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Technological Transformation of the Company Towards Sustainable Development – A Case Study

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Abstract:

Purpose: *The aim of the study was to evaluate the importance of technological transformation for enhancing enterprise competitiveness and supporting sustainable development based on a case study of a small and medium-sized enterprise.*
Design/Methodology/Approach: *The study employed a case study approach supported by a qualitative in-depth interview conducted in 2026 with the owner of the analyzed enterprise to identify the key determinants, effects, and challenges of technological transformation.*
Findings: *The findings indicate that technological transformation improves organizational efficiency, service quality, energy efficiency, and market competitiveness while simultaneously supporting the implementation of sustainable development principles through environmental, organizational, and strategic improvements.*
Practical Implications: *The results provide practical guidance for managers by demonstrating that successful technological transformation requires the integration of technological investments with organizational change, human capital development, and long-term sustainability-oriented strategic planning.*
Originality/Value: *The originality of the study lies in identifying the key factors of technological transformation and sustainable development determinants and proposing an original conceptual model based on qualitative evidence obtained from an SME case study.*

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1. Introduction

The dynamic development of digital technologies, growing requirements in the field of environmental protection and increasing competitive pressure make technological transformation one of the most important directions of development of modern enterprises. The implementation of innovative technological solutions is no longer limited to the modernization of production or service processes, but includes a comprehensive change in the way the organization operates, resource management and building a competitive advantage.

At the same time, companies are increasingly obliged to take into account the principles of sustainable development, including rational management of resources, reducing negative impact on the environment and achieving long-term economic efficiency. As a consequence, technological transformation and sustainable development cease to be separate areas of management, creating mutually complementary elements of the company's modern development strategy.

Despite the growing number of studies on digitization and technological transformation, there is still a lack of studies presenting the actual course of the process of implementing modern technologies in small and medium-sized enterprises and their impact on the implementation of sustainable development goals.

Most of the research to date focuses on quantitative analyses or refers to large industrial enterprises, while relatively rarely an in-depth analysis of the processes taking place in individual organizations, taking into account the perspective of those directly responsible for the planning and implementation of technological investments, is undertaken. The added value of this article is the identification of key drivers of technological transformation and determinants of sustainable development on the basis of a case study of an enterprise from the SME sector.

An additional contribution is the development of an original model presenting the relationships between the factors of technological transformation and the determinants

of sustainable development, isolated on the basis of a qualitative in-depth interview with the owner of the company.

The structure of the article has been subordinated to the achievement of the adopted research goal. The first part presents a review of the literature on the technological transformation of enterprises and its importance for the implementation of sustainable development assumptions. Next, the research methodology was presented, including a case study and a qualitative in-depth interview conducted

with the owner of the surveyed company. In the next part, the results of the research are discussed, the author's model of technological transformation factors and determinants of sustainable development is presented, and conclusions and recommendations for business practice are formulated. The article ends with the limitations of the conducted research and the indication of the directions of further research work.

2. Literature Review

2.1 Technological Transformation of Enterprises

The technological transformation of enterprises is currently one of the most important directions of development of modern organizations operating in the conditions of dynamic economic changes and technological progress. This process goes beyond the implementation of individual IT solutions and includes a comprehensive redesign of business models, operational processes and ways of managing enterprise resources.

The literature emphasizes that effective technological transformation requires the integration of digital technologies with the strategic goals of the organization and the creation of conditions conducive to continuous process improvement and building innovation (Obukhova *et al.,* 2020; Liu *et al.,* 2024). As a result, companies increase their adaptability and flexibility of operation, which allows them to respond more effectively to changing market needs and stakeholder expectations (Wu *et al.,* 2024; Liu *et al.,* 2025).

The results of previous research indicate that technological transformation remains one of the most important factors stimulating the development of innovation of enterprises. The implementation of modern digital technologies is conducive to the creation of new products, the improvement of production processes and the increase in the efficiency of research and development activities.

Digital solutions enable more efficient use of knowledge resources, improved information flow, and faster management decision-making, which translates into an increase in the ability of enterprises to generate technological innovations (Hu *et al.,* 2024; Fang and Liu, 2024). At the same time, the development of the digital economy

and the intensification of digitization processes increase the potential of enterprises to implement innovative organizational and technological solutions, strengthening their competitive advantage (Li *et al.,* 2022; Liu, 2025).

More and more attention is also paid to the importance of technological transformation in the implementation of sustainable development assumptions. Research indicates that the digitization of enterprises is conducive to improving energy efficiency, reducing greenhouse gas emissions and the development of green technological innovations.

The use of intelligent process management systems enables more rational management of resources, reduced energy consumption of processes and reduction of the negative impact of enterprises on the natural environment (Su and Wu, 2024; Feng *et al.,* 2022). At the same time, technological transformation supports the development of low-carbon technologies and contributes to increasing the efficiency of production and the implementation of solutions in line with the concept of the green economy (Du *et al.,* 2023; Zhou and Liu, 2024; Chen *et al.,* 2024; Zhang *et al.,* 2023).

Modern enterprises increasingly treat technological transformation as an element of a long-term strategy for building the value of an organization. The literature emphasizes that the effectiveness of this process depends not only on the level of advancement of the technologies used, but also on the development of employee competencies, organizational changes and the company's ability to integrate digital processes with business and environmental goals.

Technological transformation also improves the quality of management, the development of ESG practices, and increases the resilience of organizations to changes in the economic environment (Zhong *et al.,* 2023; Guo *et al.,* 2023). In SMEs, the use of modern digital tools supporting strategic management, process automation and building a sustainable competitive advantage, while maintaining high economic and environmental efficiency, is of particular importance (Bhuiyan *et al.,* 2024; Liu *et al.,* 2024).

2.2 Technological Transformation of Enterprises and Sustainable Development

Technological transformation of enterprises is currently perceived as one of the most important instruments supporting the implementation of sustainable development assumptions.

The implementation of modern digital technologies makes it possible to simultaneously achieve economic, environmental and social goals by improving the efficiency of processes, reducing resource consumption and increasing the organization's ability to adapt to dynamic changes in the environment. The literature emphasizes that the digital transformation of enterprises fosters the building of a

sustainable foundation of sustainable development, enabling more rational management of resources, reduction of operating costs, and improvement of operational efficiency (Su and Wu, 2024; Luo and Liu, 2024).

At the same time, the development of digital technologies is becoming an important factor supporting the achievement of the United Nations Sustainable Development Goals, especially in companies operating in sectors characterized by high energy consumption and environmental pressure (Yu *et al.,* 2024; Richnák and Fidlerová, 2022).

Strategic management of technological transformation is also increasingly important as a process leading to increased organizational resilience and building long-term value of the company. The implementation of modern technological solutions requires not only investments in digital infrastructure, but also organizational changes, the development of employee competencies, and the adaptation of management models to the requirements of the digital economy (Pronchakov *et al.,* 2022).

This is particularly important in the SME sector, where digitalisation makes it possible to increase competitiveness while supporting the achievement of environmental and social objectives (Akpan and Ibidunni, 2023; Philbin *et al.,* 2022). In addition, the literature indicates that effective technological transformation fosters the development of corporate social responsibility and intensifies the implementation of green technological innovations, thereby strengthening the organization's ability to conduct sustainable activities (Zheng and Zhang, 2023; Zhang *et al.,* 2023).

The development of digital technologies, artificial intelligence and big data analytics creates new opportunities for companies to achieve high economic efficiency while reducing the negative impact on the natural environment. Research indicates that the use of advanced technologies supports the decision-making process, increases resource efficiency, and accelerates the implementation of pro-ecological innovations (Kulkov *et al.,* 2024).

The development of digital finance, which facilitates the financing of green investments and supports the development of a low-carbon economy, also plays an important role (Razzaq and Yang, 2023). Technological transformation also contributes to increasing the capacity of companies to implement green innovations, improve environmental performance, and build a competitive advantage based on responsible resource management (Feng *et al.,* 2022).

At the same time, it is emphasized that the impact of digital transformation on sustainability is not automatic and depends on how the change process is managed and the degree of integration of technology with the company's strategic goals (Du and Qu, 2024).

3. Methods, Materials, and Results

3.1 Methods and Materials

The aim of the article was to assess the importance of technological transformation of the company for the implementation of sustainable development assumptions and the increase of its competitiveness. Particular attention was paid to the identification of organizational, economic and environmental benefits resulting from the implementation of innovative technologies in an enterprise from the SME sector.

A research hypothesis was adopted assuming that technological transformation based on the implementation of innovative and energy-efficient technological solutions contributes to increasing the organizational efficiency of the company, increasing its competitiveness and achieving the assumptions of sustainable development. The following research questions were subordinated to the implementation of the research objective:

- What were the reasons for the decision to implement innovative technologies?
- How did the implemented solutions affect the organization of processes taking place in the company?
- What are the economic and environmental benefits of technological transformation?
- How did the implemented innovations affect the competitiveness of the company?
- What barriers have occurred during the technological transformation process?
- What directions of further technological development does the company plan?

The study used the case study method, supplemented by a qualitative in-depth interview conducted in 2026 with the owner of the studied company. The selection of the respondent was intentional, because the owner directly participated in the process of planning, implementation and evaluation of the effects of the implemented technological investment.

The interview was conducted on the basis of the author's script comprising eight open-ended questions referring to the motives for the implementation of innovations, the course of technological transformation, the organizational, economic and environmental effects obtained, and the planned directions of further development of the company. The obtained empirical material was subjected to qualitative analysis, focusing on the identification of the most important conditions and effects of the technological transformation process.

The enterprise was selected purposively because it had recently completed a comprehensive technological transformation involving technological, organizational and environmental changes.

3.2 Results

In order to deepen the results of the analysis and better understand the determinants of the technological transformation process of the enterprise in 2026, a qualitative in-depth interview was conducted with the owner of the surveyed enterprise.

The use of this research method made it possible to learn about the motives for investment decisions, identify barriers and benefits related to the implementation of innovative technological solutions and assess their impact on the functioning of the company. The interview scenario included eight questions related to key aspects of the technological transformation process. Table 1 presents a synthetic summary of the questions and answers obtained during the qualitative interview conducted with the business owner.

Table 1. *Results of the qualitative interview*

Review question	Synthetic interview response
What were the reasons for the implementation of the new technology?	Increasing energy costs, the need to increase process efficiency and maintain a competitive advantage.
What was the importance of sustainability in the investment decision?	An important criterion was the reduction of energy consumption, reduction of pollutant emissions and the use of renewable energy sources.
What organizational changes were necessary to implement the technology?	Work processes were reorganized and employees were trained, adapting the company to new technological solutions.
How did the implemented technology affect the quality of the services provided?	Higher quality of paint coatings, greater repeatability of the process and shortening of service delivery time were achieved.
How did the investment affect the company's competitiveness?	The attractiveness of the offer was increased, new customers were acquired and the company's market position was strengthened.
What barriers have occurred during the technological transformation process?	The biggest challenges were the high investment costs, the need to adapt the infrastructure and the process of implementing new solutions.
What were the economic effects of the investment?	Operating costs have been reduced, process efficiency has been increased and the economic efficiency of the company has been improved.
What are the further directions of the company's development?	Further investments in automation, digitization and technologies increasing energy efficiency and sustainability are planned.

Source: *Own study.*

The first question concerned the reasons for making a decision to implement modern technologies to support the painting process. The response was informed that the main factors were rising energy costs, the need to increase the efficiency of technological processes and the desire to maintain a competitive advantage in the market by offering higher quality services.

The second question referred to the importance of sustainable development in the investment planning process. The responses obtained indicated that environmental aspects were one of the most important criteria for the selection of technologies. Particular attention was paid to reducing energy consumption, reducing pollutant emissions and using renewable energy sources.

The third question concerned the organizational changes that were necessary to implement the new technology. The response emphasized the need to adjust the organization of work, train employees and change the way of planning and implementing technological processes, which contributed to improving the efficiency of the company's operation.

The fourth question focused on the impact of the implemented technology on the quality of the services provided. The information obtained indicated that modern solutions made it possible to achieve greater repeatability of the painting process, shorten the time of service delivery and improve the quality of the obtained paint coatings.

The fifth question concerned the impact of investments on the competitiveness of the company. The response indicated that the implementation of the innovative technology made it possible to expand the service offer, increase the number of customers and build the image of the company using modern and ecological technological solutions.

The sixth question referred to the barriers encountered during the process of technological transformation. The responses obtained indicated that the biggest challenge was the high investment outlays, the need to adapt the technical infrastructure and the time needed to fully implement the new organizational solutions.

The seventh question concerned the impact of investments on the economic efficiency of the company. The response emphasized the gradual reduction of operating costs, reduction of energy consumption of technological processes and increase in work efficiency, which in the long term translated into an improvement in the company's economic results.

The last question referred to the plans for further development of the company. The information obtained indicated that the technological transformation was treated as a

long-term process. The owner has declared that it will continue to invest in digital solutions, process automation and technologies supporting energy efficiency and sustainable development of the company.

The interview confirmed that technological transformation is not limited only to the implementation of modern equipment, but also includes organizational, strategic and environmental changes, which together determine the long-term development and increase in the competitiveness of the company.

4. Discussion

On the basis of the conducted research, several important conclusions can be drawn. First of all, it was confirmed that technological transformation is one of the key factors supporting the development of the company and strengthening its competitive position. The implementation of modern technologies has contributed not only to the improvement of organizational efficiency and the quality of the processes carried out, but also to the increase in efficiency and reduction of the costs of the business.

The results also indicate that effective technological transformation requires the simultaneous consideration of organizational, economic and environmental aspects. The mere purchase of modern technological solutions is not enough if it is not accompanied by appropriate changes in the organization of work, the development of employee competencies and long-term strategic planning.

The research also confirmed that the implementation of technologies based on energy efficiency and the use of renewable energy sources is conducive to the achievement of sustainable development assumptions. Reducing the energy consumption of processes, reducing the negative impact on the environment and rationalizing the use of resources contribute to achieving economic and environmental benefits at the same time.

An important conclusion is also that technological transformation improves the quality of services provided and increases customer satisfaction, which translates into the possibility of acquiring new customers and strengthening the company's position on the market. At the same time, this process should be perceived as a continuous activity, requiring systematic monitoring of technological changes and consistent investment in the further development of the company.

The conducted research confirmed the adopted research hypothesis, according to which technological transformation based on the implementation of innovative and energy-efficient technological solutions contributes to increasing the organizational efficiency of the company, increasing its competitiveness and achieving the assumptions of sustainable development.

The results obtained indicate that the integration of technological innovations with the strategic goals of the company can be an important factor in building a sustainable competitive advantage in the conditions of dynamic changes taking place in the modern economic environment.

Figure 1 (in Appendix) presents the author's model of the factors of technological transformation of the company and the determinants of sustainable development identified on the basis of the conducted qualitative interview. The presented model indicates that technological transformation is a multidimensional process, covering both technological, organizational, economic and social aspects.

The most important factors of technological transformation include energy efficiency, reduction of operating costs, technological innovation, market competitiveness, sustainable development, organizational changes, human capital development, improvement of process quality, as well as digitization and automation.

At the same time, the model indicates that effective technological transformation leads to the implementation of the basic determinants of sustainable development of the company. Among them, improvements in energy efficiency, the use of renewable energy sources, reduction of negative environmental impacts, optimization of resource use, development of human capital and long-term strategic orientation were identified.

The results obtained confirm that the implementation of innovative technologies should not be seen only as an investment in modern technical means, but as a comprehensive management process that integrates economic, environmental and social goals. As a consequence, technological transformation is becoming an important tool for building a sustainable competitive advantage of the company and supporting its sustainable development in the long term.

5. Conclusions

The findings demonstrate that technological transformation should be considered not only as an investment in modern technologies but also as a strategic management process supporting sustainable competitiveness and long-term enterprise development.

On the basis of the results of the research, several recommendations can be formulated for companies planning or implementing the process of technological transformation. First of all, this process should be treated as an element of the organization's long-term development strategy, and not only as an investment project aimed at the purchase of modern technologies. The effectiveness of technological transformation depends on the simultaneous consideration of organizational, economic, environmental and social aspects.

It is reasonable to focus investment activities on solutions that increase energy efficiency and enable the use of renewable energy sources, as they also contribute to reducing operating costs, improving process efficiency and achieving sustainable development goals. The implementation of new technologies should be preceded by an analysis of the company's needs and an assessment of potential organizational and economic effects, which allows to reduce the risk of ineffective investments.

An important element of technological transformation should also be preparing the organization for changes through the development of employee competencies, adaptation of organizational processes and building an organizational culture conducive to innovation and continuous improvement. The results obtained also indicate the need for systematic monitoring of the effects of implemented technological solutions and their impact on the company's efficiency, the quality of services provided and the level of competitiveness.

It is also recommended to integrate activities related to digitization, automation and environmental protection within a single company development strategy. This approach allows for sustainable economic, organizational and environmental benefits, while increasing the company's ability to operate in the conditions of dynamic technological changes and growing market demands.

Future directions of research should focus on expanding the analysis to include a larger number of companies representing different industries and different levels of technological advancement, which will make it possible to compare the conditions and effects of technological transformation in different organizational conditions. It also seems reasonable to conduct quantitative research allowing for statistical verification of the relationship between the level of technological transformation and the competitiveness of enterprises, organizational efficiency and the achievement of sustainable development goals.

It is also worth expanding the scope of analyses to assess the impact of digitization, automation and the use of artificial intelligence on the efficiency of business processes, the quality of services provided and the ability of companies to build a sustainable competitive advantage. An interesting direction of further research may also be the identification of factors determining the effectiveness of technological transformation in enterprises of various sizes and determining the role of organizational culture, employee competencies and management style in the process of implementing innovative technologies.

In addition, it seems expedient to conduct long-term research to assess the durability of the effects of technological transformation and their impact on the development of enterprises in changing economic and technological conditions.

This would allow for deepening knowledge on the mechanisms of integrating technological innovations with the assumptions of sustainable development and the development of universal models supporting the process of technological transformation of enterprises.

5.1 Limitations

The conducted research has some limitations that should be taken into account when interpreting the results obtained. The study was carried out in the form of a case study of one company, which limits the possibility of direct generalization of conclusions to the entire population of companies operating in other industries or different market conditions.

The use of a qualitative in-depth interview with the owner of the enterprise made it possible to obtain detailed information about the process of technological transformation, but the presented assessments are subjective and reflect the perspective of a person directly involved in the planning and implementation of the investment.

Another limitation of the study is the inability to quantitatively verify all identified relationships and assess their statistical strength. The results obtained are primarily exploratory and interpretative, focusing on the identification of mechanisms and determinants of the technological transformation of the company.

In addition, the analysis was carried out at a specific point in the development of the surveyed company, which means that the long-term effects of the implemented technological solutions may change along with the development of the organization and changes in the economic and technological environment.

Despite the indicated limitations, the results obtained provide valuable indications regarding the importance of technological transformation for the implementation of sustainable development assumptions and the increase in the competitiveness of enterprises. At the same time, they provide a basis for further research involving a larger number of companies representing different sectors of the economy and using both qualitative and quantitative research methods.

Conflicts of Interest: *The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.*

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Appendix:

Figure 1. *Conceptual model of technological transformation and sustainable development determinants*

