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THE IMPACT OF INNOVATION ACTIVITIES ON ENTERPRISE PERFORMANCE IN BUSINESS TRANSFORMATION

Abstract: Enterprise performance at the required level and sustainable performance improvement is an important assumption for successful enterprise progress. Implementing and accelerating innovation and innovation activities is a significant element for business transformation to increase enterprise success and performance. The implementation of innovation is important in enterprises where outputs of innovation activities will have a positive impact on increasing the performance and effectiveness of enterprise processes, while at the same time bringing future economic benefits to customers. Innovations have the potential to induce and cause major changes in the enterprise. When implementing innovation, environmental, economic, and social aspects are considered. The aim of the paper is to analyze and assess the impact of innovation activities on enterprise performance in business transformation, pointing to the necessity of implementing innovations in terms of their impact on increasing the financial performance of an enterprise. The result of the research is that the implementation of innovation has a positive impact on enhancing the enterprise's financial performance regarding the application of systematic procedures for implementing innovation and improving processes by reducing their variability.

Keywords: Innovation, Business Transformation, Financial Performance, Analysis, Enterprise

1. INTRODUCTION

The important prerequisite for successful enterprise progress is to achieve performance at the required level and sustainably increasing performance (Ivanička, et al., 2014). There are many factors that affect enterprises and their performance in varying degrees. Information of the possibilities of objectively assessing the impact of individual factors on enterprise and enterprise performance is an important prerequisite for determining priorities in this area. The enterprise can significantly influence its results by choosing the most important factors. The speed at which changes occur in all areas of life can be a significant impact for the enterprise to focus its efforts on increasing success and performance and accelerating innovation and innovation activities.

Changes in decisions may not always produce a positive result, but the rigid behavior of the enterprise certainly does not contribute to its growth. Enterprises consider sustainable production as a means of creating innovation, considering environmental, economic, and social considerations (Germani, Luzi, Marilungo, Papetti, & Peruzzini, 2016).

The aim of the paper is to analyze and assess the impact of innovation activities on enterprise performance in business transformation, pointing to the necessity of implementing innovations in terms of their impact on increasing the financial performance of an enterprise.

2. LITERATURE REVIEW

Innovations begin in people's heads, come out of knowledge, require new models of work organization and knowledge of innovative techniques. It is no longer true that innovations arise exclusively under the hands of scientists in white coats. Within the European Union two-thirds of economic growth can be attributed to innovation. The European Commission has introduced a program for funding research and innovation Horizon 2020. There is considerable support for innovation in prototypes, testing, demonstration, initial operation, extensive product verification and market application through Horizon 2020 (European Commission, 2015). Generally, innovations are a creative process in which a combination of two or more things creates a unique new thing. The word innovation originates in Latin and means renewal. The founder of the theory of innovation is Joseph Schumpeter, who in 1911 formulated the "Combinations of developmental changes", understood as overcoming the restoration of systems and processes in a closed circle (Schumpeter, & Swedberg, 1989). According to Drucker (1985), innovation is a specific tool for entrepreneurs to use change as an opportunity to differentiate their entrepreneurship. Freeman (1982) describes innovation as the design, producing, technical, marketing and management activities associated with launching a new product or first commercially using a new process or device. According to Zelený (2005), innovation is a quantitative and qualitative improvement of a product, process, or entrepreneurial module that adds value to the customer, enterprise, and ideally both parties simultaneously. Innovation is a strategy-oriented change that brings benefits to customers and a blue ocean enterprise (Chan Kim, & Mauborgne, 2015).

The Oslo Manual for the Measurement of Scientific and Technical Activities issued by the OECD distinguishes four types of innovation, namely product innovation, process innovation, organizational innovation, and marketing innovation (OECD, 2005). Product innovation includes products and services that are significantly differentiated by functional or user characteristics from previous enterprise products. The assumption is that there are significant changes in the technical parameters, components and materials or other functional characteristics. Small, minor improvements are not innovation. In addition to implementing a brand-new product, an example of product and service innovation is the substitution of original inputs with materials with improved properties (such as, airbags, lightweight or solid materials, environmentally friendly plastics), the implementation of a new component into original products (such as, camera phones in mobile phones), electronic purchase of tickets. Process innovation is the introduction of new or fundamentally improved produced processes, distribution methods, or support activities for products and services. Innovation must be new to the enterprise, it may not be new to the industry. An example of process innovation is the installation of new or improved technology (such as, real-time scanners), computer-aided product development. Organizational innovation involves significant changes in entrepreneurial practice, job organization, or external relationships to improve the quality of enterprise innovation capacity or the quality and efficiency of workflows. An example of organizational innovation is the reduction of the number of levels of management, the use of an outsourcing method for research and development tasks. Marketing innovation is a significant change in the way we deal with products and services. An example of marketing innovations is the new design of existing products (such as, memory cards in necklaces), new sales methods (such as grouping existing products and services into marketable packages).

The enterprise decides on product and service innovations if needs to respond to competitors' actions. In this way, it is exposed to a lower risk of failure, but the benefits of such reactive strategy are lower. The enterprise also decides on product and service innovations if it wants to proactively bring new products to gain customers and competitive advantage over its competitors. A proactive strategy requires higher costs, creative and educated employee, and brings with it the possibility of greater risk for the innovative enterprise. The enterprise decides on innovations in the case of the renewal of a production equipment if the production equipment must be restored immediately. It is necessary to replace it with a more efficient, economically efficient equipment. The enterprise also decides on innovations in the case of the renewal of a production equipment if its offer includes devices with significantly higher performance, which shortens production time, produces better products, and saves costs. The enterprise decides on a change in organization and managerial procedures if managerial procedures do not support the growth of the enterprise, or managerial procedures are not effective enough.

The implementation of innovation is important in enterprises where the outputs of innovative activities will have a positive impact on improving the efficiency and effectiveness of enterprise processes while at the same time bringing value to future customer benefits. It is very important to choose the appropriate innovative performance measures for enterprises with innovative activity. The key measure of the benefits of innovation is the level of costs they have generated in relation to the generated revenue. Extending the innovation cycle causes an increase in costs. By shortening this cycle, it is possible to achieve a higher operating profit. Innovation performance measurement indicators include innovation revenue, revenue growth from innovated products, percentage growth of revenue (earnings) due to successful innovation, revenue (profit) ratio of innovated product to total revenue (profit), average implementation time for innovation projects and number innovations per year per employee (Chromjaková, & Rajnoha, 2007). Innovation efficiency measures include the percentage ratio of decrease in the costs of innovated products and processes, the percentage ratio of profits from successful innovation by type (product or process), product innovation per employee,

total innovation expenditure as a percentage of revenue, and the real contribution of projects to overall the costs of the project (Chromjaková, & Rajnoha, 2007).

The researched object that is the impact of innovation activities on enterprise performance in business transformation was chosen because of its timeliness and dynamic development. We got information about the researched object from book and magazine sources, conference proceedings and from our own previous knowledge of the research activities. We have worked with the literature that is listed in the references section. The knowledge gained forms the basis for the processing of results and discussion.

3. DATA AND METHODOLOGY

The object of the research is the selected Slovak producing enterprise, the predominant activity of which is SK NACE 28 290 Production of other general-purpose machinery. The selected enterprise started its history with three employees who worked in the field of filtration technology. Today, after more than twenty-five years of operation, the enterprise has twenty permanent employees. The vision of an enterprise is to maintain and secure its place in the world's top bypass filtering. The mission of the enterprise is to reduce the environmental impact of industry by reducing waste oil production and preserving the environment for future generations. The selected enterprise consistently reflects the certification requirements of its products and management system. It holds the following certificates: Management System ISO 9001:2008, Environmental management system according to ISO 14000:2004, and Occupational Health and Safety Management System according to OHSAS 18000:2007. A high production quality standard is subject to permanent control in the enterprise and is a prerequisite for the collection of corporate production from the parties of all customers. The enterprises with a large oil economy are the target group of customers of the enterprise's products. The fact that international enterprises operating in the automotive industry and the suppliers of these enterprises operating in the engineering industry have established an opportunity in Slovakia and abroad to exploit the enterprise's fluid management and filter technology potential.

The subject of the paper is to assess the impact of innovation activities on enterprise performance in business transformation, pointing to the necessity of implementing innovations in terms of their impact on increasing the financial performance of an enterprise. Several methods of exploration were used in the paper, where epistemology was applied as a basic method of research. Standard methods of research, such as observation, synthesis, analysis, analogy, deduction, classification, and comparison presenting basic methodical approach to paper processing are applied. The knowledge gained using these research methods has created a new, higher level of knowledge of research problems. Ways of understanding and explaining impact of innovation activities on enterprise performance in business transformation, the inductive-deductive and analytic-synthetic logical scientific methods are used. Finally, the impact of innovation activities on the enterprise performance in business transformation is assessed, pointing to the benefits of implementing innovations in terms of their impact on improving the financial performance of the enterprise.

4. RESULTS AND DISCUSSION

Competitive advantage and enterprise leverage depend on self-education, sharing and capitalization of knowledge. If the primary goal of the enterprise is not just the money, but the enterprise builds a system of values that empowers employees and the whole enterprise, then there is a great chance of successful enterprise progress. The selected producing enterprise is made up of a team of professionals who, through their dedication, have been able to expand enterprise presence on the world market. The enterprise has long been collaborating with research and development institutions to improve its products. The enterprise was designed a simplified calculation algorithm for the design of filtering equipment, which was subsequently implemented in process management software. Throughout its operations, the enterprise has been able to adapt to changes in the enterprise environment and to reflect on the opportunities and challenges of the market.

The market situation has required modernization of technological equipment and innovation in the production process of the enterprise. The main objective of the enterprise's innovation is to increase the enterprise's competitiveness and sustainability. The supporting objectives of implementing enterprise innovations are as follows:

- Innovation of the production process to contribute to protecting the environment,
- Achieving highly efficient and accurate production with minimal waste and increased added value of the production process by providing innovative technologies, and
- Reduction the average cost per unit of production by implementing innovative technologies.

The subject of enterprise innovations and fundamental changes in the produced process are achieved by implemented innovative activities, such as:

- Innovation of the production process of filters by implementing a line to produce filters and then upgrading the produced products,
- Innovation of the production of engineering products by implementing a line to produce engineering products,

- Innovation of produced equipment, and
- Innovation of the process of produced filter bodies with a new technological process by implementing the injection mold for the T and H filter bodies into the production process and the subsequent upgrading of the original product with significantly different properties.

The implementation of the liner to produce filters into the produced process represents a high degree of process innovation, and the production of filters through the innovated process allows to produce a product with significantly improved properties that are new to the world market, thus also a product innovation with a high degree of innovation. Innovation in the technology process will allow the use of non-woven polypropylene fabrics in the production of the filters to create a product not yet produced in the world, and the product will also have other innovative features, such as:

- Expansion the application possibilities in the chemical and food industry by using new filter materials,
- Increasing impact resistance to hydraulic systems,
- Reduction the number of technological operations in production,
- Reduction of waste during production,
- Increasing operational reliability.

The expected benefits of produced filters by implementing a line to produce filters into the production process are as follows:

- Increasing the efficiency of producing of filters,
- Reduction of feedstock consumption,
- Reduction of wasters, and
- Reduction of electricity consumption.

The line to produce engineering products innovates the technological process of produced T10 and H10 filter bodies. Innovation will allow the production of filter bodies with significantly improved properties (such as, better, more precise, and detailed machining of filter bodies). Substantial improvement in the quality of the products is achieved by changing the processes and technology of the filter body production. Product and process innovation represent a middle-grade innovation scale.

Implementation of this production line will enable to:

- Increase automatization,
- Increase the efficiency of the production of filter bodies,
- Reduce of feedstock consumption,
- Reduce of wasters, and
- Reduce of electricity consumption.

The injection mold for the T35 and H35 and T20 and H20 filter bodies represents the middle degree of innovation of process and then the product. The use of modern aluminum-based alloys significantly reduces the material demands and workmanship of filter bodies. Part of injection molding technology is an injection mold that is designed and produced as a unique device. The extensive knowledge about the construction of filter bodies is the result of the enterprise's twenty-five years of development and practice.

By using a light alloy of aluminum instead of steel, the filter body acquires significant changes in parameters, as follows:

- Reduction of the total weight of the filter body by 30 per cent,
- Increasing corrosion resistance,
- Increasing impact resistance to hydraulic systems,
- Reduction of technological operations in production,
- Reduction of waste in production.

The implementation of the injection mold to produce filter bodies into the process of producing filter bodies was linked to an investment of 90,000 euros. The project was implemented in 2012 and put into operation in 2013. After four years of using this innovative technology process, the benefits of this innovation, the return on funding associated with its implementation and the economic efficiency of the project will be assessed. The objective of implementation of the production of filter bodies by means of injection mold and casting of aluminum and its alloys was to achieve higher productivity at lower costs, improve affordability and efficiency for filter body users. Better availability of filter technologies greatly helps to reduce the production of waste oil as hazardous waste, which has beneficial environmental consequences. Material demands and high demands on human labor characterizes the conventional production of filter bodies. The effect of the minimal need for subsequent machining to the final quality is achieved by precision casting. The assumption was that the implementation of a new production process of filter bodies using the injection mold will

have a significant economic effect as well as a subsequent environmental impact due to a better price advantage for the customers.

The produced costs of the injection mold are shown in Table 1.

Table 1: The produced costs of the injection mold (in euros)

Costs	In Euros	Costs	In Euros
Material	36,064	Production Direction:	
Wages	4,250	Form Factor Case	15,326
Project Documentation:		Renting Space	1,500
Design Calculations	6,300	Engineering Works	5,860
Drawing Documentation	8,900	Pressure Tests	10,000
Wages	1,800		
Total:			90,000

Source: own processing based on internal Enterprise documents.

Calculation of cash receipts from the project is shown in Table 2.

Table 2: Calculation of cash receipts (in euros)

Item	2013	2014	2015	2016
Sales	97,810	115,203	167,816	189,813
Cost excluding Interests	65,255	74,016	112,257	129,257
Gross Profit	32,555	41,187	55,558	60,555
Income Tax	0.23	0.22	0.22	0.22
Net Profit	25,067	32,126	43,336	47,233
Depreciation	10,170	12,855	20,055	21,375
Cash receipts	35,237	44,981	63,391	68,608

Source: own processing based on internal Enterprise documents.

Calculation of net present value for alternative cost of capital in amount 14 per cent is shown in Table 3.

Table 3: Calculation of net present value (in euros)

Year	Capital Expenditures Cash Receipts	Cumulative Cash Receipts	Discounted Cash Receipts	Accumulated Discounted Receipts
0.	-90,000	-	-	-
1.	35,237	35,237	30,910	30,910
2.	44,981	80,218	34,611	65,521
3.	63,391	143,609	42,787	108,309
4.	68,608	212,217	40,621	148,930
Total:	212,217			

Source: own processing based on internal Enterprise documents.

Net present value is calculated as the difference between the present value of cash receipts and the present value of capital expenditures. By calculation, it was found that the net present value is positive at 58,930 euros. The positive net present value indicates in general the acceptability of the project in the selected enterprise. It indicates the economic acceptability of the investment. Discounted cash receipts are the basis for calculating the payback period. The calculated payback period of the discounted cash flow is 2 years and 209 days.

Innovation of the process of producing filter bodies by a special way of producing castings made of aluminum and its alloys brings lower material demands and significant savings in human manual work. Detailed overview of each cost item and a cost comparison of the technology used between 2013 and 2016 will result in savings in cost items such as own labor and purchased services. By comparing the costs of produced filter body with old technology and new technology, it was confirmed that the innovated technology process would bring positive results in terms of significant cost savings and the possibility of lowering sales prices while maintaining a sufficient profit for the selected enterprise. Prior to implementation of the innovation to achieve 15 per cent profit in the production of filter bodies, it was necessary to set the sales prices at a significantly higher level than in the innovated technological process. Implementation of an innovative project could significantly reduce the number of products.

The comparison in 2012 of the price by using old technology, the price that could be set under the new technology, while retaining the original 15 per cent profit and price that is currently in force is shown in Table 4.

Table 4: Comparison of prices (in euros)

Filter Body	Price (Year 2012)	Price (Theoretical)	Price (Present)
T20	146.98	79.66	95.50
H20	241.50	131.68	156.50
T35	181.82	89.38	137.00
H35	270.19	151.66	212.60

Source: own processing based on internal Enterprise documents.

The comparison of prices concludes that the use of new technology has contributed to a significant reduction in cost items and to a reduction in the sale price with a higher profit effect for the selected enterprise.

A further positive effect from the innovative method of producing the filter bodies is a significant reduction in the production capacity (Table 5). It has been a marked decline in the production of innovative products, ranging from 54 to 64 per cent.

Table 5: Change of production capacity of filter body

Filter Body	T20	T20	H20	H20	T35	T35	H35	H35
Technology	Old	New	Old	New	Old	New	Old	New
Production Capacity (in minutes)	201	74	241	109	209	76	241	111
Change (in per cent)		-63		-55		-64		-54

Source: own processing based on internal Enterprise documents.

The total production of filter bodies in the years from 2012 to 2016 is shown in Table 6.

Table 6: Production of filter bodies

Year	Production (in pieces)	Revenue (in euros)	Costs (in euros)	Difference (in euros)
2012	1,830	362,036	314,813	47,223
2013	678	97,810	62,255	32,555
2014	857	115,203	74,016	41,187
2015	1,337	167,816	112,257	55,558
2016	1,425	189,813	129,098	60,715

Source: own processing based on internal Enterprise documents.

The ratio of the revenue from the production of the filter bodies to the total production revenue and the ratio of the costs to the total costs of the enterprise for each year is shown in Table 7.

Table 7: Comparison of revenue and costs (in euros)

Year	Revenue from Innovated Filter Bodies	Total Revenue of Enterprise	Ratio of Revenue	Costs of Innovated Filter Bodies	Costs of Production of Enterprise	Ratio of Costs
2012	362,036	1,231,533	0.29	314,813	699,065	0.45
2013	97,810	951,223	0.10	62,255	584,867	0.10
2014	115,203	1,064,184	0.11	74,016	695,913	0.11
2015	167,816	1,372,078	0.12	112,257	963,197	0.12
2016	189,813	1,860,389	0.10	129,098	1,309,976	0.10

Source: own processing based on internal Enterprise documents.

Revenue from 2012, which reached the highest value, was affected by the highest production from the comparative period because the production for a large customer was realized in this year. In 2012, it was the highest costs due to the

use of old technology. In 2015, smaller output with lower production revenue produced a more significant effect than the largest volume of revenue earned in 2012. The ratio of revenue from innovated products produced by the innovated process is comparable to the ratio of the costs of innovated production at the costs of production. In 2012, the ratio of revenue from filter bodies accounted for 29 per cent of total revenue and the ratio of costs of filter bodies accounted for 45 per cent of total costs of production.

The results of the research show that innovation activity can significantly affect enterprise performance. Properly chosen innovation shifts enterprise performance to meet enterprise goals and to steadily improve of enterprise performance. Research has revealed that the object of research (selected producing enterprise) has been developing for years in successive, thoughtful steps. The selected producing enterprise extends its enterprise activities, improves working practices and conditions. At the same time, it is characterized by innovative activity, which brings an effect not only for the enterprise itself, but also has a positive impact on the environment, which also results from the enterprise focus itself. The enterprise has implemented several innovations during its existence. The subject of the research was to assess the implementation of innovation on enterprise performance in business transformation from the period of five years ago. The net present value method verified the acceptability of the implemented innovation project. The total cash receipts and the its time distribution is important for the enterprise. The net present value of cash receipts was positive, confirming the acceptability of the project. The payback method calculated the time at which the initial capital expenditures were paid out of the cash receipts from the investment. Capital expenditures returned in 2 years and 209 days. In designing the project, it was assumed that the innovation of the produced process of the filter bodies would bring significant cost savings. Compiled detailed reports, comparisons of cost items using the original produced process of products and using an innovated production method have confirmed the accuracy of this assumption. At the same time, the production capacity of the product decreased significantly, by an average of 59 per cent. By comparison of production in individual years, it was found that the highest production was from the whole of the monitored period in the year before the injection mold was put into use. It was related to the fulfillment of the order from an important customer. In 2013, production was at the lowest level, but in subsequent years it has grown steadily to 1,425 pieces in 2016.

It would be ideal to assess the economic results while maintaining the *Ceteris paribus*, which is, however, inaccessible in practice. Therefore, assessing the impact of innovation as a factor capable of significantly affecting enterprise performance is challenging in the rapid development and changes taking place in the enterprise and its surroundings. Because innovation activity characterizes the entrepreneurship, it would be appropriate for the enterprise to use systematic procedures to find innovative solutions and to implement the Six Sigma concept as a methodology of systematic improvement of processes by reducing their variability. The basis of the Six Sigma concept is a substantial knowledge of customer requirements, disciplined use of facts and ordering data, statistical analysis, and ongoing efforts to optimize processes.

5. CONCLUSION

Enterprise as a living organism needs to evolve, and innovation can be a way forward. Even a slight change can bring the effect of butterfly wings. Innovations have the potential to bring about this effect and cause major changes in enterprise. The aim of the paper was to analyze and assess the impact of innovation activities on enterprise performance in business transformation, pointing to the necessity of implementing innovations in terms of their impact on increasing the financial performance of an enterprise.

Based on the research results, we can state that the implementation of innovation has a positive impact on increasing the financial performance of the selected producing enterprise. The enterprise should use systematic approaches to finding innovative solutions and implement the Six Sigma concept as a methodology of systematic improvement of processes by reducing their variability.

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