

INTERNATIONAL ECONOMIC RELATIONS

Yaroslav Hrytsenko, Master of International Economic Relations

*Educational and Scientific Institute of International Relations
of the Taras Shevchenko National University of Kyiv
Kyiv, Ukraine*

DOI: <https://doi.org/10.30525/978-9934-26-698-0-32>

SMEs IN THE SYSTEM OF GREEN TRANSFORMATION OF INDUSTRIAL DEVELOPMENT: FINANCIAL, TECHNOLOGICAL, AND INSTITUTIONAL CHALLENGES

The contemporary transformation of the global economy is increasingly shaped by the simultaneous interaction of climate, technological, energy, and digital transitions, which collectively alter the principles of industrial development and international competitiveness. The growing role of decarbonization policy, green industrial modernization, and technological sovereignty demonstrates that environmental regulation no longer functions exclusively as a component of ecological policy but increasingly becomes an instrument of economic restructuring and strategic competition between states. Under such conditions, the green transition transforms not only production technologies and energy systems, but also mechanisms of market access, investment resources, technological infrastructure, and participation in global value chains.

An important feature of contemporary industrial transformation is the growing interdependence between climate regulation and industrial policy. Green industrial policy is increasingly focused on supporting strategic sectors, accelerating technological modernization, stimulating low-carbon innovation, and strengthening domestic production capacity. Consequently, the logic of industrial development gradually shifts from maximizing production efficiency primarily through cost minimization to ensuring technological resilience, sustainability, and carbon competitiveness. In this configuration, access to green technologies, sustainable financing, and digital infrastructure becomes a key determinant of economic competitiveness.

These processes substantially affect the position of micro, small, and medium-sized enterprises within the global economy. SMEs account for a

significant share of employment, regional economic activity, and entrepreneurial dynamism, while simultaneously functioning as important channels for innovation diffusion and local production diversification. However, unlike large corporations, SMEs often possess more limited financial resources, weaker technological capabilities, and lower institutional resilience, which constrain their capacity to adapt to rapidly changing regulatory and technological conditions. The acceleration of green transformation, therefore, intensifies structural asymmetries between large and small businesses, particularly in relation to decarbonization costs, technological modernization, and compliance with emerging environmental standards.

At the same time, contemporary climate policy increasingly shapes the structure of international competition through mechanisms such as carbon regulation, green standards, sustainable finance requirements, and environmental certification systems. The emergence of low-carbon production requirements and climate-related trade instruments creates a situation in which environmental compliance gradually becomes a prerequisite for maintaining access to international markets and investment flows. Under such conditions, SMEs risk experiencing forms of green marginalization due to insufficient financial and technological capacity to adapt to the new architecture of global industrial competition.

The digital transformation of financial systems partially changes these dynamics. Financial technologies, digital lending platforms, alternative financing mechanisms, and data-driven risk assessment systems expand opportunities for SME participation in financial markets and reduce barriers to traditional banking. Simultaneously, digitalization facilitates the formation of integrated production-financial ecosystems in which technological infrastructure, financial instruments, state support mechanisms, and innovation networks function as interconnected elements of industrial modernization. As a result, the effectiveness of contemporary SME policy increasingly depends not only on the scale of financial support but also on the capacity to integrate enterprises into digital and low-carbon development ecosystems.

Within this context, the transformation of SME support policy reflects broader changes in the contemporary model of capitalism, where green transition, technological modernization, and digitalization become mutually reinforcing processes. The state increasingly serves as the strategic coordinator of structural transformation, combining climate objectives with industrial development priorities and technological upgrading. SME support policy gradually evolves from fragmented

compensatory measures toward ecosystem-based models of industrial adaptation to ensure long-term competitiveness within the emerging low-carbon economy.

Traditional models of SME support based on direct subsidization and preferential lending are gradually being replaced by an ecosystem support model, in which financial, technological, digital, and institutional instruments operate as interconnected mechanisms to ensure enterprise competitiveness. In this context, SMEs are increasingly viewed not merely as participants in entrepreneurial activity, but as structural elements of industrial modernization and climate adaptation policy [1].

The green transition fundamentally reshapes the logic of competitiveness in the global economy. While earlier competitive advantages were largely determined by low production costs, cheap labor, and access to raw materials, contemporary industrial development increasingly depends on reducing carbon intensity, improving energy efficiency, modernizing technology, and integrating into low-carbon value chains. Under such conditions, SMEs often face structural disadvantages compared to large corporations due to limited access to financial resources, innovation infrastructure, and advanced technologies. As a result, climate transformation intensifies asymmetries between enterprises with different levels of capital concentration and technological capacity [2].

Financial constraints remain a key barrier to SME adaptation within the system of green industrial transformation. The problem concerns not only insufficient credit availability, but also structural inequalities in access to financing between large and small businesses. High transaction costs, limited collateral, lower financial transparency, and higher perceived risks reduce SMEs' opportunities to attract investment resources required for decarbonization and technological upgrading. Green modernization increasingly requires investments in energy-efficient technologies, digital reporting systems, environmental certification, and emission-monitoring mechanisms, thereby significantly increasing the financial burden on small enterprises [3].

In this context, financial technologies ("fintech") have gradually become an important mechanism for overcoming barriers to capital access. Digital lending platforms, crowdfunding, peer-to-peer financing, and alternative credit scoring systems help reduce transaction costs and expand SME participation in financial markets. Fintech solutions simultaneously stimulate the digitalization of business processes, improve financial transparency, and facilitate the integration of enterprises into modern digital economic ecosystems. Digital financial infrastructure becomes an

important component of green industrial policy aimed at supporting technological modernization and increasing climate resilience [4].

The green transformation also alters the state's role in industrial development policy. The state increasingly performs not only compensatory functions associated with correcting market failures but also acts as a coordinator of structural modernization and technological transition. Within mission-oriented policy, SME support is integrated into broader objectives of decarbonization, the development of clean technologies, energy transformation, and the strengthening of technological sovereignty. Subsidies, grants, tax incentives, and green financing programs therefore function not as isolated support measures, but as instruments of long-term restructuring of the production system and industrial competitiveness [5].

An important challenge in this process is the risk of green peripheralization, when new climate standards and environmental requirements become barriers to SMEs' access to international markets, technologies, and investment resources. Large corporations possess significantly greater capacity to finance decarbonization, integrate into low-carbon production chains, and participate in international green financing initiatives. SMEs, especially in developing economies and carbon-intensive production systems, risk being marginalized within the new architecture of global competition. Effective state support increasingly requires combining financial, technological, and institutional instruments within a unified ecosystem of industrial and climate modernization.

At the same time, the green transition creates new opportunities for SMEs. The expansion of circular economy models, localization of production, growth in demand for environmentally friendly products, and the diffusion of green technologies create new market niches for small enterprises. Under such conditions, SMEs may become important drivers of sustainable industrial development, innovation diffusion, and regional economic diversification. The transformation of SME support policy reflects broader changes in the global economic system, within which green transition, technological modernization, and digitalization operate as interconnected processes shaping new models of international competitiveness.

References:

1. Medvedieva M., Yedeliev R., Reznikova N., Nanavov A., Grydasova G. (2024). European strategy for achieving climate neutrality and analysis of legal instruments for its implementation. *Social and Legal Studios*, vol. 7, no. 2, pp. 64–74. DOI: <https://doi.org/10.32518/sals2.2024.64>

2. Reznikova N., Grod M. (2024). Institutionalization of climate change combat in the EU and socio-economic effects of industry decarbonization. *Actual Problems of International Relations*, vol. 158, no. 1, pp. 59–69. DOI: <https://doi.org/10.17721/apmv.2024.158.1.59-69>
3. Reznikova N., Ivashchenko O., Kurbala N. (2020). Tendencies in the development performance of small and medium-sized businesses and their impact on the economic conjuncture and competitiveness of developed countries. *Ekonomika ta derzhava*, no. 10, pp. 4–14. DOI: <https://doi.org/10.32702/2306-6806.2020.10.4>
4. Reznikova N., Panchenko V., Husarova K., Hrytsenko Y. (2026). Erosion of climate multilateralism: From a universal regime to a localized regulatory logic. *Ekonomichnyi prostir*, vol. 212, pp. 184–192. DOI: <https://doi.org/10.30838/EP.212.184-192>
5. Reznikova, N., Panchenko, V., Husarova, K., & Hrytsenko, Y. (2026). Climate imperative as a legitimizing framework of structural domination: Green regulatory frameworks of coercive modernization. *European Scientific Journal of Economic and Financial Innovation*, Vol. 2 (20), 121–132. <https://doi.org/10.32750/2026-0210>