

THE COMPETITIVE CHALLENGES FOR THE POLISH STEEL INDUSTRY

Arkadiusz SZMAL

Silesian University of Technology, Zabrze, Poland, EU, arkadiusz.szmal@polsl.pl

Abstract

Metallurgical enterprises operate in a highly turbulent environment, the existence of which is a natural consequence of globalization and consolidation processes. When observing the contemporary sector of steel producers, it is interesting to observe that during the process of dynamic changes some companies gradually dominated it. Over a few years, the list of the largest steel producers published by *World Steel Association* has changed dramatically. What was the reason for such big changes? What factors contributed to the fact that in the turbulent environment some companies gain while others lose their positions? The improving situation on the market creates new opportunities. However, enterprises discouraged by the lack of development prospects in the industry and declining income are reluctant to make strategic investment decisions. Cost optimization was the basic strategy to remain competitive in the market. Unfortunately, there must be a limit such activities. The steel industry has faced new challenges to remain competitive on the market. Thus, the main objective of this paper was to present the key competitive challenges for the Polish steel industry.

Keywords: competitiveness, change management, innovation, cooperation for innovation

1. INTRODUCTION

The conditions important for the functioning of enterprises in the steel industry began to change significantly about twenty years ago. Currently, the conditions for competitiveness in the sector are completely different. Steel industry experienced a very particular wave of changes. Firstly, the demand for steel began to grow dramatically. The development of emerging markets vastly contributed to the situation. Moreover, various investments in the developed countries increased the demand for steel. Secondly, the competition in the sector significantly rose and the companies started to fight for a share of the market. This led to a price war, which reached its peak in the years 1999-2000. Years 2008-09 brought another crisis, this time related to a sudden decrease in the demand for steel. The key competence at the time proved to be a skill to adjust production capacity to the market needs. The changes in the list of the biggest steel producers are presented in **Tables 1 and 2** [1].

Table 1 The biggest steel producers in 2001

| Position | Producer | Country of origin | Production [mln. tons] | Market share [%] |
|----------|---------------------|--------------------------------|------------------------|------------------|
| 1 | Arcelor | Luxembourg | 43.1 | 5.2 |
| 2 | POSCO | Sourh Korea | 27.8 | 3.3 |
| 3 | Nippon Steel | Japan | 26.2 | 3.1 |
| 4 | Ispat International | India | 19.2 | 2.3 |
| 5 | Shanghai Baosteel | China | 19.1 | 2.3 |
| 6 | Corus | Great Britain/ The Netherlands | 18.1 | 2.2 |
| 7 | Thyssen Krupp | Germany | 16.2 | 1.9 |
| 8 | Riva | Italy | 15.0 | 1.8 |
| 9 | NKK | Japan | 14.8 | 1.8 |
| 10 | Kawasaki | Japan | 13.3 | 1.6 |

Table 2 The biggest steel producers in 2011

| Position | Producer | Country of origin | Production [mln. tons] | Market share [%] |
|----------|-----------------|-------------------|------------------------|------------------|
| 1 | ArcelorMittal | Luxembourg | 97.2 | 6.5 |
| 2 | Hebei Group | China | 44.4 | 3.0 |
| 3 | Baosteel | China | 43.3 | 2.9 |
| 4 | POSCO | Sourh Korea | 39.1 | 2.6 |
| 5 | Wuhan | China | 37.7 | 2.5 |
| 6 | Nippon Steel | Japan | 33.4 | 2.2 |
| 7 | Shagang Group | China | 31.9 | 2.1 |
| 8 | Shoungang Group | China | 30.0 | 2.0 |
| 9 | JFE | Japan | 29.9 | 2.0 |
| 10 | Ansteel Group | China | 29.8 | 2.0 |

The analysis shows high dynamics of changes and a clear shift in the sector towards developing countries, mainly China. Therefore, it is not surprising that the biggest steel manufacturers are looking for their business opportunities in these countries. Polish steel industry also contributed to the changes presented in the tables. In 2004 Mittal took over 69 % of shares in Polish Steelworks, which consists of the largest Polish metallurgical plants. In the following years Mittal took over an American company International Steel Group and metallurgical plants in Germany and Ukraine. However, it was only the historic takeover of 43.6% of shares of the British company Arcelor that gave Mittel the position of the largest metallurgical company in the world, which since 2006 has been known as ArcelorMittal. Polish metallurgical industry has been included in the global consolidation process which has a significant impact on its competitive position. Still, the question of what key competitive challenges face the steel industry in Poland remains unanswered. The article attempts to provide answers to the question.

2. COMPETITIVE FACTORS OF STEEL PRODUCERS

Due to the cyclical and predictable character of changes in the past, the activities of enterprises were based on long-term plans, whose aims were typically to increase resource efficiency. The economies of scale and scope were mainly used for the purposes. The experience of recent years has shown that such measures have ceased to produce the desired results. The most successful companies proved to be not those offering the lowest prices but those which can adjust their products and activities to ever changing surroundings and, in particular, to customer preferences. Customer orientation, disregard for the past and scenario thinking began to grow in importance [2]. The new situation initiated major changes in the business environment and as a result forced organizations to look for other ways to increase their competitiveness. The factors that cause turbulence and those responsible for the increase in the risk of running a business are worth analyzing. The most important are advances in technology and IT revolution and also the more and more common breakthrough technologies and innovations. Literature [3] indicates the areas in which companies should seek sources of competitive advantage at different levels of turbulence in the area. In the repetitive environment the search for stability is crucial and the organization itself can create a closed system. Such features prevail in strategies based on experience and cost reduction. With the increasing changeability of the environment, organizations should create more and more open systems [3]. Innovation and technological leadership are gaining importance and strategic effectiveness takes the place of operational efficiency.

When analyzing the competitive factors of the steel producers one should bear in mind the range of manufactured products. The analysis of the development of technology in steel production is important from the point of view of evolution of strategies and business models used by the steelworks. The products are rather homogeneous and of a low level of complexity. However, there is a large variety of steel products which often makes manufacturers opt for a specialization. In practice, some steelworks produce virtually the entire

range of products, some, however aim at specialization. It should be noted that despite the large diversity of products they are still not very complex, and, most of all, homogeneous. The content regimes of alloying elements are very clearly defined by the standards, which makes it difficult for companies to compete in the area of product differentiation. This does not mean, however, that companies producing steel are not looking for new products. New innovative alloys appear on the market. However, research on new steel requires substantial funding and time, and imitating new products by competitors is relatively simple. All of the factors may facilitate setting up large organizations in the sector. It is worth noting that the business models of steel producers in the first period of dynamic development in the steel industry were related mainly to the industrial development of individual countries and regions. Metallurgical industry grew in places where the development of economy and infrastructure were most dynamic. The business model of a steelworks in the nineteenth and the first half of the twentieth century focused primarily on addressing local needs and was based on a relatively high level of specialization. In majority, the companies operating at that time did not concentrate their efforts on cost reduction. Their business model was not based on innovative products either. It is true that during this period, a number of inventions were made which modernized steel making process, but they focused primarily on increasing production capacity for the needs of the dynamic development of the regions. This business approach resulted in the collapse of many once-leading manufacturers. Contemporary business models of steel producers are much more complex than a few decades ago. Modern steelworks must provide products that will meet the increasingly sophisticated needs of customers and provide high-level service at every part of a supply chain, while operating in a global environment. Therefore, the contemporary business models are based on strict global arrangements with customers and suppliers, putting special emphasis on the development and broadly-understood innovations in operating [4].

It is certain that megatrends in the global economy will have an impact on the steel producers in the long time perspective. With population growth and demographic changes, the urbanization process will play an important role in the development of the world. The advance in health care and changes in lifestyle, will double the number of generations 60+ before 2050. In 2030, more than 60% of the world



Fig. 1 Main areas of influence of steel producers [5]

population will live in cities, which will require many investments, among others, in transport systems and construction infrastructure. These investments will not be possible without steel products, which will undoubtedly have a major impact on the growth of the sector in the future. What is more, the globalization processes will continue to shape the methods of competing and cooperation in the sector. The influence of these megatrends on the steel industry in the coming years are undisputed and determine the development trends. However, even today it is clear that the challenges of increasing productivity, quality, safety, and also issues related to the reduction of energy demand in production will determine the development directions of steel producers. Innovation is the driving force of any company which wants to grow in the market and stay ahead of the competition. In the case of steel producers it will also be a crucial factor in the coming years [5].

The main development areas of steel producers and the main factors determining innovation of change are presented in **Fig. 1**.

3. THREATS AND CHALLENGES FOR INTERNATIONAL COMPETITIVENESS OF STEEL INDUSTRY IN POLAND

After the period of transitions, the group of the largest steel producers in Poland currently includes: ArcelorMittal Polska SA, CMC Poland sp. z o.o., Celsa Huta Ostrowiec sp. z o.o., Stalprodukt S.A., ISD Huta Czesochowa sp. z o.o., Alchemia S.A., ArcelorMittal Warszawa sp. z o.o., Cognor S.A., Huta Pokój S.A., Huta Łabędy S.A.. They have the following technological potential at their disposal: 2 BOF steel plants, EAF steel plant, 10 rolling mills for flat products, 9 rolling mill for long products, 12 rolling mills for pipes and sections. [6] The first challenge for the Polish producers is the surplus production capacity when compared to the needs of the market. The maximum production capacities were at the level of 12.6 million tons which amounted to 63% use of capacities in 2013. Domestic use of steel products includes import at the level of 1/3. To complete the description of this aspect of competition it should be noted that the production capacity in the EU is at 71%. European producers have about 80 million tons of steel production capacity surplus. The level of surplus is alarming because it is 6 times higher than the total production capacity in Poland. Yet another significant challenge is posed by the location of the steel production capacity. Nearly half the world's steel production is located in China. The company, which would like to increase its global market share must operate on the Chinese market. However, due to the political situation in the country it is practically impossible. Further consolidation is likely to include companies operating in Europe, the USA, South America and Russia. The strong position of China entails one more threat. If the demand for steel decreases in China, the country will increase its export of steel, which in consequence will significantly reduce the profitability of steelworks in other countries. Moreover, the oversupply of iron ore and coke in China can pose a threat to the other steelworks. On the other hand, it is the consolidation of companies which provides large enterprises with the chance to compete with the cheap Chinese manufacturers. Currently, the European steel industry is in a very difficult situation. The ongoing economic crisis has led to a substantial decline in production and the associated demand for steel, which is 27% lower than before the crisis. Therefore, the number of manufacturing plants have closed down or reduced production, which resulted in the loss of jobs. It is estimated that 40,000 work places have been lost in recent years. The employment in metallurgical industry in Poland is also constantly decreasing and amounted to 22,300 employees in 2013. Therefore, the pressure to restructure and reduce production capacity will remain one of the key challenges for the sector for some time. Reacting to the situation, the EU has prepared a European Steel Action Plan (SAP) [7], which emphasizes that a strong and competitive steel sector is essential for the European industrial base. SAP should be treated at the same time as a chance and a threat to the steel industry in Poland.

The European steel industry finds itself with the simultaneous effects of low demand and overcapacity in a globalized steel market whilst at the same time being confronted with high energy prices and needing to invest to adjust to the green economy and produce innovative products. Major technological drivers and challenges have been identified. [7] Steel is likely to remain a key material of choice in construction and manufacturing. However, a number of trends in steelmaking technology and steel use could affect steel demand. Collaborative design and process innovation can be expected to be the key drivers for such trends. This is an area where Europe can lead. On the demand side, construction of power stations, including on- and off-shore wind farms, energy transmission, housing and the transport sector will continue to provide windows of opportunities for innovative steel products. Climate policies and resource efficiency will be another important driver for technology changes. A thematic scope of SAP provides a comprehensive intervention in many fields. However, taking into account the key issue the author will focus on the problem of supporting innovation. The technical level of production is close to the limits for currently available technologies. Hence, without new breakthrough technologies it will be difficult to achieve progress (eg. to reduce CO₂). What is needed is the ability to conduct

innovative activities using the capabilities of European and regional programs. This issue was discussed by the author [8] in the context of the *Regional Innovation Strategy of Silesian Province for 2013-2020*. The program Horizon 2020 provides specific support for the process industry may be given to a proposed public private partnership (PPP), called Sustainable Process Industry through Resource and Energy Efficiency (SPIRE). In addition, Carbon Capture and Storage (CCS) has been Identified as a key technology for decarbonisation of the industrial sector in the 2050 Low Carbon Economy Roadmap. The importance of applying steel in energy and the need for research and innovation were described in the Action Plan in the context of materials used for the development of low carbon energy technologies. Therefore, at the next stage of commercial projects, particularly demonstrative projects relating to CCS in steel production it is necessary to use the leverage effect resulting from other instruments and building partnerships - an innovation network [9]. The European steel industry is continually developing **new types of steel** for specific applications. ArcelorMittal is a good example of such a company as it has a specialized R&D department, cooperating, among others, with car manufacturers and in consequence developing new steel alloys dedicated just for that customer. This new concept of Mittal was named S-in Morion, and the result is a catalogue of products dedicated exclusively to the automotive industry. In addition, through a global sales network ArcelorMittal provided access to their materials virtually anywhere in the world, which for global industries, including automobile manufacturers, is very important. Consequently, ArcelorMittal reached 18% share in the automotive sector in 2011. ArcelorMittal employed 1,130 people in research and development in 2011 in 11 research centers and annual costs of this department exceeded 300 million USD.

Another promising area in terms of improving competitiveness and reducing the impact on the environment is the potential of new sorting technology and innovative systems and business models in the further development of recycling scrap metal. The European Innovation Partnership on Raw Materials (EIP) promotes innovation at all stages of steel production, from exploration and production to the efficient processing, recycling and the search for alternative raw materials. Thus, there are many initiatives to increase innovation and to support such projects financially. However, the question whether the Polish steel industry will be able to take advantage of these opportunities remains open.

CONCLUSION

In the last couple of years the still sector has changed very rapidly, and the current list of the largest producers is very different from the one at the turn of the century. Global players have appeared on the market that are redefining the market and gaining more and more of the market share, achieving at the same time above-average economic results. However, there are also other companies which have not adjusted to the changes and, in consequence, left the market. Some companies have been taken over by the market leaders, others had to declare bankruptcy. All of this takes place in the context of changes in the hierarchy of prevailing resources (currently relational resources), the hierarchy of the dominant sectors in the economy (the network economy era), changes in the rules governing additional profits (innovation profit). The set of these variables generates a range of key challenges for the competitiveness of the Polish steel industry. When observing the sector of steel producers it can be noted that the companies operating there base their strategic decisions on the possessed resources, and above all, on competences, the unique and skillful use of which allows to achieve above-average results. The EU takes note of the threats facing the European steel industry and has prepared a European Steel Action Plan, which should be treated as both a threat and a chance for the steel industry in Poland. In order to maintain the competitiveness of the Polish steel industry it will be necessary to implement the currently promoted concept of innovation at every stage of steel production. This must be done with the use of the European and regional funding for scientific research with the very active and creative participation of the science sector.

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