Ecoinnovation as a driver of positive environmental benefits in Czech textile industry in context of EU

Pavla Herclíková[1], Martina Novotná[2]

Abstract: In the modern world, innovation is a prerequisite for a company's competitiveness in any industry. Nowadays, emphasis is also placed on sustainable growth of the company, which includes, among other things, the environmental dimension of economic development, especially energy savings, optimization of water consumption, elimination of water waste, minimization of waste, use of secondary raw materials in production, etc. The aim of this article is to identify innovative activities of enterprises in the textile industry of the Czech Republic in the context of the EU. These are innovations that both contribute to environmental protection and are thus effective for the enterprise. The evaluation of innovative activities of textile enterprises is also made from the perspective of environmental benefit. Although it has been found that eco-innovations are being implemented in this sector across the EU, which provide significant savings especially in energy consumption, hence transforming the sector towards sustainability and environmental friendliness, this progress is very slow. It is mainly the cheaper products from developing countries that are very significant competitors for European textiles in the eyes of consumers.

Keywords: innovation, sustainability, textile enterprises
JEL Classification: O31, Q01, L67

1 Introduction

The textile industry is one of the world's most important global industries (Hansen and Schaltegger, 2013). Textile products are very important to human society as they are used to make not only clothing but also many other products that play a key role in people's daily lives. The importance of the sector for European industry is also undeniable. This is mainly due to the textile industry's high contribution to job creation. In 2021, almost 1 298 000 workers will be employed in the EU textile and clothing industry (EURATEX, 2022). However, the production and use of textiles has a significant negative impact on the environment, climate and society through the consumption of resources, water, land and chemicals, and the production of greenhouse gases and other pollutants (Thiry 2011). Textile manufacturing is the third most water- and land-intensive sector in the EU, with the fourth largest negative impact on the environment and climate change. Moreover, the growing demand for clothing encourages the unsustainable use of non-renewable resources, as exemplified by the production of synthetic fibres from fossil fuels (European Commission, 2022).

To be competitive in the market, companies need to constantly monitor the costs related to competitiveness and quality, which can be considered added value, innovation, environmental access and export opportunities (Huggins and Thompson, 2017). Sustainability can be a driver of innovation (Melane-Lavado, Álvarez-Herranz, 2018). Staying competitive in the market requires changes that specifically target the sustainability status of value chains, products and services, and business models (Nidumolu, Prahalad and Rangaswami, 2009). The ability to innovate in the context of sustainability is an essential business capability, whether it is associated with small incremental steps or radical, disruptive innovations (Adams et al., 2012). Increasing sustainability also helps to reduce the amount of raw materials used in production, and recycling waste into new production inputs also has a positive impact. For this reason, profitability should be the driving force behind companies' efforts to protect resources and the environment (Kislingerová et al., 2023).

[1] University of South Bohemia, Faculty of Economics, Department of Applied Economics, Studentská 13, České Budějovice, Czech Republic, herclp00@ef.jcu.cz.
[2] University of South Bohemia, Faculty of Economics, Department of Applied Economics, Studentská 13, České Budějovice, Czech Republic, novotna@ef.jcu.cz.

„Eco-innovation refers to any innovation that reduces impacts on the environment, increases resilience to environmental pressures or uses natural resources more efficiently“ (EC 2011). *„Eco-innovation is essential for achieving the objectives of the European Green Deal, such as the transition to a climate-neutral, circular economy“* (EC 2019). The Eco-innovation Scoreboard gathers data on eco-innovation performance across the EU to monitor and evaluate progress, made since 2010.

The authors Arena, Michelon and Trojanowski (2018) identify eco-innovation as the most important driver of economic development, as it continuously changes the external environment and our way of life. Eco-innovation is the key to resolving the tension between economic growth and environmental degradation. It is a combination of green and innovation-driven development (Zhang Zhu, 2019). Eco-innovation can also be seen in the context of competitiveness. In this case, it is an innovation that allows companies to continuously maintain or even improve their position in a specific market. Eco-innovation can be used as a solution to environmental impacts within business processes and, at the same time, it can improve the product itself, making it possible to gain a better position in the market (Porter & Van der Linde, 1995). As mentioned above, green innovations prioritise environmental benefits and their main difference from conventional innovations is the effect of 'double externalities'. Green innovations provide a positive environmental externality in addition to the positive knowledge spillover externality that results from innovation activities in general (Arfi et al., 2018).

Corporate social responsibility has become an increasingly important issue for achieving market competitiveness and sustainable development (Qian et al., 2010). Just by showing interest in environmental protection and striving for more sustainable behaviour, a company acquires an important strategic tool that can reduce costs, improve corporate governance, increase the company's operational performance and market value, and last but not least, influence the company's image as perceived by society, among other things, reducing negative externalities affecting the environment (Hu et al., 2018).

The aim of this article is to identify the innovation activities of enterprises in the Czech Republic in the context of the EU. The focus is on the manufacturing industry, which includes the textile industry. Innovations have been evaluated from the perspective of environmental benefits. The ideas and findings that have already been researched on this topic are presented in the first part of the article. The following part of the paper is dedicated to explaining the objective of the paper as well as the methodological approach that was used to process the results. This is followed by summarising the most important findings, which are then discussed and compared with those already published. The last part of the paper will consist of a final summary of the results.

2 Methods

The data for this article have been extracted from the Eurostat database, statistics and reports available on the website of the Czech Statistical Office (hereinafter referred to as ČSU). First, there was an observation of the share of business innovations in the EU countries in the period 2018-2020. These innovations were converted into percentages to make clearer and easier to follow for all enterprises in the EU countries as a whole, and then for the manufacturing industry. This was followed by analysing the percentage of enterprises in the Czech Republic reporting innovation activity not only for manufacturing but also specifically for textile manufacturing. This was then analysed in terms of the share of innovative products and services in the total turnover of enterprises in these sectors. The assessment is based on the views of the representatives of the companies interviewed on the environmental benefits of their innovations.

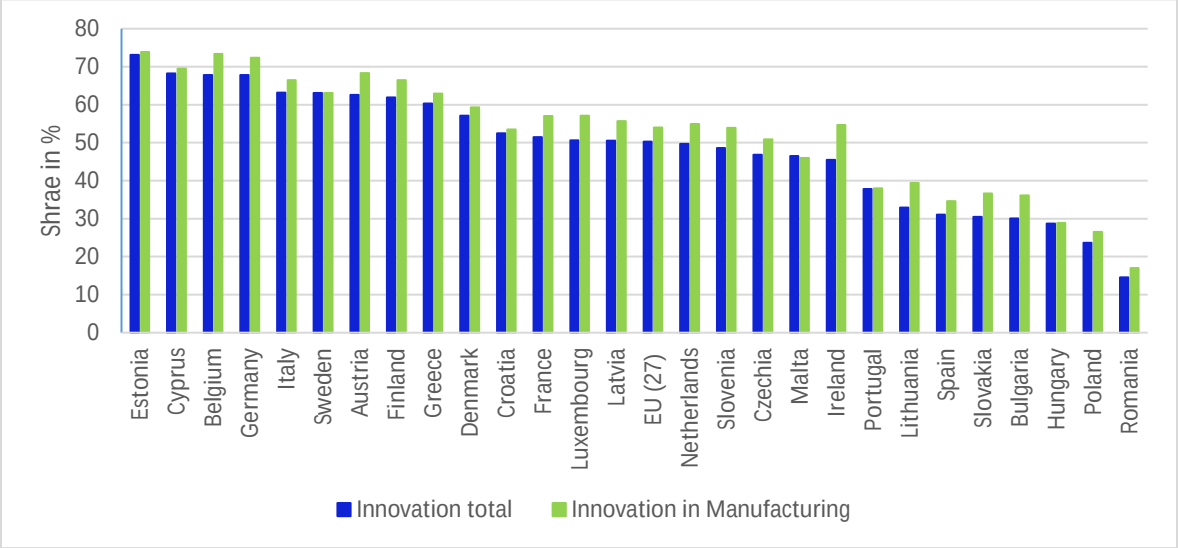
The evaluation of innovative enterprises in the Czech Republic focused on the manufacturing and textile industries. Innovation was understood as the innovative activity of enterprises, while indicators such as sales of innovative products, introduction of innovations were monitored. In the methodological procedure of data processing, the ČSU followed the OECD Oslo Manual of 2018, which distinguishes two types of innovation. The first type is business process innovation. This includes improvements in internal processes, organisational changes in the company or marketing innovations. The second type is product innovation. This involves either introducing new products and services or changing the characteristics of existing products and services (ČSU, 2022). Finally, the positive benefits of business innovation, not only on the company's side but also on the customer's side, were evaluated using selected indicators, such as reduction of CO2 emissions, reduction of energy consumption, etc.

3 Research results

The share of innovative enterprises in the EU was used to analyse the position of the Czech Republic in the field of innovation. In this area the Czech Republic is below the EU average (the share of innovative enterprises in the Czech Republic is around 47 %).

Figure 1 shows that Estonia, Cyprus, Belgium and Germany have the highest shares of innovative activity in the EU as a whole. In the manufacturing sector, the share of enterprises with innovation activity is assessed as a proportion of the number of enterprises in the manufacturing sector. The highest shares of innovation activity were found in Belgium, Estonia and Germany, followed by Austria and Finland. In the Czech Republic, the proportion of enterprises engaged in innovation activity is higher in the manufacturing sector (around 51 %). Obviously, and also influenced by the structure of the economies of the countries surveyed, innovation activities of enterprises in the manufacturing sector are more applied not only in the Czech Republic, but also in Ireland, Slovakia, etc.

Figure 1: Innovation activities of enterprises in EU countries total and in manufacturing in the period 2018-2020



Source: Own processing based on Eurostat database

The following figure 2 provides information on the evolution of the composite eco-innovation index and indicators for selected EU Member States over the last 10 years (2012-2022).

Figure 2: Eco-Innovation performance of the chosen EU Members States

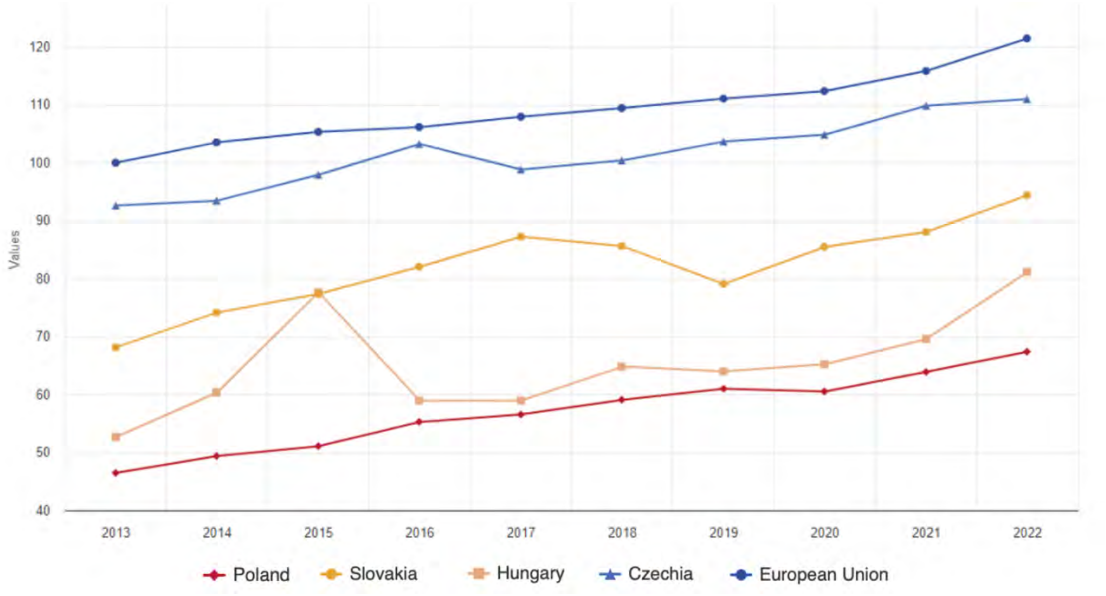


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Table 1 shows the number of enterprises in the manufacturing and textile industries in the Czech Republic and the number of enterprises that implemented innovation activities in 2018 to 2020, including their percentage shares. More than half of the entities (58.3%) in the manufacturing industry included some innovation activity in their business activities, while in the textile industry about half of them did so. The situation is no different when looking at the share of sales of goods and services, where 86.4% of total sales are accounted for by innovative goods and services. From the available data of the ČSU (2022), it was also found that the textile industry is the sector of the manufacturing industry with the lowest costs of innovation activities. In the Czech Republic, relatively few enterprises operate in the textile industry, probably due to outdated production processes caused by lack of innovation activity of enterprises and competition from cheap products from third countries.

It is also clear from Table 1 that it is the larger enterprises that are more innovative and have a higher market share, for example, the innovative enterprises in the textile industry account for 75% of the total turnover of textile enterprises.

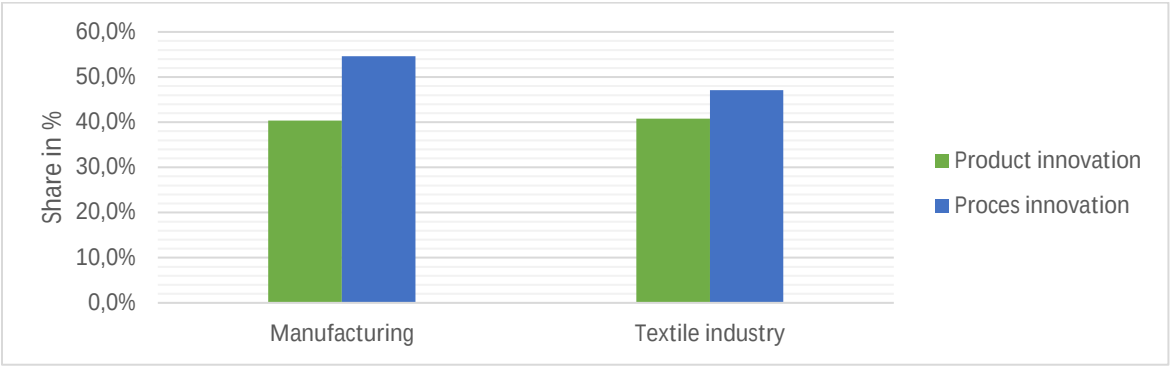
Table 1: Economic characteristics of innovating enterprises in the Czech Republic in manufacturing in the period 2018-2020

Indicator	Number of enterprises			Sales of goods and services (billion CZK)		
	Total	innovating	share in %	Total	innovating	share in %
Manufacturing	11 826	6897	58.3	4 346.8	3754.5	86.4
Manufacture of textiles, wearing apparel, leather and related products	651	327	50.2	64.4	48.7	75.6

Source: Own processing based on ČSU

Figure 3 shows the types of innovation in manufacturing and particularly in textiles. The figure shows that process-oriented innovation is dominant in both the manufacturing industry and the textile industry. This is understandable given the nature of both industries. However, product innovation is not completely neglected, and Figure 3 shows that in textiles the pursuit of product innovation is fairly balanced with process innovation. In this respect, innovation is certainly a priority for the industry in terms of changing the composition of the product (textiles), for example to make it easier to recycle.

Figure 3: Types of innovation in Manufacturing and Textile industry in the period 2018-2020

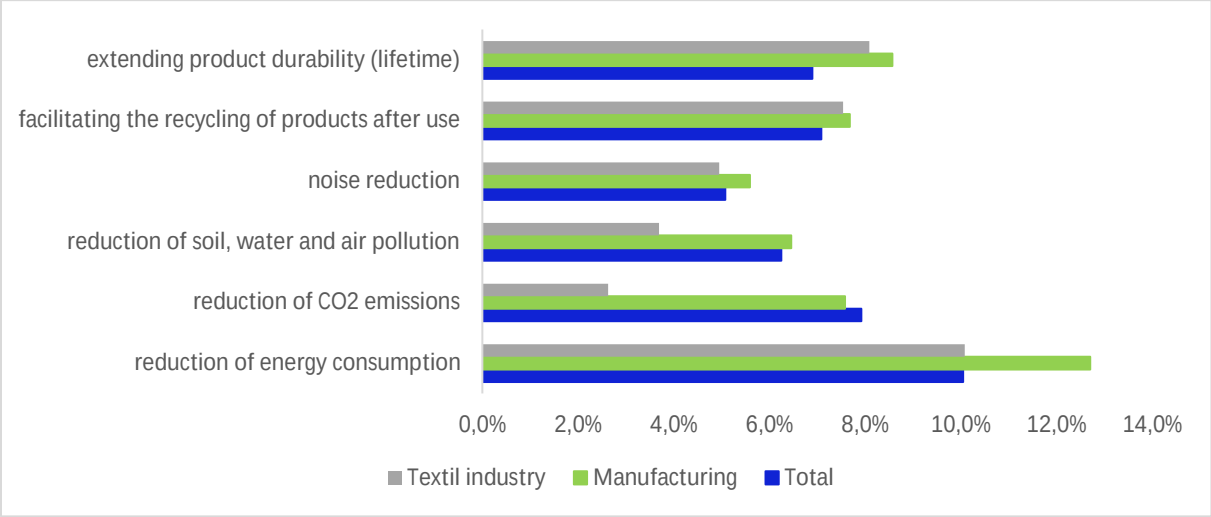


Source: Own processing based on ČSU

Innovation activities were monitored in more detail for enterprises in selected sectors with positive environmental benefits. These were innovations related to the production, distribution or sale of products and services on the part of the enterprise (Figure 5) and innovations related to the use of products or services on the part of the customer (Figure 4).

Figure 4 clearly shows that for enterprises operating in the textile industry, most of the customer-related environmental benefits are recorded for the indicator 'reduced energy consumption', followed by 'extended product life'. This also applies to manufacturing enterprises and to Czech enterprises overall.

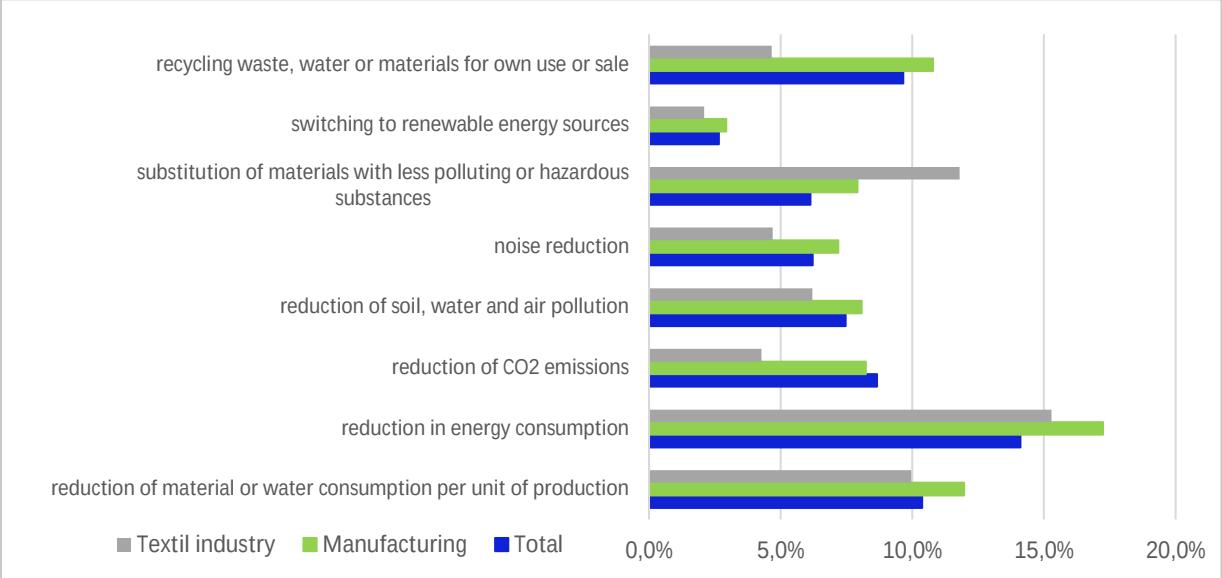
Figure 4: Positive environmental benefits of Innovation on the customer side in the period 2018-2020



Source: Own processing based on ČSU

The environmental benefits on the company side are the focus of Figure 5. Again, the largest percentage for all business sectors compared is the reduction in energy consumption. Substitution of materials with less polluting or hazardous substances comes second for the textile manufacturing sector. For the manufacturing industry, the second most important benefit is reduced material or water consumption per unit produced, and this applies to all enterprises in the country as a whole.

Figure 5: Positive environmental benefits on the enterprise side in the period 2018-2020



Source: Own processing based on ČSU

4 Conclusions

When assessing the innovation activities of manufacturing enterprises in the EU, it was found that the Czech Republic is below the European average. The analysis of the innovation activity of enterprises in the Czech Republic in the manufacturing industry compared to the textile industry shows that fewer enterprises innovate in the textile industry. The percentage of enterprises innovating in the textile industry is around 50 % and it is mainly business process innovation. However, the textile industry is the sector of the manufacturing industry with the lowest level of innovation activity. Among the positive environmental benefits associated with the production, distribution or sale of products and services on the customer side, reducing energy consumption and extending product lifetimes are the clear winners for all three enterprise groups surveyed (total, manufacturing, textile

industry). The benefits to the company as well as to the customer are mainly related to energy consumption, followed by reducing soil, water and air pollution in the textile industry.

A limitation of the research is the data evaluated, which is based only on the respondents' opinions of the innovations implemented. Company data on eco-innovations are difficult to obtain, and the financial statements that companies publish do not yet offer this information.

Innovation in the textile industry has been going on for a long time and it is of vital importance not only for the textile industry but for other industries as well (Hodges, Link, 2019). Furthermore, sustainability is seen as an important driver of current and future innovation. Sustainability and circularity in textile manufacturing are already priorities not only for companies and consumers, but also for public authorities in the EU. Unfortunately, according to the European Commission (2022), the change is gradual, relatively slow and the sector's environmental and climate footprint is still significant. Yes, although it has been shown in this article that there are efforts within the European Union to transform the textile industry towards sustainability, environmental friendliness and economic growth, unfortunately the innovation activity of companies in this sector is currently relatively low in comparison to others. Niinimäki (2015) states that about 80 % of the textile sector involves transporting finished products from developing countries to developed countries. Developing countries are popular locations for manufacturers from developed countries to relocate production due to low labour costs, labour relations and environmental legislation that is less stringent than in developed countries (Niinimäki, 2015).

At the same time, there is considerable pressure on consumers from the supply of cheap textiles from developing countries which, unfortunately, sustainable and environmentally friendly textiles from the EU are not yet able to fully compete with. This is why the attitude of the consumer is also one of the key factors. Do they want more sustainable products, produced using less electricity, chemicals and carbon, or will they continue to prefer cheaper products from countries violating human rights and using highly unsustainable production practices? The solution could be, for example, the introduction of the now much-discussed carbon tariff on imports into the EU, which would compensate for the price difference between domestic goods and imports.

Based on the available information, it is discussed that the starting point for the Czech textile industry to grow is to increase exports, especially to European countries that appreciate top quality and are willing to pay for it. Czech companies should therefore invest in innovation with the aim of improving the quality of products, which will be the result of more environmentally friendly and sustainable production processes. This should ensure the competitiveness of the companies, combined with a sustainable economic growth.

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