

SME SECTOR IN CONDITIONS OF ECOLOGICAL TRANSFORMATION

**Tatiana COLESNICOVA PhD, Associate Professor,
Leading Scientific Researcher,
Head of Department "Social Research and Standard of Living"
National Institute for Economic Research
Academy of Economic Studies of Moldova,
E-mail: ctania@gmail.com
ORCID: <https://orcid.org/0000-0001-9663-6991>**

**Iulia BEJENARU, scientific researcher,
National Institute for Economic Research,
Academy of Economic Studies of Moldova
E-mail: iuliabejenaru90@gmail.com
ORCID: <https://orcid.org/0009-0008-2050-4384>**

DOI: <https://doi.org/10.36004/nier.cecg.I.2024.18.12>

Abstract. *This research analyzes the problems of the SME sector in the context of environmental transformation. The report of the UN Commission on Environmental Problems forecasts revealed that our planet will face serious environmental changes until 2032. Human activity will lead to deformation of more than 70% of the Earth's surface and disappearance of more than a quarter of flora and fauna species. The threat of shortages of clean air, drinking water and virgin landscapes is becoming a reality. According to WHO, 80% of diseases are linked to poor quality water, and about 5 million people die each year from dirty water. In the future, water may become the cause of conflicts similar to modern conflicts over oil. The relevance of this research lies in the founding solutions to reduce negative environmental impacts, especially in the context of small and medium-sized enterprises (SMEs), which play an important role in the economy. Sustainable business development becomes a key element for the protection of nature and public health. In Moldova, the issue of environmental transformation of SMEs is insufficiently researched, which emphasizes the relevance of this research. The aim of this research is to determine the role of SMEs in the ecological transformation of the economy, as well as to identify barriers and opportunities for the introduction of environmentally friendly technologies in this sector. Scientific methods include analyzing statistical data, analyzing surveys and interviews with experts, as well as comparative analysis of other countries' experience. The results of the research reveal that improving environmental indicators open a new business opportunity for SMEs, but the main barriers are lack of resources, skilled labor and knowledge. Support from public authorities is required to balance economic and environmental interests and ensure sustainable development.*

Keywords: *environmental change, surface deformation, clean water, small and medium enterprises (SMEs), pollution, sustainable development, resources, government support.*

JEL: L26, M13, O13, Q01, Q25, Q56

UDC: 502.131+ 502.171

Introduction. In the modern world, ecological transformation has become a necessity due to the depletion of natural resources and dangerous consumerism towards the environment. Habitual patterns of production and consumption have contributed to the emergence of significant environmental problems, which directly affects the quality of life of people and their health, as well as poses threats to global security. This situation requires fundamental changes in the management of natural resources and economic processes.

Economic views on nature began to take shape during the period of pre-classical and classical school of economics. The contributions of the physiocrats, such as François Quéné, had a significant influence on later theories. He saw land and agriculture as key elements in the growth of the economy, and his model was one of the first to reflect the relationship between the economy and nature. Adam Smith later developed these ideas in his (1776a) work, *An Inquiry into the Nature and Causes of the Wealth of Nations*, but the classical school remained skeptical about the potential for long-term growth when natural resources were depleted.

Today, the greening of the economy plays a crucial role, especially in the small and medium-sized enterprise (SME) sector, which provides a significant share of employment and contributes to economic growth. SMEs actively influence the development of scientific and technological progress and job creation. However, their involvement in environmental transformation remains low and environmental initiatives have been slow and limited.

Many European Union and EaP countries are seeking to motivate SMEs to adopt environmentally friendly technologies and sustainable practices. Various regulatory and economic incentive instruments are used for this purpose. However, many countries have not yet created sufficient legal and institutional conditions to raise environmental standards in the SME sector. The introduction of environmentally sustainable practices requires an integrated approach, which should include information campaigns, financial support and strengthened environmental regulation.

Thus, the environmental transformation of SMEs is an important and multi-stage process that requires attention from governments to ensure sustainable economic development and environmental protection.

The aim of this study is to analyze the impact of environmental transformation on small and medium-sized enterprises (SMEs) in the Republic of Moldova, as well as to develop recommendations for improving the management of SME sector development in the country.

In order to achieve this objective, the following tasks should be accomplished:

1. To investigate the role of SMEs in the ecological transformation of the economy, identifying their contribution to sustainable development and environmental responsibility.
2. Identify the barriers that prevent SMEs from improving their environmental performance, including financial and technical constraints.
3. Analyze the main challenges faced by domestic SMEs in environmental transformation to identify key areas for improvement.
4. Propose specific measures to support the adoption of environmentally friendly business practices, including the development of support programs and strategies.

Literature review. The ecological transformation of business and the implementation of environmental practices are becoming increasingly relevant and widely discussed in academic circles. Due to the deteriorating environmental situation in the world, many scientists are looking for ways to integrate sustainable development into the economy. In this process, small and medium-sized businesses play an important role and are actively involved in the implementation of environmentally friendly production methods.

In recent years, researchers' attention has focused on the greening of small and medium-sized enterprises (SMEs) in different countries. According to the European Commission, SMEs contribute significantly to environmental pollution. A study by OECD (2018) identified many barriers faced by SMEs in adopting green technologies: lack of finance, lack of information and lack of sufficient incentives.

One of the first works that influenced the modern understanding of the relationship between economy and nature was *The Wealth of Nations* (Adam Smith, 1776b). This work described how natural resources affect economic growth. Later his ideas were supplemented by physiocrats, who considered land as the main source of wealth and for the first time emphasized the connection between nature and human economic activity.

In the twentieth century, the issue of the impact of business on nature became particularly urgent. The problems of pollution, especially water, were described in the famous work “Welfare Economics” (Arthur Cecil Pigou, 1920). This theory describes the need for government regulation to combat the negative consequences of economic activity. Pigou proposed the idea that the consequences of taxes (so-called Pigovian taxes) can be used to solve the problems of pollution and other negative side effects. We would also like to emphasize the famous hypothesis that came to be preserved as the Smith curve (Simon Kuznets, 1950-1960). He suggested that at the initial stages of economic growth and pollution continues, but at later stages, after reaching a certain level of income, there is a decline in indicators, including pollution. The works developed by these renowned economists laid the foundation for the concepts of sustainable development and environmental regulation.

Among the significant studies on the role of SMEs in sustainable development are the works (Michael Porter and Klaas van der Linde, 1995) describing how

environmental innovation affects business competitiveness. The studies prove that enterprises implementing environmental initiatives not only improve their reputation, but also gain economic benefits by reducing raw material and energy costs.

An important area of research is eco-economics, which focuses on finding a balance between economic growth and environmental protection. Increasing attention is being paid to green innovation and the concept of circular economy, which proposes a shift from the traditional linear production model to a circular one where waste is minimized and resources are reused. Eco-economics also emphasizes social justice and equity in the distribution of natural goods. It considers not only the economic benefits but also the long-term consequences for future generations, suggesting strategies to prevent resource depletion. An important aspect of eco-economics is the recognition that sustainable growth is only possible if environmental and economic interests are integrated, which implies a revision of traditional consumption and production patterns.

The issue of environmental regulation of business is widely discussed in the scientific literature. A significant contribution to this topic was made by Porter and Van der Linde (1995), who argued that environmental regulations can stimulate innovation and improve the economic performance of firms. In discussions about environmental regulation of business, the idea of introducing “environmental taxes” and “carbon pricing” is often mentioned. These measures suggest that companies should pay to pollute or to use natural resources, encouraging them to do less harm to the environment. It is also said that it is important to incorporate environmental standards into companies' strategies, which can lead to new business models and help ensure long-term business sustainability.

Thus, current research shows that despite the importance of the SME sector to the economy, it faces many challenges in adopting environmentally sustainable practices. Nevertheless, the environmental transformation of this sector is not only relevant, but can be the basis for increased competitiveness and sustainable development.

Research methodology. This study uses a comprehensive methodological approach that combines the method of analyzing quantitative and qualitative indicators of the impact of environmental transformation on small and medium-sized businesses (SMEs) in the context of modern economic and environmental challenges. The study investigated the relationship between the degree of environmental integration in the business processes of enterprises, their economic performance and sustainable development. Also, this study focused on identifying barriers and incentives for the adoption of environmentally friendly technologies and practices.

At the initial stage of the study, data collected from various official sources were analyzed. The main sources were data published by the National Bureau of Statistics, as well as reports from the European Commission, the Organization for Economic Cooperation and Development (OECD), and analytical materials from

Statista and Eurostat platforms. These sources provided important information for analyzing the dynamics of environmental and economic performance of SMEs, as well as for identifying key trends and challenges related to environmental regulation of enterprises.

Also included in the study was a comparative analysis of the environmental and economic performance of SMEs in the European Union and EaP countries. This stage helped to identify differences in the level of environmental regulation and practices among the countries, as well as to identify successful models of green business applied in different regions.

Main results. According to research conducted in 2019 by the Special Association of Artisans, Small and Medium-sized Enterprises (UEAPME) revealed that small and medium-sized enterprises are responsible for around 64% of pollution from industrial sources in the European Union. However, only a small proportion of these enterprises are actively taking measures to reduce their environmental impact: between 3% and 4% of micro-enterprises, between 7% and 8% of small companies and between 6% and 7% of medium-sized enterprises.

The ecological system, as the natural habitat of human society, is the result of the long-term evolution of nature. While society, economy and enterprises are artificial structures created by man, over time they have become part of the ecosystem and have begun to influence its balance.

It is challenging for the government to regulate the environmental activities of SMEs due to the diversity of their activities and associated environmental problems, the large number of actors and the lack of information on the degree of environmental compliance. Most SMEs remain vulnerable to environmental compliance as they often lack awareness of existing regulations and the difficulties of continuous compliance.

The development of SMEs is significantly affected by the instability in the country's economy, as well as by existing legal regulations, the tax system and the general standard of living of the population. In the current environment in which enterprises in this sector operate, there are many factors that create unfavorable conditions for doing business. Especially in the context of the northern regions, the important role of SMEs as a tool for realizing the economic interests of different market players, as well as a key element in the development of human capital and a stimulant for environmental responsibility and innovation in sustainable development should be taken into account.

Although the individual environmental impact of SMEs may seem insignificant, this sector accounts for an overwhelming share of all enterprises, which makes their cumulative impact on nature quite significant. Every year, more and more businesses are realizing the benefits of adopting environmentally friendly technologies, such as reducing raw material costs, complying with environmental standards and improving customer relations. However, a significant proportion of SMEs still do not fully realize that a high level of environmental performance can serve as a competitive advantage. In addition, most enterprises face difficulties in

interpreting and adequately responding to existing regulatory requirements and incentives aimed at supporting sustainable development.

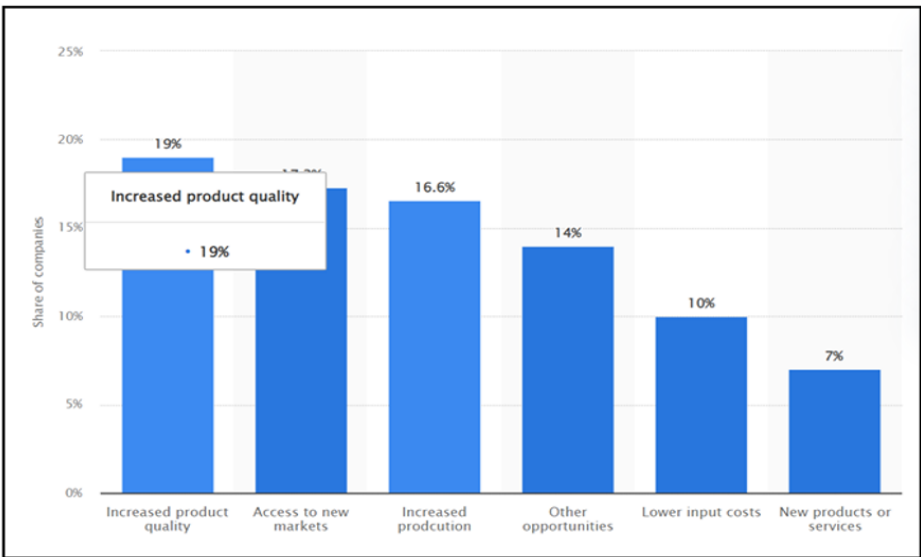


Figure 1. **Benefits of environmental investments for SMEs worldwide, 2021**
Source: Statista, <https://www.statista.com/statistics/1249921/sme-gains-from-environmental-investment/>

According to Statista, the most common benefit of environmental investments is improved product quality, reported by 19% of SMEs globally in 2021. One-sixth of these companies also reported entering new markets and increasing production as a result of environmental investments.

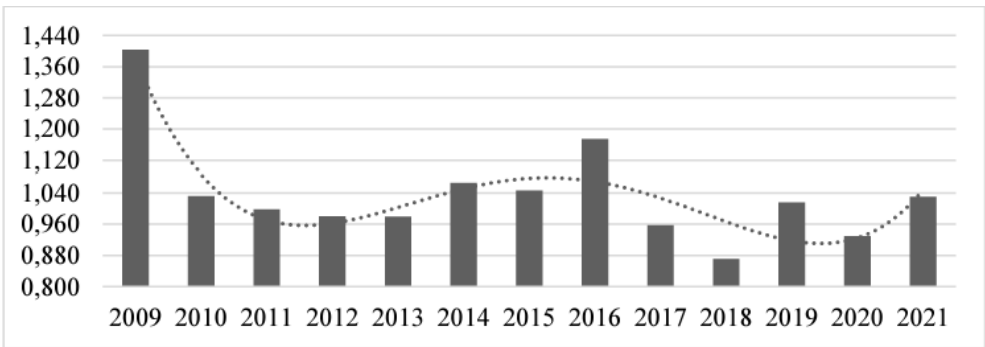


Figure 2. **Evolution of environmental and economic efficiency in the Republic of Moldova, 2009-2021, %**
Source: ANACEC, <https://anacec.md/files/Chirtoca-teza.pdf>

Based on the official, annually provided data of the National Bureau of Statistics of the Republic of Moldova, calculations and analysis of the environmental and economic efficiency indicator were obtained. At the country level, this indicator in 2010 showed a significant decrease by 0.371 units (%) compared to 2009. This trend continued in subsequent years, with the lowest value of 0.871 units (%) in 2018

(see Figure 2). The decrease in the indicator indicates the deterioration of the situation in the field of environmental protection, increased pressure on natural resources, as well as the inefficiency of the current model of economic growth.

Also, we would like to note that according to EU4Environment's 2022 SME surveys in Armenia and Moldova, only 12% and 23.5% of companies that take steps to improve resource efficiency receive any technical or financial assistance in these countries. The likelihood of receiving support increases with the size of the company, with micro-businesses receiving little or no such support. The lack of state support in these countries represents a significant gap compared to the level of state support for SMEs in EU countries.

There are examples of financing sources for energy efficiency and renewable energy projects in Armenia. For example, Inecobank and Araratbank offer “green loans” for energy efficiency projects such as energy efficient lighting, thermal insulation and solar thermal installations. These loans are supported by the Greening for Economic Growth Fund's Southeast Europe chapter.

Ameriabank, since 2012, and Anelik Bank, since 2010, offer “renewable energy loans” under Armenia's Sustainable Energy Financing Program. This program was established by the European Bank for Reconstruction and Development (EBRD) to support the financing of energy efficiency and renewable energy projects implemented by the private sector in Armenia.

Also, the International Finance Corporation (IFC) provided USD 15 million in financing to HSBC Armenia to support sustainable energy projects and provide loans to SMEs interested in investing in energy saving technologies and promoting efficient use of resources.

We would like to mention that the Republic of Moldova has a Greening Program for SMEs, approved by Government Decision No. 592/2019, which is implemented by the Organization for Business Development (ODA). The main objective of the program is to encourage, support and develop the capacity of SMEs to implement environmental practices in production processes and service provision. The program activities are financed from the state budget of the Republic of Moldova and supported by the EU4Environment project funded by the European Union.

This national greening program for SMEs includes the provision of information support, advice and mentoring, as well as environmental training and education. The program also focuses on research and development, promotion, exchange of best practices at both national and European levels in the application of green and circular economy principles. In addition, grant funding is envisaged for greening activities of SMEs and supporting their access to international markets.

Conclusions. Changing production processes can be complex, but you can start with small steps. For example, it may be worth reducing the amount of packaging for delivery or increasing the volume of output. Once these initial steps have been accomplished, you can move on to more complex tasks:

1. Introduce an ecological corporate culture, introduce eco-initiatives into the company's activities and guide the organization on the path of sustainable development. Today, sustainable development is the criterion for successfully solving the environmental problems of an enterprise.
2. Switch to alternative energy sources, reduce inefficient use of water and electricity. Organize separate waste collection at all stages of production. This can be assisted by various environmental organizations that exist in most cities.
3. Develop social responsibility. This includes support for orphanages and boarding schools, participation in charity marathons and campaigns, as well as participation in clean-up days and other events.
4. Organize training events for employees. Employees should understand the reasons for the changes. Most often companies choose lectures with experts or environmental team building as a format.

Despite the large number of empirical studies that have demonstrated that improving a company's environmental performance leads to increased financial results, many small and medium-sized enterprises (SMEs) still fear that environmental improvements will be associated with increased costs. They fear that the desire to protect the environment may conflict with the need to keep costs low in order to run a successful business. The main challenge is to convince SMEs that green business practices not only help to reduce costs, but also help to improve business performance.

The situation with state support for SMEs in the Republic of Moldova, as in other EaP countries, remains very heterogeneous. Usually, state authorities are minimally active in promoting environmental sustainability and best practices. The role of the state is often limited to accepting projects financed by international donors without active participation in their implementation.

In a number of EaP countries, ministries of economy implement various information and training programs for small businesses, but these initiatives do not always become an integral part of their daily activities. A positive example is Georgia, where the Ministry of Economy and Sustainable Development provides private companies with reliable and practical data and analytical materials. This agency actively informs businesses about the opportunities that come with implementing sustainable business practices.

Several key conclusions can be drawn from this research:

- SMEs play an important role in the ecological transformation of the economy, but face barriers such as financial constraints and lack of technical information, making it difficult for them to adopt green technologies.
- Domestic SMEs' internal problems, such as lack of support and difficulty in adapting to environmental requirements, also require attention.
- Technical and financial support measures are needed to encourage the adoption of green practices, including the establishment of grant and subsidy programs.

- The introduction of environmental management certification systems would be an important step to improve the competitiveness of SMEs and their environmental performance.
- In order to achieve sustainable development in the context of environmental transformation, it is necessary to continue research aimed at assessing long-term effects and developing effective support strategies.

Acknowledgments / Note: The article was developed within the framework of Subprogram 030101 „Strengthening the resilience, competitiveness, and sustainability of the economy of the Republic of Moldova in the context of the accession process to the European Union”, institutional funding.

REFERENCES

- Annual report on european SMEs. (2024). Database. <http://ec.europa.eu/>
- Cirtoca, A. (2024). Managerial aspects of the process of eco-economy formation in the Republic of Moldova. Dissertation for the degree of Doctor of Economic Sciences. Chisinau, ASEM. <https://anacec.md/files/Chirtoca-teza.pdf>
- Dezvoltarea durabilă verde a Republicii Moldova. <http://www.green.gov.md/pageview.php?l=ro&idc=30&t=/Prezentare/Ce-inseamna-dezvoltareadurabila-si-economia-verde>
- Gagauzia Regional Development Agency. (2022). Moldovan small and medium-sized enterprises (SMEs) are invited to learn about resource efficiency. <https://www.adrgagauzia.md/libview.php?l=ru&idc=340&id=4318&t=/precca/novocti/moldavckie-malie-i-crednie-predpriatiea-mcp-priglasaiutcea-dlea-poluceniea-znanii-ob-affektivnocti-icpolizovanieia-recurcov/>
- Kené, F. (1758). Table of the Agricultural Production. [historical archives].
- Kuznets, S. (1955). Economic growth and income inequality. The American Economic Review, 45(1), 1-28. <https://www.jstor.org/stable/1811581>
- National Bureau of Statistics of the Republic of Moldova. Annual reports on environmental and economic efficiency. <https://statistica.gov.md/ro>
- Organisation for Economic Cooperation and Development (OECD). (2018) <https://www.oecd.org/sti/inno/boostinginnovationtheclusterapproach.htm>
- Organisation for Economic Cooperation and Development (OECD). (2020). Environmental policies and practices for SMEs. <https://www.oecd.org/>
- Pigou, A. C. (1920). The economics of welfare. London: Macmillan and Co. http://files.libertyfund.org/files/1410/Pigou_0316.pdf
- Porter, M. E., & Van der Linde, K. (1995). Green and Competitive: Ending the Stalemate. Harvard Business Review, 73(5), September-October). <https://hbr.org/1995/09/green-and-competitive-ending-the-stalemate>
- Smith, A. (1776a). An Inquiry into the Nature and Causes of the Wealth of Nations. An Inquiry into the Nature and Causes of the Wealth of Nations, but the classical school remained skeptical about the potential for long-term growth when natural resources were depleted. https://cdn.gumer.info/bibliotek_Buks/Econom/smit/smit_1.pdf

- Smith, A. (1776b). The Wealth of Nations: An Inquiry into the Nature and Causes of the Wealth of Nations. London: W. Strahan and T. Cadell (1776b).
- Statista. (2021). Environmental investments benefits for SMEs worldwide in 2021. <https://www.statista.com/statistics/12345678/environmental-investments-benefits-smes-worldwide/>
- Strategia Națională de dezvoltare "Moldova Europeană 2030". (2022) <https://www.mediu.gov.md/ro/content/4119>
- United Nations Environment Program (UNEP). Improving the efficiency of resource utilization. <https://www.unep.org/>