-competitive business scope of steel companies,
- Preparing a development vision and the Strategic Research Programme (SRP) for the steel industry in Poland.

While preparing SRP it was agreed that the main areas and research directions of SRP will be consistent with the European Steel Technology Platform (ESTEP). It was acknowledged that the research needs of the national steel sector will be included in the form of - taking into account local conditions - research problems coming from the areas and research directions included in ESTEP Programme and in the form of additional research directions introduced to the ESTEP Programme.

Implementation of the Programme will take place through the launch of research projects designed to address specific issues within the scope of the Programme. [10]. Some of these objectives can be undertaken in the framework of the so-called cluster platform. Geographic concentration of interconnected companies, specialized suppliers, service providers, firms operating in the related industries and associated R & D institutions in various fields, competing but also cooperating in the framework of the project testing
innovative tools and products is a very desired phenomenon. Although the decision-making power, having the real impact on the development strategy of the project will be in hands of the biggest corporations, yet smaller companies, if they can be properly active and make their own contribution, are essential in the structures of such cluster platforms.

Another technical and technological challenge for the industry is to improve efficiency and energy use savings in order to meet the challenges of the third energy package and climate policy. The costs which must be incurred for the implementation of climate policy in the sector are very high, but if this is not done, the price which will have to be paid in the future will be even higher. A regional context is also important for innovation activities and it will be exemplified by the Silesian Province.

3. REGIONAL INNOVATION STRATEGY OF SILESIAN PROVINCE AS A NEW PERSPECTIVE OF INNOVATION

Silesian Province is a region of a successful restructuring. After more than 20 years of systemic change that shook the foundations of the traditional industries such as mining, metallurgy, energy and textiles, we are witnessing a stabilization process of a new scientific and economic structures in the region.

In the knowledge-based economy - building networks, developing and maintaining relationships, setting up partnerships and cooperation enable different types of organizations to use and multiply their capital, use the knowledge and experience of others, achieve synergies, which has an important impact on the local and regional development. Competitiveness of, among others, European economy involves two issues: the ability to create social networks and provide the environment conducive to creativity and innovation. Innovations at the same time are not incidental events but a continuum, a process which results from the interaction of interdependent organizations, which through extensive contacts acquire the necessary specialist skills. Ability to work with others, as part of the innovation ecosystem, is beginning to be seen as decisive for the development of innovation [11] Ecosystems are defined as the intentional community organizations whose individual activities are largely dependent on the whole community. The key components (platforms) of the innovation ecosystem include: technology transfer / commercialization, internationalization, research / strategic intelligence, education and development, innovation, communication, promotion and funding of innovation.

The main idea of the innovative development of the Silesian Province for 2014-2020 is: innovation ecosystem of the Silesian Province based on dynamically changing innovative environments. The updated Regional Innovation Strategy involves the development and transformation of the regional innovation system into the ecosystem of innovation. The perspective of the ecosystem means: the mutual development of the processes, generating solutions not distinguished in terms of functions but naturally permeating in theme systems and coexistence and interaction of actors in building relationships in a variety of configurations depending on their common aspirations and conditions of the surroundings.

The ecosystem is characterized by an atmosphere and conditions beneficial for innovation and the ability to self-improvement. It generates coordinated measures to strengthen the elements and internal connections, and on the other hand, acquires resources and relations on a larger scale, skilfully using the advantages and superiority over others.

The priorities concerning the development of the innovation ecosystem are:

1) Increase and internal integration of the innovation potential of the region. This priority is connected with the continuation of the current efficient and effective projects which strengthen the readiness of companies, institutions and society in the region to take new challenges and implement innovative scientific and economic projects of key importance for the development of the region. This does not mean simply continuing the current activities but their validation, specification, the development of a
new type of infrastructure and services, and increasing the scale of interactions in the innovation ecosystem in the Silesian Province. The objectives consistent with this priority will be implemented in incremental development processes.

2) Creating intelligent markets for the technologies of the future. This priority applies to opening businesses, institutions and society in the region for the participation in value chains and the use of new business models in connection with the widening transformation scale in the direction of so-called intelligent markets and pro customer behaviours related to them. The essence of this priority is to strengthen the powers of both servicing such markets from the technological and social (consumer behaviour) perspective, and to build long-term abilities to create such markets and participate in them. The objectives consistent with this priority are focused on making technological and product breakthroughs. [12]

The development priorities of an innovation ecosystem and regional innovation strategy of Silesian Province create new conditions for development of innovation in steel enterprises.

4. SUMMARY

Presented overview of the condition of the Polish steel industry gives grounds to conclude that companies in this sector have the ability to adapt. Despite numerous disturbances and trend changes they were able to respond to the changes expected by the market. However, current competitive conditions require further guiding of steel companies business models so that they are able to generate and diffuse innovation. The key issue here is a well designed innovative activity, which is becoming a strategic challenge. Building a competitive advantage is increasingly possible because of the ability and effectiveness of the company to introduce various types of innovation. The phenomenon of the formation and implementation of innovation is itself a complex, multifaceted issue.

Innovation rarely occurs in isolation, it is a highly interactive cooperation process within a growing and diverse network of stakeholders. Enterprises gain knowledge from many sources through partnerships, alliances and joint ventures or through acquisition of knowledge in the form of agreements for conducting R&D or purchased licenses. Cooperation is becoming the means for widening the scope of development projects, a way to supplement the competencies of a company.

A trend which is increasingly visible involves cooperation, building partnerships between pro-development companies, research and self-government institutions for the diffusion of innovation. Due to the concentration of companies, research centres as well as financial institutions an increased competitiveness of industries is achieved ensuring the so-called critical mass of industry in the region, necessary to carry out a given project. This awareness is becoming more and more common. The steel industry is also interested in this new form of cooperation. For effective adaptation of projects and proposals of the scientific and research community concerning technological and organizational innovations, cooperation within the network and cluster platform is needed. The more companies from one industry in a given region are able to create a platform for cooperation, the better. It is also important that the system of exchange of information, transfer of knowledge and scientific collaboration between individuals, businesses and other entities was real and beneficial. The presented example of Regional Innovation Strategy of Silesian Province shows that they will form a supportive infrastructure for building partnerships for innovation.

REFERENCES


