

INNOVATION AS A FACTOR OF STEEL SECTOR COMPANIES VALUE GROWTH

Globalisation of economy, increasing competition and emerging crisis phenomena force the companies to enhance competitiveness and effectiveness. Creating and implementing innovations in order to create value for the client and company reinforces the company's market standing. The paper presents a process of implementing various types of innovations in the selected steel sector companies, in the aspect of creating value and changing business models of these organisations. Elements of Balanced Scorecard were used to measure the value representing various perspectives of the company's operations.

Keywords: innovation, value, business model, steel sector company, Balanced Scorecard, effectiveness

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Globalizacja gospodarki, nasilająca się konkurencja i pojawiające zjawiska kryzysowe zmuszają przedsiębiorstwa do wzrostu konkurencyjności i efektywności. Kreowanie i wdrażanie innowacji, tworząc wartość dla klienta i przedsiębiorstwa, znacząco wzmacnia pozycję rynkową przedsiębiorstwa. W artykule przedstawiono proces wdrażania różnych rodzajów innowacji w wybranych przedsiębiorstwach hutniczych w aspekcie tworzenia wartości i zmian modeli biznesu tych organizacji. Do pomiaru wartości reprezentującej różne perspektywy działalności przedsiębiorstwa zastosowano elementy strategicznej karty wyników (BSC).

Słowa kluczowe: innowacje, wartość, model biznesu, przedsiębiorstwo hutnicze, Strategiczna Karta Wyników, efektywność

1. INTRODUCTION

The low level of Polish economy innovativeness¹ is perceived as its weakness and, at the same time, a great developmental challenge. Innovations have a significant and constantly growing importance for social and economic development, both on the global and the local scale. At the same time, implementation of innovations is often related to a huge risk and the necessity to engage significant resources of knowledge and finances, which in case of companies (especially small and medium) is a barrier for growth of innovativeness. Various types of innovations invented or implemented in the company lead to the growth of its competitiveness and sustainable development.

These can be process, product, marketing, organisation and social innovations. Innovations implemented by a company should be manifested with the growth of broadly defined value. This is about the value offered to a client and attaining better economic results (including especially economic value added – EVA) and the improvement of the company's image. The subject of the research, results of which are presented in the paper, is the process aspect of implementing innovations and its impact on creating value in a company. It also deals with the change of business model that took place as a result of innovations, treating the business

model as an instrument to create and implement innovations. Theoretical aspects of innovation processes and business models are presented here briefly. The empirical part presents results of research performed in two steel sector companies. Steel sector is still one of the most important raw material sectors, both in the world and the national economy. In 2014, Poland produced almost 9 million tonnes of steel (consumption is ca. 12 million tonnes) and the steel sector's share in GDP is ca. 2.4% [1]. Over 90% of domestic production capacities belong to global steel groups (mostly ArcelorMittal). The steel sector is an important supplier for the construction industry, household equipment sector and automotive industry, what is important from the research point of view. Distribution, trading and service companies (the so-called steel service centres) are important for regional and local markets. The investigated companies belong to this group. The first is a trading and servicing company of steel sector products. The second is a rolling mill of re-roller products. The surveyed companies do not belong to any capital group and they are owned by a natural person.

The purpose of the research was to indicate the role of innovations in the growth of value, considering that its driving force is the changing business model of a company. The research questions related to the problems are as follows:

¹ More on this below.

1. What was the structure of innovations implementation process in the steel sector company?
2. What kind of innovations were implemented?
3. Which dimension of value has changed the most?

Research methodology is based on the structural analysis of the business model and measurement of value using the Balanced Scorecard (BSC). Using BSC to measure value allowed for capturing many aspects such as economic, market, resources and HR.

2. INNOVATIVENESS – IMPORTANT FACTOR OF GROWTH OF COMPETITIVENESS AND EFFECTIVENESS OF A COMPANY

Under circumstances of global competition and the increasing importance of knowledge, creating and implementing innovations represents a huge economic and social challenge for our country. Undoubtedly, the progress of innovativeness in Poland is unsatisfactory in both dimensions: the economy as well as in the social live.

Innovativeness of the national economy, in relation to most EU countries, is still at a quite low level [2]. The Summary Innovation Index (SII) used to assess in-

novativeness is about 313 points, whereas in the EU, the average is ca. 555 points [3]. The group of leaders consists of: Sweden, Denmark, Finland and Germany. They attain over twice higher innovation index comparing to Poland. Figure 1 presents the profile of the Summary Innovation Index in individual EU countries within 2013–2014. **Poland, among 27 EU states, is located far behind such states as Slovakia, Hungary, Cyprus, Malta or the Czech Republic.**

Poland, with its synthetic innovativeness result of 313 points is placed among moderate innovator countries, and it overtook Romania 204, Bulgaria 229, Latvia 272 and Lithuania 283. For comparison purposes, Figure 2 presents innovativeness indexes attained within 2009–2010 [4]. When analysing the presented values, one can notice a small progress in the innovativeness area. Poland moved one place up because of Croatia's accession to the EU – a member state with a lesser SII than Poland.

Innovativeness in case of the company is a path to innovation and its valid strategic orientation. In relation to innovation, it is a primary phenomenon, closely related to creativity, but also to the ability of a company to develop projects, absorb innovations, apply and distribute innovations. This is a company feature that allows it to compete when its competitive advantage is based on innovation.

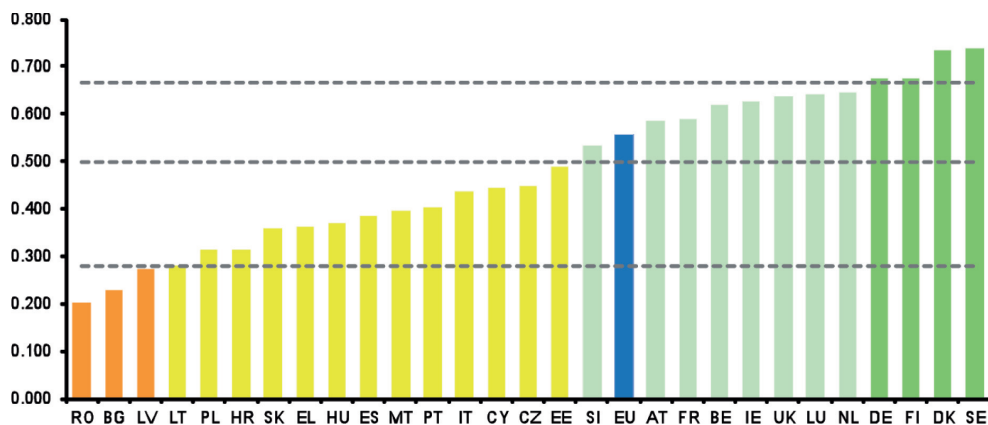


Fig. 1. Profile of the Summary Innovation Index in individual EU countries within 2013–2014

Rys. 1. Profil syntetycznego współczynnika innowacyjności (SII) w poszczególnych krajach UE w latach 2013–2014

Source: Innovation Union Scoreboard 2015, Report May 13th, p. 5

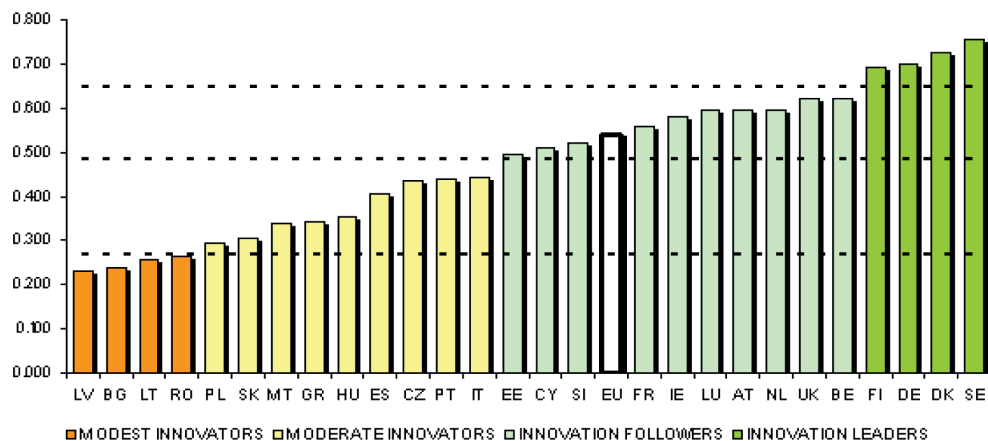


Fig. 2. Profile of the Summary Innovation Index in individual EU countries within 2009–2010

Rys. 2. Profil syntetycznego współczynnika innowacyjności (SII) w poszczególnych krajach UE w latach 2009–2010

Source: Innovation Union Scoreboard 2011, The Innovation union's performance scoreboard for Research and Innovation, 5 February 2012, p. 7

Measure of innovations is the implemented innovative solutions and benefits, e.g. effectiveness, competitive edge, client satisfaction, environment protection [5], [6] emerging from them. Innovativeness perceived this way differs from innovation, because it is a feature of a specified company; it expresses its ability to undertake innovative operations and reflects results of such operations.

In the case of innovation, references provide for a lot of its definitions [7, 8]. Novelty and changes are the two most emphasised elements in various definitions of innovation. In the case of change, its two dimensions are differentiated. The first one is the change of value – expressed by products offered by a company and processes (methods) by means of which they are created and delivered to clients. The second dimension of change is the degree of its novelty [9]. The aspect differentiating innovation from change is its positive impact on competitiveness, first and foremost in the form of benefits and ‘actual’ economic results, however some authors mention social and economic benefits as well. Each innovation is change, but not every change is innovation. For the purposes of the research (including comparative analyses) and statistics, as given in the Oslo Manual [10], “innovation is the implementation of a new or significantly improved product (good or service), or process, a new marketing method, or a new organizational method in business practices, workplace organization or external relations.”

Like the in case of the definition of innovation, there are many classifications in the references concerning their distinctions; different criteria are applied. From the point of view of the EU and the domestic information system, basic differentiation of innovation results from the definition given in the quoted Oslo Manual. Object – area differentiation criterion covers the following types of innovation:

- product (including the production of new products or improvement of the existing ones, which is manifested in changes of technical specifications, used materials and components, as well as functional features),

- process (the effect of these innovations is new or improved methods of production and supply of products),
- organisational (these are related to the implementation of new solutions in organisations and management),
- marketing (these specify introduction of new marketing methods that cover e.g. price policy or product design) [10].

For the purposes of the research, the following division of innovations is very important, e.g. based on the origin:

- closed (implemented using internal resources of a company),
- open (absorbed from the scientific, research and business field).

Needs and experience deriving from the management practice and multi-aspect issues related to innovation make innovation more frequently perceived as a process [11, 12]. The process approach allows for analysing individual stages (operations) leading to innovations, which gives the chance for their optimisation based on various criteria, including especially the aspect of creating and delivering new value to the client. Like in the case of innovations, also the innovation process is defined differently. Many of the existing definitions of the innovation process emphasise its final product, which is the value obtained through putting a solution into practice. Innovation process can be understood as creation, development and distribution of all new products and services, as well as implementing organisational changes.

These operations are closely interlinked and are performed in a determined way and can be characterised with a clearly defined beginning and end. Definitions of the innovation process, beside their differentiation, share the perception of their values, which are important for strategic and operational management of a company. These are values created for the client by developing and implementing new products and other solutions and new relations with the market. Innovativeness of metallurgical sector in Poland (acc. Central

Table 1. Innovative companies in selected sectors in Poland in the years 2011–2013

Tabela 1. Innowacyjne firmy w wybranych sektorach w Polsce w latach 2011–2013

| Sector | Manufacturing innovative enterprises (%) | Enterprises which introduced new or significantly improved products (%) | Enterprises which introduced new or significantly improved process (%) | Industrial enterprises which introduced organisational innovations (%) | Industrial enterprises which introduced marketing innovations (%) |
|--|--|---|--|--|---|
| Manufacture of coke and refined petroleum products | 50.9 | 32.7 | 40.0 | 30.9 | 18.2 |
| Manufacture of pharmaceutical products | 47.0 | 42.5 | 26.9 | 15.7 | 19.4 |
| Manufacture of beverages | 33.3 | 23.0 | 29.0 | 16.4 | 26.2 |
| Manufacture of basic metals | 29.5 | 17.9 | 21.7 | 14.4 | 18.5 |
| Water collection, treatment and supply | no data | 3.5 | 14.8 | 6.6 | 2.1 |
| Manufacture of wearing apparel | 7.4 | 4.5 | 4.1 | 2.3 | 4.0 |
| Sewerage | no data | 1.2 | 17.3 | 6.9 | 3.7 |

Source: Działalność innowacyjna przedsiębiorstw w latach 2011–2013. INFORMACJE I OPRACOWANIA STATYSTYCZNE Warszawa 2014, p. 37, 44, 49, 55.

Statistical Office, sector: manufacture of basic metals) can be perceived as more than average [13]. Table 1 presents results gained by companies from this sector, comparing them with the best and the worst results in the sectors of Polish economy (3). Out of 30 classified sectors within the innovative activities, companies of the investigated sector are located at the 8th place and statistically every third (29%) manufacturer of metals in Poland is an innovative company. Companies of the basic metal manufacture sectors yield far worse (places in the second ten) concerning the application of product and process innovations – the distance to leaders, i.e. manufacture of coke and refined petroleum products and manufacture of pharmaceutical products, is very noticeable. The situation is better in the implementation of organisational innovations (9th place) and marketing innovations (10th place) in the sector of basic metals production (3).

3. METHODOLOGY OF RESEARCH

To solve the research problem, in particular to find an answer to research questions and implement the purpose of the paper, a research model was applied, diagram of which is presented in Fig. 3. The first stage of the research is the identification and analysis of the applied innovations, dividing them into process, product, marketing and organisation innovations. The last ones are mostly related to changes of business model elements. Then, an innovation implementation process map was presented and analysed. Implementation of innovations is possible through the application of an appropriate business model, and the other way round, changes in the business model should be perceived as value gained due to the application of organisational innovation.

Elements of Balanced Scorecard were used for the purposes of quantitative measurement of the value gained by the application of proper types of innovation. Values created by innovations were represented by the results obtained in four perspectives:

- financial,
- market,
- business processes and technical resources,
- development and learning.

Certainly, the impact of individual types of innovation on the results in the mentioned perspectives was

different. For example, the financial perspective was affected mostly by marketing and product innovations and the aspect of business processes and technical resources was affected mostly by process innovations.

4. RESULTS OF EMPIRICAL RESEARCH

Case study – Trade and service company (company A)

The investigated company has been operating for 15 years and in 2014 it attained sales at the level of ca. PLN 48 million and its economic value added (EVA) is at the level of PLN 1.2÷1.5 million. At the end of 2014, the investigated company employed 108 employees. Since 2009, innovations have been implemented and the company changed its business model (organisational innovations) from a trading company to a service and trading company by starting service centres.

Innovations implementation process map is presented in Fig. 4. It is worth mentioning that different kinds of innovations were implemented, mostly of an open character. They were related to starting innovative processes concerning service of steel products (process innovations), that allow for the production of new products and services (product and process innovations) in modern service centres. This important process innovations are as follow: gas and electric MIG/MAG welding, cutting sheets with the use of a guillotine up to 13 mm, cutting with the use of a burning method > 13 mm, zinc coating and powder materials based on RAL pallet of colours. Also, new products (product innovation) are as follow: steel constructions, aluminium constructions, stainless steel constructions, plasma cutting up to 20 mm and gas cutting up to 100 mm, pipes and sections cutting up to 100 mm, cutting sheets up to 13 mm thick and 3000 mm wide, bending sheets of thickness up to 8 mm and width 3000 mm. The company started to provide specialist advisory and design services, treated as products complementary to the steel sector and construction products (process and product innovations). The effectiveness of a widened scope of services was mostly related to the implementation of client service systems, based on close relations and a pro-consumer approach (marketing innovation). Financial resources gained from the Innovative Economy (EUR 1.8 million) programme were important factors enabling the implementation of innovations.

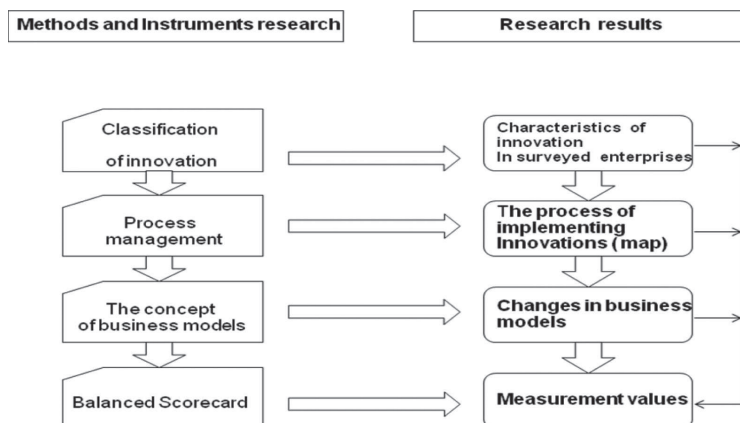


Fig. 3. Model research

Rys. 3. Badanie modelowe

Source: own study

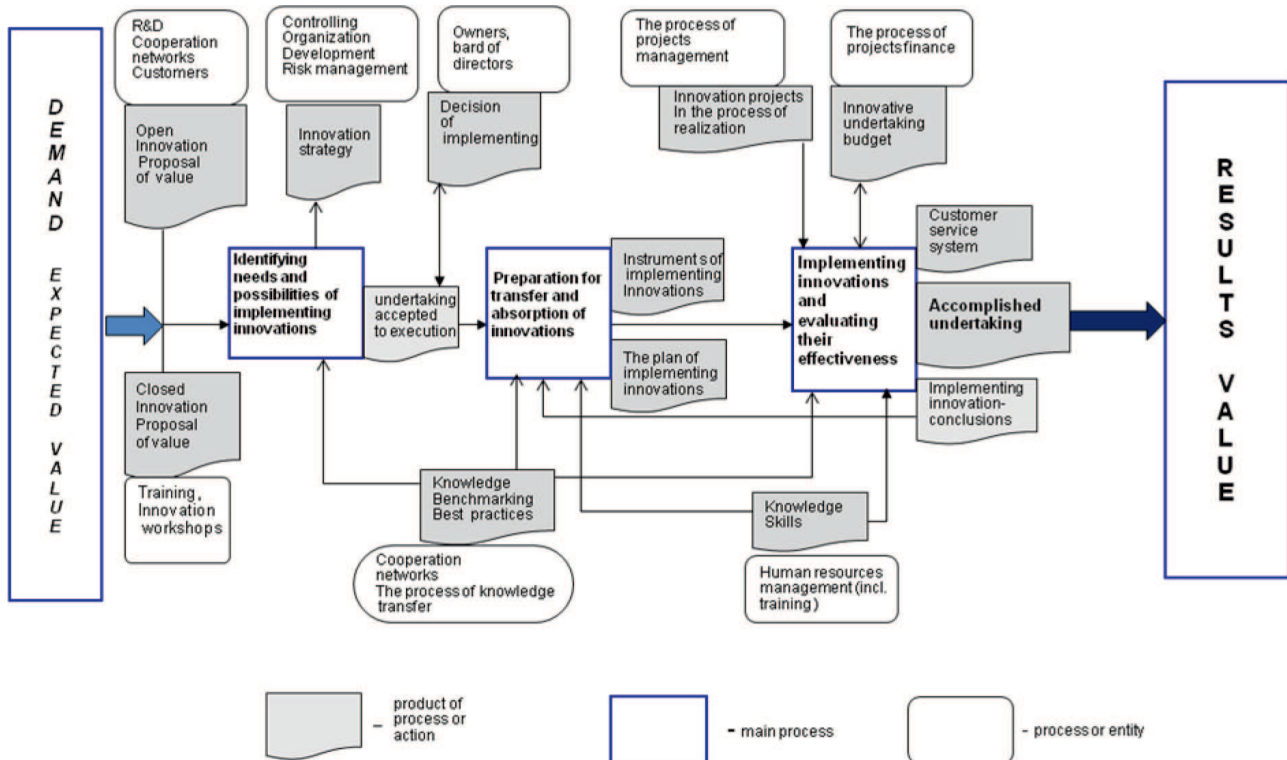


Fig. 4. Innovations implementation process (map)

Rys. 4. Proces wdrażania innowacji (mapa)

Source: own study

The most important results of the implemented innovations are as follow:

- Engineering and trading competences were developed within the scope of steel sector products service, production and designing steel sector products. The number of employees with a university degree increased significantly. Implemented CRM system. Pro-consumer relations are created. Significantly increased range of formal information and knowledge (trainings, post-graduate studies, developed IT systems). Cooperation with steel sector producers was extended.
- Increase in assets and equity. Investment into steel sector products service technologies. Modern devices for plastic working, metal working and production of steel structures. Well organised logistics system (deliveries from leading manufacturers of steel sector products). Good location of depots and service centres. Development of existing ICT solutions. Using cloud computing services. Initially Software as a Service, then Platform as a Service.
- Business processes: steel sector products service, procurement, production of steel sector products, products marketing, designing and consultancy.
- Developed HR process (selection of staff, incentive system). Developed chain of value adapted to clients' needs – creation of the source of value based on specialist steel products services; to a lesser extent on trade operations.
- A competitive and attractive portfolio and product offer, covering the following products, was created for the client:
 - steel structures,
 - aluminium structures,
 - service of steel products (bending, cutting, welding).

Results representing value created by the business model of the investigated company are presented in Table 1.

Case study – Production and service company (company B)

The investigated company, located in one of the EU states, was established in 1994 as a results of restructuring a large steel group operating as a joint stock company, where employees were the major shareholders. At the end of 2014, it reached sales at the level of ca. EUR 40 million and its economy value added (EVA) is at the level of PLN 1.5÷1.7 million. At the end of 2014, the investigated company employed 236 employees. Within 2008–2014, relatively slow changes of the business model took place, because for many years innovations were implemented to a very limited range or not at all. The applied business model was based on a limited assortment of long steel products, hot rolling technology, production assets leased on favourable conditions and relatively low costs of labour. Changes of the business model took place after new technologies (process innovation) were introduced together with new products (product innovation). Further changes took place after starting a service centre (in a limited scope); in this case they can be perceived as innovations of a product and marketing character (CRM).

The most important results of the implemented innovations:

- Slow growth of engineering competences within the scope of production and then service of steel sector products. The number of employees with university degree increased slowly. Competences concerning cooperation with suppliers of charge from outside the EU, as well as wholesalers and industrial partners (including steel service centres), were created. In-

Table 2. Balanced Scorecard – Company A and Company (B)**Tabela 2. Zrównoważona karta wyników – Firma A i Firma (B)**

| Client's perspective | | | | | Financial perspective | | | | |
|--|---------------------------------|----------------|----------------|----------------|------------------------------------|--|----------------|---------------|---------------|
| Purpose | Measure | Scope (years) | | | Purpose | Measure | Scope (years) | | |
| | | 2008 | 2011 | 2014 | | | 2008 | 2011 | 2014 |
| Level of client's satisfaction | Percentage of satisfied clients | 75.5 (80.1) | 85.9 (82.2) | 85.2 (83.0) | Economical profit – EVA | million EURO | -0.19 (1.2) | 0.41 (1.6) | 0.35 (1.4) |
| Level of client's loyalty | Number of regular clients | 98 18 | 136 24 | 142 28 | Profitability of sales | Profit to sales ratio | 1.3 (3.1) | 8.8 (4.8) | 7.4 4.3 |
| Value of sale | million EURO | 4.2 (30.3) | 9.4 (43.5) | 12.1 (45.1) | Profitability of assets | Gross profit / assets | 5.4 (7.8) | 8.6 (11.8) | 7.4 (10.2) |
| Business processes perspective | | | | | Growth and learning perspective | | | | |
| Purpose | Measure | Scope (years) | | | Purpose | Measure | Scope (years) | | |
| | | 2008 | 2011 | 2014 | | | 2008 | 2011 | 2014 |
| New offers | Quantity | 3 (2) | 14 (7) | 17 (11) | Increase of employees productivity | Value of sales per 1 employee (thousand EURO) | 39 (148) | 88 (166) | 111 (178) |
| Service quality increase – decrease of complaints | Percentage (%) | 1.4 No data | 1.2 (0.0) | 1.0 (0.4) | Qualifications of personnel | Number of engineers and economists with marketing degree | 39 (7) | 68 (10) | 73 (16) |
| Increase in the net value of machinery and equipment | Percentage (%) | 8.1 (-0.7) | 32.2 (7.3) | 84.4 (12.4) | Innovativeness of employees | Number of reported innovative solutions | 5 (3) | 4 (5) | 4 No data |

Source: own study

- creased scope of formal information and knowledge (training).
- Using equity to invest in new technologies and products (perforated shapes). Modern technical devices for servicing steel products (cutting, machining, bending). Well organised system of deliveries from outside the EU. Better utilisation of leased property. Structure-oriented in the production of typical and innovative steel sector products and services. Modern production control systems. Information technology in controlling.
 - Business processes: production and sale of classic and innovative long products, service of steel product, purchase of charge, project management. HR process - incentive system related to results (BSC), more extensive scope of trainings. Quality management system ISO, controlling and risk management.
 - More developed value chain – creating value based on effective production of both typical and innovative long products, as well as steel service.
 - Competitive edge based on price / standard quality of long products (sections), relationship and differentiation (new products) and flexibility of services.

Results showing the value created by the business model of the surveyed enterprise are presented in Table 2.

5. CONCLUSIONS

Analysis of the process of innovation implementation, the map of which is presented in Fig. 1, allows for identifying the most important elements deciding about effectiveness of innovation application. These are:

- Identifying needs and possibilities of implementing innovations,
- Analysis of funding sources and financing innovation,
- Process of risk management,

- Preparation for transfer and absorption of innovations.

Implementing innovations and evaluating their effectiveness. When assessing the character of applied innovations, one may find that process and product innovations (these were the main subject of financing) played the leading role. However, one must emphasise that they created marketing innovations (new client service systems – CRM) and organisation innovations, which were expressed in the changes of business models of the investigated steel sector companies. This peculiar synergy of innovations has allowed to achieve a value of which the most important effects were increases in the following:

- Economic Value Added (EVA),
- Sales,
- Client's loyalty,
- Employees productivity,
- Employees qualifications.

Value for the client is the main factor of competitive edge and company effectiveness. Value created for the client and the company more and more depends on the implemented innovations. This is proven by results of research performed in steel sector companies. Application of BSC in the examined companies allowed for a quantitative evaluation of results concerning the implemented innovations through changes of business model. In both companies, favourable changes in the employment structure took place, productivity increase among the employees was also noticed. Changes in the social architecture of business models did not cause the growth of employee-based innovativeness, which means that the examined companies applied open innovations. Because of innovative changes in the business processes, there was significant improvement of quality of the offered products, which enables large dynamics of sales.

To sum up, one may find that the application of BSC allows for measurement of value created by different types of innovations.

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