

ROMANIAN INDUSTRIAL SECTOR IN EUROPEAN CONTEXT

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ABSTRACT: *The Romanian industry plays an important role in the national economy and in Romania's integration into the European market. Since 1990, the Romanian industry has been affected by outdated technological infrastructure, high energy consumption, and underfunding of research and development. This article analyzes the position of the Romanian industrial sector in the European context, highlighting both the progress made and the challenges faced. It also explores the development prospects of the European and Romanian industrial sector, emphasizing the opportunities that must be overcome to ensure a resilient and sustainable industrial economy. The conclusions underline the necessity of coherent public policies and a strategy to ensure the sustainable and competitive development of the Romanian industry.*

Keywords: *European Union, Romania, industry, competitiveness.*

JEL Classification: *O14, Q01*

1. INTRODUCTION

Industry represents an important pillar of the European economy, significantly contributing to economic growth, employment, and the transition to a sustainable development model. In order to strengthen the European Union industrial competitiveness and promote a more sustainable, resilient and digitalised economy, the European Commission published the industrial policy [1]. An important place in the EU's industrial policy is occupied by the European industrial strategy, updated in May 2021, which focuses on the following key areas:

- addressing EU strategic dependencies;
- strengthening the resilience of the single market;
- accelerating the green and digital transitions.

Complementing the European industrial strategy, at the beginning of 2025 was adopted the European Clean Industry Deal, outlining the development directions of European industry, focusing on digitization, innovation and reducing environmental impact.

In this context, Romania's industrial sector is influenced by the European Union strategies and policies, which driving its adaptation to the new technological and environmental requirements set at the European level and have a direct impact on its competitiveness.

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2. OVERVIEW OF THE ROMANIAN INDUSTRIAL SECTOR IN THE EUROPEAN CONTEXT

Industry is the backbone of the European economy, and directly provides 35 million jobs. In 2024, compared with 2023, in European Union the annual average industrial production decreased by 2,3% and in December 2024, compared with December 2023, industrial production decreased by 1,7% [2].

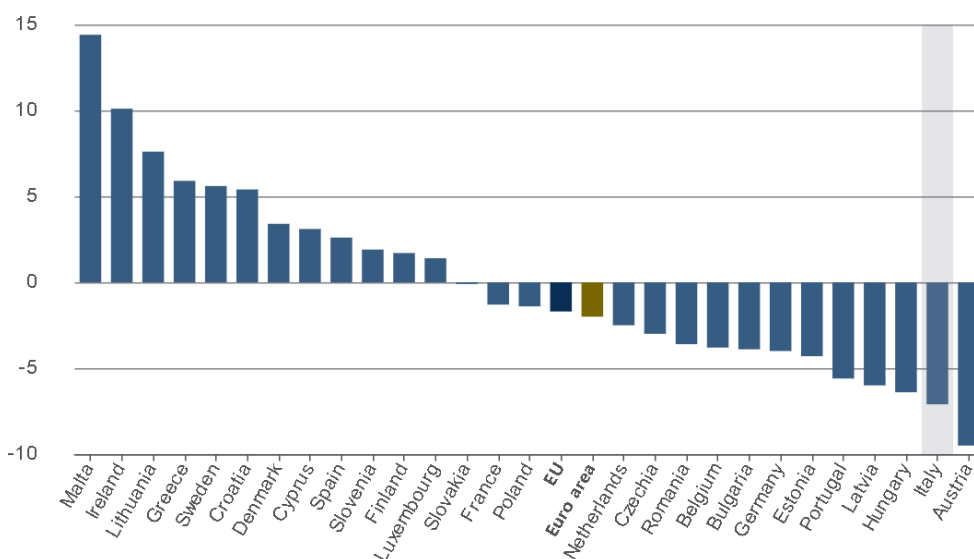
Table 1. Industrial production in EU- % change compared with same month of the previous year

2024	Jul	Aug	Sept	Oct	Nov	Dec
Total industry	1,5	-0,1	-1,7	-0,5	-1,5	-1,7
Intermediate goods	3,9	-2,4	-3,5	-2,7	-1,8	-2,3
Energy	1,2	2,2	1,5	-0,9	0,3	0,6
Capital goods	4,0	-0,4	-5,1	-1,8	-2,8	-7,5
Durable consumer goods	4,2	-4,4	-2,7	-2,6	0,5	-1,8
Non-durable consumer goods	4,4	2,9	5,1	4,3	0,5	8,2

Source: Author owns processing based on Eurostat data (2025)

In the EU, in December 2024, compared with December 2023, industrial production decreased by 2,3% for intermediate goods, 7,5% for capital goods 1,8% for durable consumer goods and increased by 0,6% for energy and 8,2% for non-durable consumer goods (Table 1). The largest annual decreases were recorded in Austria (-9,5%), Italy (-7,1%) and Hungary (-6,4%) (Figure 1). The highest increases were observed in Malta (+14,4%), Ireland (+10,1%) and Lithuania (+7,6%) [2].

Figure 1. Industrial production in December 2024 % change compared with December 2023



Source: Eurostat (2025)

Industrial production has a major importance for Romania, which has a significant industrial tradition and a substantial base of raw materials and energy sources/mineral resources. According to data provided by the National Institute of Statistics, Romania's industrial production decreased by 1,5% in 2024, the most drastic decreasing being in

electricity and thermal energy production, gas, hot water, and air conditioning, with 4,7% [3]. In January 2025, compared to December 2024, industrial production in Romania declined, as a gross series, with -2,3%. This decrease was driven by contractions in the extractive industry (-8,3%) and the manufacturing industry (-2,4%). However, the production and supply of electricity and heat, gas, hot water, and air conditioning increased by 0,8%. Despite these conditions, Romania demonstrated a positive performance in the industrial sector at the beginning of 2025, surpassing the European Union average [4].

The industrial turnover, encompassing both the domestic and external markets, increased nominally by 5,6% in 2024 compared to the previous year. This evolution was primarily influenced by the manufacturing industry, which grew by 5,9%, while the extractive industry registered a decline of 1,8%. Across major industrial groups, turnover growth was recorded in the following sectors: capital goods industry (+11%), durable consumer goods industry (+7,5%), fast-moving consumer goods industry (+3,8%), and intermediate goods industry (+3%). Conversely, the energy industry experienced a decline of 2,5% [5]. Thus, although certain industrial sectors in Romania have registered increases in 2024, the industry, as a whole, continued to face significant challenges, as reflected in the overall decline in industrial production.

Over the past decade, Romania's economy has undergone some of the most profound structural shifts in Europe and the share of industry and agriculture in GDP has registered the steepest decline in the EU. As a result, the contribution of industry to GDP formation dropped from 25.2% in 2013 to just over 20% at present, in the conditions in which, at the European level, industry has strengthened its role in GDP formation. Even if in 2013, Romania ranked second in the EU in terms of industry's share in the economic mix, following the Czech Republic, a decade later, the country has fallen to eighth place [6]. Even under these conditions, the industrial sector still holds a significant share in the economy.

In the current geopolitical and economic context, industrial policies within the European Union are crucial to ensuring security, prosperity, and climate change mitigation. New policies, focused on the sustainable transformation of Member States' industries, reflects a shift in strategic thinking at both the European and national levels. In this regard, Mario Draghi's report proposed a dual approach to the challenges of industrial transition, centered on decarbonization and competitiveness objectives [7].

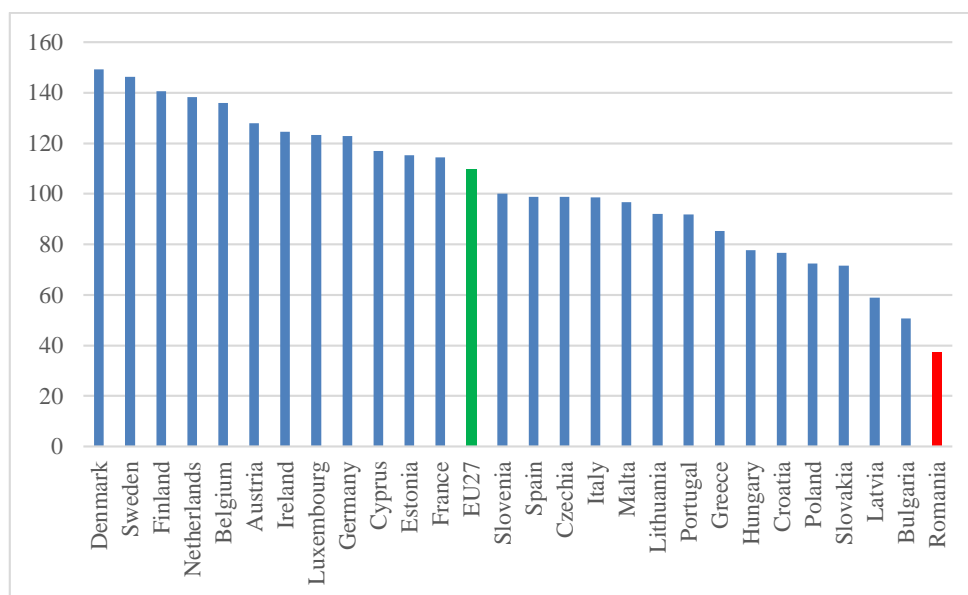
Competitiveness is at the heart of the EU's agenda and, Commission takes action to maintain European industry's global competitiveness, reach climate-neutrality by 2050, and make Europe fit for the digital age [8]. Europe now faces major transformations, the first of which is the need to accelerate innovation and find new growth engines. The EU's competitiveness is currently being squeezed from two sides. On the one side, EU companies are facing weaker foreign demand and rising competitive pressures from Chinese companies. On the other side, Europe's position in the advanced technologies that will drive future growth is declining. Only four of the world's top 50 tech companies are European and the EU's global position in tech is deteriorating: from 2013 to 2023 [7].

As a key driver of the EU's long-term competitiveness and prosperity, research and innovation policy is a powerful tool to achieve Europe's ambitious digital and green objectives and to enhance its resilience and technological sovereignty. In this context, the European Innovation Scoreboard serves as a performance compass for Europe's commitment to fostering innovation [9]

The European Union's innovation performance, as measured by the European Innovation Scoreboard, increased by 10% since 2017. Between 2023 and 2024, the EU's innovation performance improved by 0,5 percentage points as a result of the innovation performance increasing in 15 Member States. In 2024, Denmark occupied first position as the most innovative Member State, ahead of Sweden which was the leading EU Member State

from 2017-2022 (Figure 2.). Compared to the 2023 edition, the performance of Member States has remained relatively stable and most EU Member States have increased their innovation performance since 2017 [9].

Figure 2. European Innovation Scoreboard index in 2024



Source: Author owns processing based on Eurostat data (2025).

At the European level, according to the European Innovation Scoreboard 2024, Romania is an emerging innovator and occupies the last position in the EU in terms of innovation performance. Among the relative strengths of the Romania are: broadband penetration, exports of medium and high technology products and air emissions by fine particulates. On the other hand, relative weaknesses are: population with tertiary education, SMEs introducing business process innovations, innovative SMEs collaborating with others.

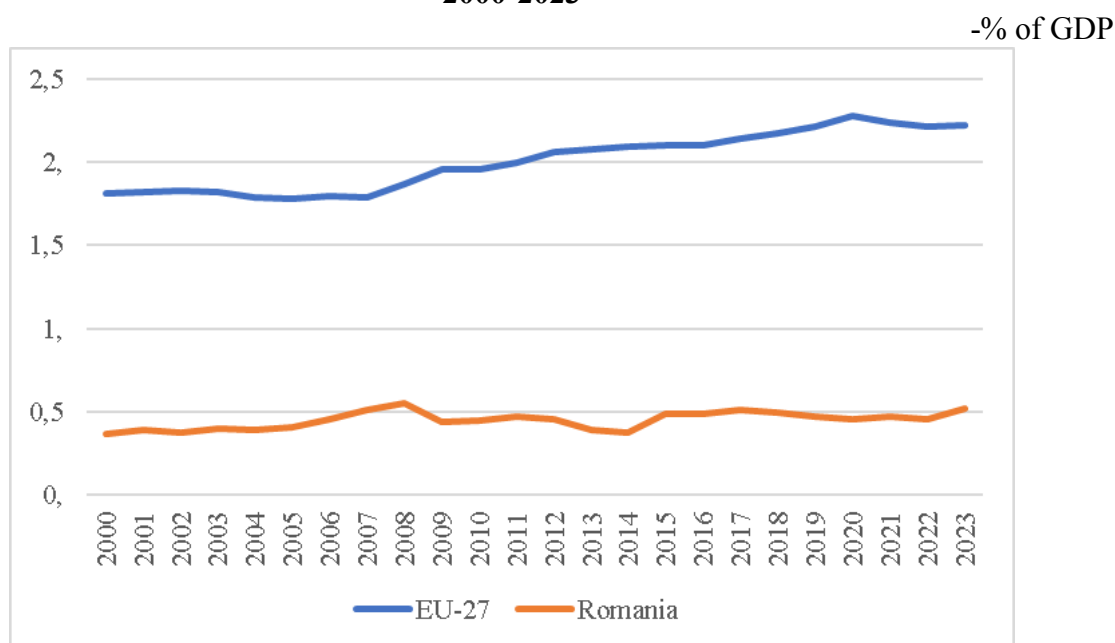
Alongside innovation, European industrial development strategies consider research and development as one of the key factors for boosting economic competitiveness. Unfortunately, Romania faces significant challenges in strengthening its competitiveness through research and development and for many years research in Romania is underfunded. Although EU policy recommends allocating 3% of GDP to research and development —1% from public funds and the remainder from private sources—public expenditure on research and development has been continuously declining in recent years (Figure 3.).

The level of research- development expenditure in Romania does not exceed 0,5% of GDP, significantly below the EU-27 average of approximately 2.2% of GDP [10] Chronic underfunding of research and development represents a major challenge for Romania, with profound implications for the country's economic, social, and technological progress. In an increasingly competitive world, where innovation serves as the primary driver of economic growth, insufficient investment in this field limits development potential and undermines Romania's ability to compete on the global stage. The effect of research- development underfunding is evident in economic performance, the migration of highly skilled personnel, the lack of innovation and technological development, and the declining quality of education.

This persistent Romania's weakness is reflected in the low levels of investments in applied and experimental research. A lack of collaboration and coordination between public institutions, universities, and the business sector exacerbates this issue, further hindered by a limited and insufficiently attractive talent pool for researchers and innovators.

Applied research should be leveraged through innovation to generate positive economic impacts. However, Romania has consistently ranked last in the EU's Innovation Scoreboard, indicating that research is not effectively contributing to economic performance and competitiveness. Nevertheless, through the National Strategy for Research, Innovation, and Smart Specialization 2021-2027, Romania reaffirms its strategic commitment to increasing public research and development spending to reach 1% of GDP by 2027 [11].

Figure 3. Evolution of public research and development expenditures in Romania, 2000-2023



Source: Author owns processing based on Eurostat data (2025).

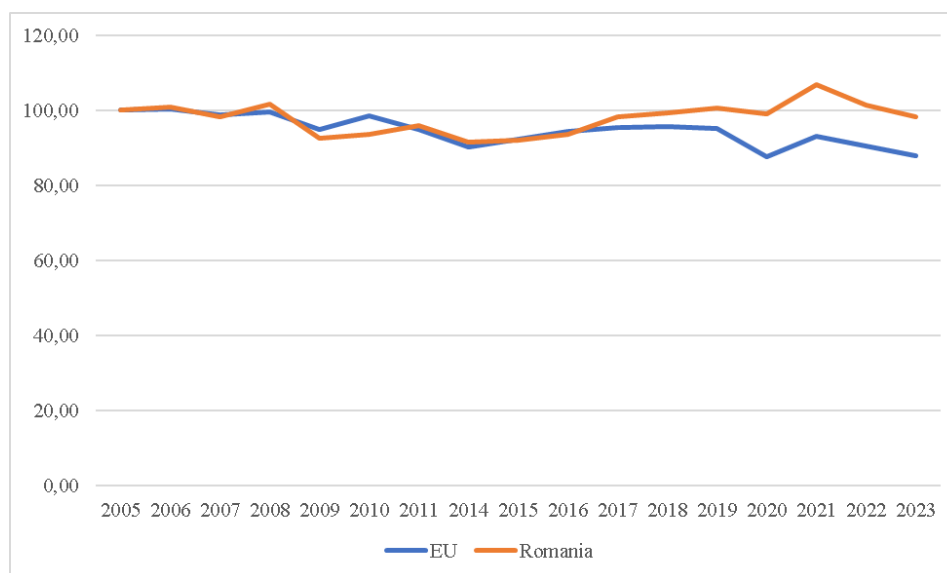
Also, Romania lags in the integration of digital technologies, ranking 27th in the EU for digital technology adoption, according to the 2024 Digital Economy and Society Index (DESI) [12]. The share of SMEs with at least a basic level of digital intensity stood at 22%, far below the EU average of 55%. Therefore, efforts must be intensified to meet the Digital Decade target, which aims for 90% of SMEs to achieve a basic level of digital intensity by 2030. Currently, only 12% of SMEs engage in online sales, and a mere 4% conduct cross-border e-commerce, positioning Romania behind most EU member states. Adoption of advanced technologies, such as cloud computing, remains low at just 11%, compared to the EU average of 34%. In terms of artificial intelligence, only 1% of Romanian businesses have integrated AI technologies (EU average: 8%). The use of big data analytics also remains relatively low at 5%, compared to the EU average of 14. On a slightly more positive note, the proportion of businesses with a medium-to-high level of green ICT initiatives stands at 68%, slightly above the EU average of 66% [12].

Regarding Romania's energy efficiency, the period from 2005 to 2023 was characterized by a general decline in final energy consumption, influenced by energy efficiency measures, the increasing share of renewable sources, and structural transformations in the economy. According to data from the National Institute of Statistics, in 2023, the final energy consumption for the entire economy decreased by 3.2% compared to 2022, due to declines recorded in industry (-13.8%), households (-4.3%), and agriculture and forestry (-2.7%) [13]. During this period, significant progress and initiatives aimed at aligning the country with the European Union objectives on sustainability and greenhouse gas emission reduction were highlighted. EU energy efficiency measures focus on policy areas with the greatest potential

for energy savings, like industry, the public sector, the construction and renovation of buildings, the transport and energy supply sectors

In 2023, compared to 2005, energy efficiency has improved both in the EU and in Romania (Figure 4). However, Romania remains below the European average in terms of energy efficiency [14] due to the greater dependence of its economy on energy-intensive sectors and the different pace of adopting energy efficiency measures.

Figure 4. Energy efficiency in Romania, 2005-2023- Index, 2005=100



Source: Author owns processing based on Eurostat data (2024).

We can consider that Romania has made progresses in improving energy efficiency, both by reducing energy consumption and by implementing policies and measures aligned with EU objectives, but the differences with developed countries have not been completely eliminated. So, although Romania has recently shown signs energy efficiency improvement, it still faces major challenges that require the implementation of effective strategies to ensure sustainable and competitive growth.

In order to improve energy efficiency along the entire energy chain, to reduce greenhouse gas emissions, and increase the competitiveness of economic activity across all sectors of the economy in 2024 has been adopted the Romania's Energy Strategy 2025-2035, with a perspective to 2050. In order to significantly improve energy efficiency at the national level, the Strategy proposes, by 2035 and with a view to 2050, the following: optimizing energy production, transmission and distribution processes to minimize losses and costs; using advanced technologies and practices to improve the efficiency of power plants, networks and other infrastructure; efficiently use of fossil fuels, the development and use of renewable energy resources, such as solar, wind and hydroelectric energy, and green gases (biomethane, hydrogen, synthetic methane, etc.), promoting energy efficiency among consumers – both industrial and residential, prioritizing investments in technologies and projects that offer the best return on investment over time [15].

3. CONCLUSION

The Romanian industry is undergoing a continuous transformation, shaped by both internal and external factors, such as European industrial policies, digitalization, and the need for a transition towards a green economy. While certain industrial sectors, such as capital goods

and durable consumer goods, have recorded growth, challenges persist in key areas such as research and development, digitalization, and energy efficiency. The main challenges of the Romanian industrial sector are:

- Declining industrial production – Romania experienced a contraction in industrial production in 2024 amid a broader industrial recession across Europe. This trend highlights the fragility of certain sectors and the lack of coherent policies to support domestic production.
- Underfunding of research and development – Romania invests well below the European average in research and development, hindering innovation and reducing the competitiveness of industrial companies.
- Delayed digitalization – The slow integration of digital technologies into the industrial sector negatively impacts productivity and efficiency.
- Skilled workforce shortage – The emigration of highly qualified labor and the lack of effective vocational training programs weaken the industry's ability to adapt to new technological requirements.

To overcome these challenges and ensure the sustainable and competitive development of Romania's industry, concrete measures are needed in several key areas:

- Increasing investments in research and innovation by: creating attractive funding schemes for companies investing in research and development, aligning applied research with business sector needs, increasing public funding for research, with the goal of reaching at least 1% of GDP by 2027.
- Accelerating industrial digitalization by: implementing a national industrial digitalization program, modeled after initiatives in other EU countries, to support the adoption of advanced technologies (automation, artificial intelligence, Internet of Things), developing innovation incubators and technology hubs to support industrial start-ups.
- Stimulating domestic production and reducing import dependency by: launching a reindustrialization program to support strategic sectors and reduce key import dependencies, encouraging the production of industrial equipment through subsidies and tax incentives for local companies, supporting Romanian companies in integrating into European supply chains through export assistance programs.
- Transitioning to a green and energy-efficient industry by: providing subsidies for sustainable technologies, including renewable energy production for industrial use, promoting energy efficiency through modernization programs and digitalization of energy consumption.

Romania is in a crucial position to reshape its industry and increase its competitiveness in the international market. By investing in technological modernization, energy efficiency, research and development, as well as by capitalizing on the green and digital transition, Romania has the opportunity to strengthen its economic role in the region. However, success will depend on the adoption of coherent and sustainable strategic measures that facilitate the transition to a modern, digitalized, and sustainable economy. Investments in innovation, education, and green technologies are essential to positioning Romania as a strong industrial hub in the region. In this context, the active involvement of the government, private sector, and academic institutions is crucial for developing a resilient industrial sector capable of addressing future challenges.

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