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ANALYSIS OF THE COMPETITIVENESS OF THE REPUBLIC OF MOLDOVA'S EXPORTS TO THE CHINESE MARKET IN THE CONTEXT OF TECHNOLOGICAL INNOVATIONS AND SUSTAINABILITY

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Purpose of the article: *This paper investigates the competitiveness of the Republic of Moldova's exports to the Chinese market, emphasizing the impact of technological innovations and sustainability-oriented practices. It aims to identify how green technologies, digitalization, and eco-efficient production enhance the international positioning of Moldovan exporters.*

Methodology: *The study employs a mixed research design, combining statistical analysis of trade indicators (RCA, export diversification index, and trade balance) with qualitative assessment of national strategies and bilateral cooperation programs in innovation and sustainable trade.*

Conclusions: *Results reveal that Moldova's export competitiveness increasingly depends on the integration of innovation, renewable energy solutions, and environmentally responsible production. Strengthening cooperation with China in digital trade, green technologies, and logistics infrastructure is essential to ensure sustainable export growth and alignment with global ESG standards.*

Originality: *The article introduces a sustainability-based analytical framework for assessing export competitiveness in emerging economies, highlighting how digital and green transformation jointly drive Moldova's long-term trade potential with China.*

Keywords: *export competitiveness; technological innovation; sustainable trade; green economy.*
JEL Classifications: F14, Q56, O33

INTRODUCTION

Export competitiveness is an important part of bringing emerging economies into the global trade system in the context of economic globalization (Porter, 1990; Krugman, 1994). The Republic of Moldova has a lot of work to do to improve its position on foreign markets, especially the Chinese market, which is highly competitive and characterized by advanced technological standards (World Bank, 2023; OECD, 2022). Digitalization, technological innovation, and a shift toward sustainability are becoming critical drivers for increasing export value-added and strengthening international competitiveness (UNCTAD, 2023; OECD, 2022). In this context, the paper examines the competitiveness of the Republic of Moldova's exports to China, emphasizing the significance of technological advancements and sustainability-oriented practices for the evolution of international trade (UNCTAD, 2023).

MATERIALS AND METHODS

The study uses a mixed-method approach, combining quantitative and qualitative analysis. The quantitative analysis utilizes statistical foreign trade data for the Republic of Moldova over the period 2020–2024, employing indicators such as Revealed Comparative Advantage (RCA), export diversification measures, and the trade balance (Balassa, 1965; International Trade Centre [ITC], 2025; UNCTAD, 2019).

The qualitative component examines strategic policy documents and bilateral cooperation directions in innovation and sustainability, with interpretation framed by current international evidence on digital and green trade transitions (OECD, 2022; UNCTAD, 2023). The applied methods include comparative analysis, dynamic analysis, and interpretative synthesis (UNCTAD, 2023).

RESULTS AND DISCUSSIONS

The dynamics of bilateral trade between the Republic of Moldova and China during 2020–2024 reflect structural changes in external economic relations, highlighting trade interdependencies, export competitiveness constraints, and a growing dependence on imports (ITC, 2025; United Nations, 2024). The integrated analysis of exports, imports, re-exports, and the trade balance enables the identification of major trends and imbalances that characterize this bilateral relationship in a context marked by global economic transformations and intensifying trade exchanges (UNCTAD, 2023).

Table 1. Dynamics of bilateral trade between the Republic of Moldova and China, 2020–2024

Product label	Moldova, Republic of's exports to China					Deviation			
	2020	2021	2022	2023	2024	2024 from 2020	2024 from 2021	2024 from 2022	2024 from 2023
Export	12488	12400	9773	7880	8463	-4025	-3937	-1310	583
Import	645831	836544	947165	1017546	1248674	602843	412130	301509	231128
Trade Balance	-633343	-824144	-937392	-1009666	-1240211	-606868	-416067	-302819	-230545
Reexport	1899	2608	1247	1482	1749	-150	-859	502	267

Source: elaborated by the authors based on the source (Trade Map, 2025).

During the period under review, bilateral trade between the Republic of Moldova and China (2020–2024) underwent substantial growth in total volume, predominantly fueled by the rapid increase in imports (ITC, 2025). The total value of trade went up by about 91%, from about USD 658.3 million in 2020 to over USD 1,257 million in 2024. This shows that the two countries' economic ties are getting stronger.

Exports of the Republic of Moldova to China recorded a medium-term downward trend, decreasing from USD 12,488 thousand in 2020 to USD 8,463 thousand in 2024. This represents a reduction of approximately 32%, indicating difficulties in maintaining competitiveness on the Chinese market (Porter, 1990; UNCTAD, 2023). However, 2024 marks a slight recovery compared to 2023, suggesting a possible beginning of stabilization.

In contrast, imports increased steadily and rapidly, from USD 645,831 thousand in 2020 to USD 1,248,674 thousand in 2024, registering a growth of over 93%. This evolution reflects the intensification of the Republic of Moldova's dependence on industrial, technological, and consumer goods originating from China (World Bank, 2023; ITC, 2025), particularly in sectors such as electrical equipment, machinery, and manufactured products.

The trade balance remained negative throughout the entire period, with the deficit deepening significantly from USD -633.3 million in 2020 to USD -1,240.2 million in 2024. This deterioration, of approximately 96%, indicates a structural asymmetry in trade relations, where imports grow at a much faster pace than exports (UNCTAD, 2023; ITC, 2025).

Re-exports showed a fluctuating evolution, with relatively low values ranging between USD 1,247 thousand and USD 2,608 thousand. In 2024, they reached USD 1,749 thousand, slightly below the 2020

level but higher than in the previous years. This dynamic suggests a limited yet existent role of the Republic of Moldova as an intermediary within regional trade chains (ITC, 2025).

In order to more clearly highlight the evolution of the Republic of Moldova's exports to China and to capture the dynamic trends recorded during the analyzed period, their graphical representation becomes relevant, as it allows for a more intuitive interpretation of both absolute and relative changes. In this context, Figure 1 illustrates the trajectory of exports over the period 2020–2024 (ITC, 2025), emphasizing both the medium-term downward trend and the early signs of recovery in the most recent year analyzed.

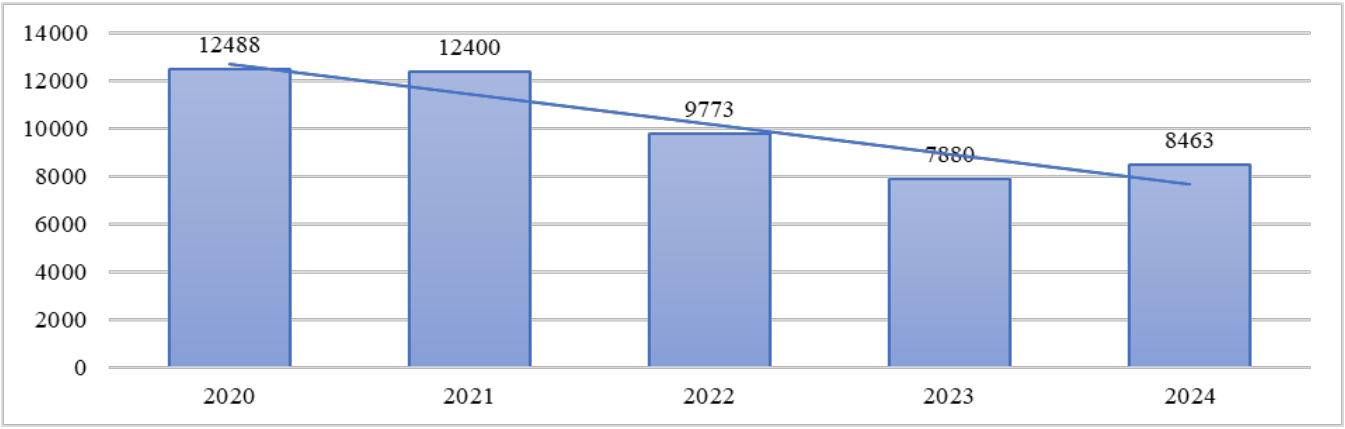


Figure 1. Analysis of the Republic of Moldova's exports to China during the period 2020–2024
Source: elaborated by the authors based on the source (Trade Map, 2025).

The analysis of the data presented in Figure 1 reveals a generally downward trend in the exports of the Republic of Moldova to China over the period 2020–2024, with a slight recovery in the last year analyzed.

Exports of the Republic of Moldova to China decreased from USD 12,488 thousand in 2020 to USD 8,463 thousand in 2024, reflecting a total decline of USD 4,025 thousand. The annual dynamics indicate a slight reduction in 2021 to USD 12,400 thousand, followed by a more pronounced contraction in 2022, when the value dropped to USD 9,773 thousand, and in 2023, when the minimum level of USD 7,880 thousand was recorded. In 2024, a modest recovery is observed, with exports increasing to USD 8,463 thousand, which is USD 583 thousand higher than in the previous year (UNCTAD, 2019).

Compared to the reference years, exports in 2024 are lower by USD 3,937 thousand compared to 2021 and by USD 1,310 thousand compared to 2022, confirming the downward trend over the medium term.

Exports of the Republic of Moldova to China declined by approximately 32.2% compared to the 2020 level and by around 31.7% relative to 2021. Compared to 2022, the decrease is about 13.4%, while in relation to 2023, an increase of approximately 7.4% is observed, indicating a slight recovery in the last analyzed year.

This evolution highlights two distinct phases. The first phase, 2020–2023, is characterized by a continuous contraction in exports, mainly driven by the reduction in shipments of traditional products, particularly beverages, which held a dominant share in the export structure. The second phase, represented by the year 2024, indicates a slight recovery supported by the emergence and consolidation of new product categories, including goods with a higher degree of processing or technological content.

From a structural perspective, the decline in exports reflects limited competitiveness on the Chinese market and a high dependence on a narrow range of products. At the same time, the increase recorded in 2024 suggests the beginning of a diversification process (Hausmann et al., 2007; UNCTAD, 2019), although still insufficient to offset the previous decline.

Estimating the export potential of the Republic of Moldova to China, it can be noted that it is currently in a phase of structural adjustment, characterized by a reduction in both absolute and relative terms over the medium term, but with early signs of stabilization. Strengthening this positive trend requires a strategic orientation toward higher value-added products and integration into more competitive global value chains (UNCTAD, 2023).

To more clearly illustrate the upward trend and stability in the evolution of imports of the Republic of Moldova from China, their graphical representation is useful, as it allows for the observation of the continuous increase and the intensification of trade flows throughout the analyzed period. In this regard, Figure 2 presents the dynamics of imports over the interval 2020–2024 (ITC, 2025), highlighting both the steady growth in their volume and the increasing economic dependence on the Chinese market.

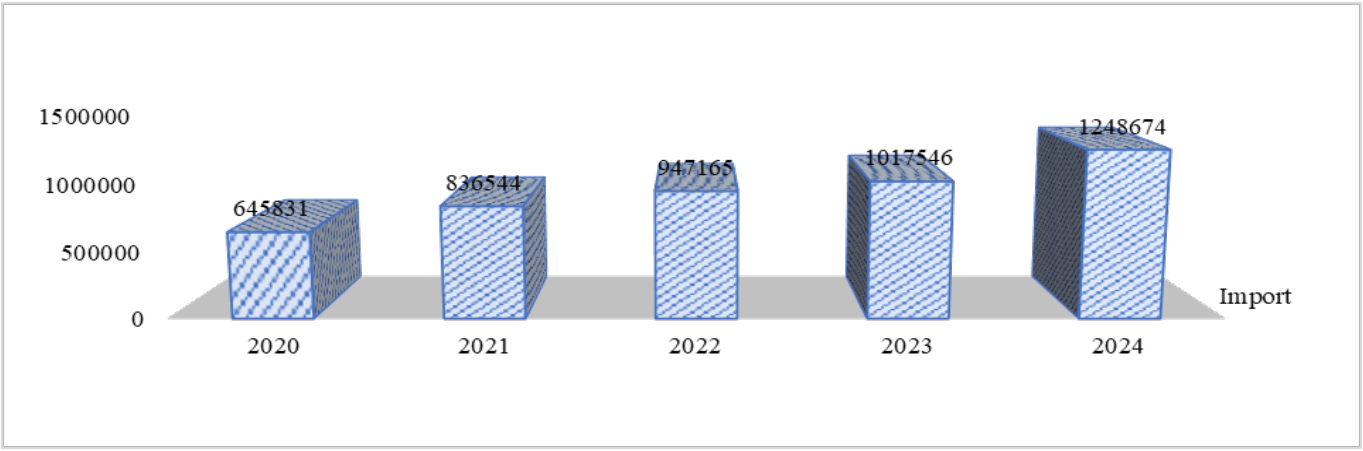


Figure 2. Dynamics of the Republic of Moldova's imports from China during the period 2020–2024
Source: elaborated by the authors based on the source (Trade Map, 2025).

The evolution of imports of the Republic of Moldova from China highlights a clearly upward trend, supported by the values recorded throughout the analyzed period. This dynamic reflects the intensification of bilateral trade relations and the increasing dependence of the national economy on goods originating from China (ITC, 2025; World Bank, 2023).

The value of imports increased steadily from USD 645,831 thousand in 2020 to USD 1,248,674 thousand in 2024, representing an increase of USD 602,843 thousand. The growth rate remained sustained throughout the entire period, with a noticeable acceleration between 2021 and 2023 and a consolidation in 2024 (UNCTAD, 2023). Compared to 2021, imports are higher by USD 412,130 thousand, and compared to 2022 by USD 301,509 thousand. Additionally, relative to 2023, an increase of USD 231,128 thousand is observed, indicating the persistence of the upward trend.

Analyzing the growth rate of imports, they have nearly doubled over the analyzed period, recording an increase of approximately 93% compared to 2020. Compared to 2021, the growth is around 49%, and relative to 2022 approximately 32%. Even compared to the previous year, 2023, an increase of over 22% is observed, confirming the continuous expansion of trade flows from China to the Republic of Moldova (Krugman, 1994; UNCTAD, 2023).

This evolution is mainly driven by the increase in imports of industrial and technological goods, particularly electrical equipment, machinery, metal products, textiles, and consumer goods, as also highlighted in the structural analysis of imports from the attached document. The increase in these flows shows that Chinese goods are becoming more integrated into the national economy, both in how they are made and how they are used in the country.

In conclusion, imports from China have grown quickly and steadily between 2020 and 2024. This has made China an even more important supplier of industrial and consumer goods to the Republic of Moldova. This trend shows both the chances that come with diversifying supply sources and the dangers that come with being too reliant on trade and having an external imbalance.

A graphical analysis of the trade balance is especially useful for showing how changes in exports and imports have affected the Republic of Moldova's trade relationship with China as a whole.

The picture makes it easy to see how the deficit is getting worse and how structural imbalances are already there. In this context, Figure 3 shows how the trade balance changed from 2020 to 2024. It shows how the negative balance kept getting bigger and how foreign trade was under more and more pressure.

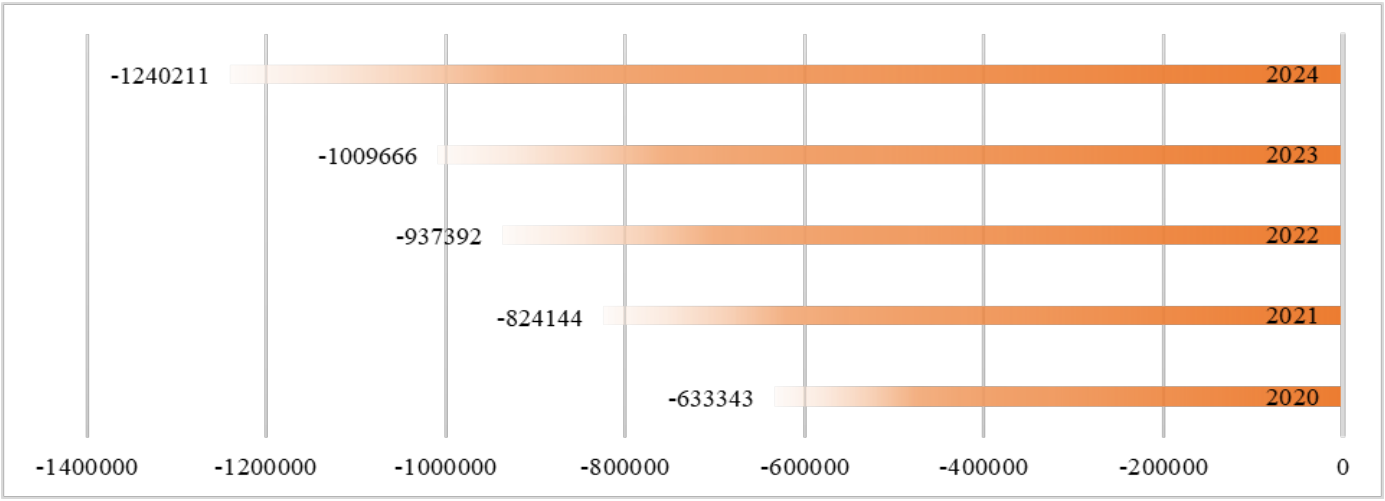


Figure 3. Evolutionary analysis of the trade balance of the Republic of Moldova in relation to China, 2020-2024

Source: elaborated by the authors based on the source (Trade Map, 2025).

The values presented indicate a continuous deterioration of the trade balance between the Republic of Moldova and China over the period 2020–2024. Throughout the analyzed period, the trade balance remains negative, and its evolution reflects a gradual deepening of the deficit.

In 2020, the trade deficit amounted to USD -633,343 thousand. In 2021, it worsened to USD -824,144 thousand, representing a deterioration of USD 190,801 thousand in a single year. The trend continued in 2022, when the negative balance reached USD -937,392 thousand, and in 2023, when it further declined to USD -1,009,666 thousand. The maximum deficit level was recorded in 2024, when the trade balance reached USD -1,240,211 thousand.

Compared to 2020, the deficit increased by USD 606,868 thousand, reflecting an almost doubling of the trade imbalance within just four years. Relative to 2021, the deterioration amounts to USD 416,067 thousand, and compared to 2022 to USD 302,819 thousand. Even in comparison with 2023, the year 2024 marks a further aggravation of the deficit by USD 230,545 thousand.

The deficit in 2024 is about 96% higher than it was in 2020 when you look at it as a percentage. The increase is more than 50% compared to 2021 and about 32% compared to 2022. The imbalance grew by about 23% from the previous year, 2023.

The evolution shown in the figure shows that the growth rate of imports has always been higher than the growth rate of exports. This has put more and more pressure on Moldova's external position. The structure of bilateral trade, which is mostly made up of imports of industrial and technological goods and

exports with relatively low added value, explains why the deficit keeps getting worse (Hausmann et al., 2007; OECD, 2022).

The data in the figure show that there is a clear structural asymmetry in trade relations between Moldova and China, which is shown by the rapid growth of the trade imbalance. This underlines the need for measures aimed at diversifying and strengthening the competitiveness of Moldovan exports on the Chinese market.

To better highlight the variability and instability of the Republic of Moldova's re-exports to China, their graphical representation is useful, as it allows for capturing annual fluctuations and the phases of growth and decline. In this context, Figure 4 illustrates the evolution of re-exports over the period 2020–2024, emphasizing both their significant oscillations and the moderate recovery trend observed in the most recent years analyzed.

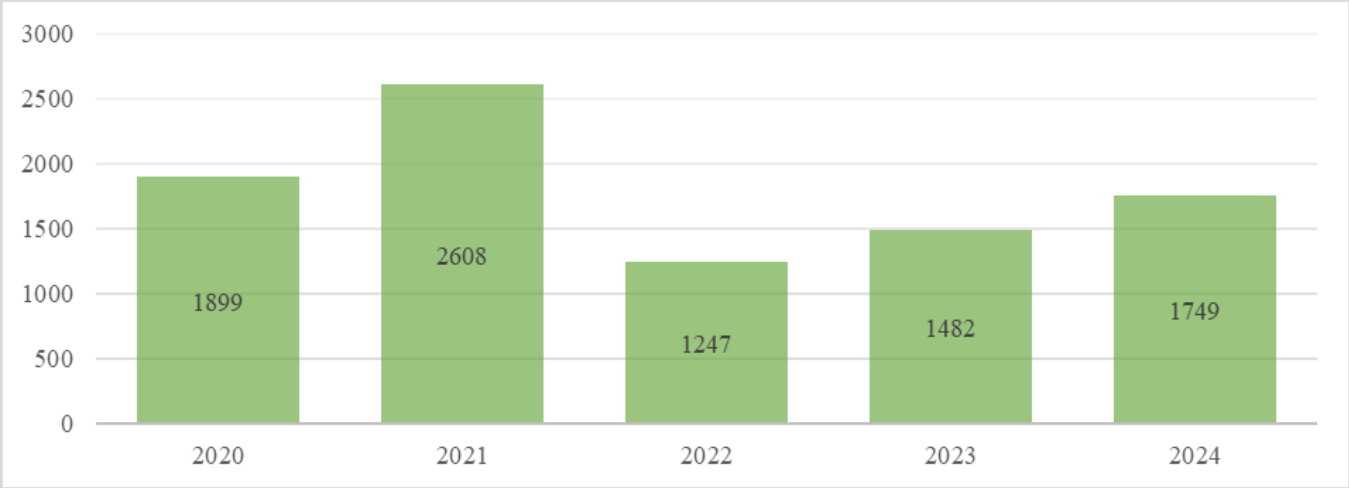


Figure 4. Evolution of the Republic of Moldova's re-exports to China (2020–2024)

Source: elaborated by the authors based on the source (Trade Map, 2025).

Analyzing the data presented in Figure 4, a fluctuating evolution of the Republic of Moldova's re-exports to China can be observed over the analyzed period, without a clear trend of continuous growth or decline, but with significant year-to-year variations (ITC, 2025).

In 2020, re-exports amounted to USD 1,899 thousand, increasing in 2021 to USD 2,608 thousand, which represents a rise of USD 709 thousand. This is the highest value recorded throughout the entire period. Subsequently, in 2022, a sharp decrease is observed, with re-exports falling to USD 1,247 thousand, representing a decline of USD 1,361 thousand compared to the previous year.

During the period 2023–2024, re-exports returned to an upward trend, reaching USD 1,482 thousand in 2023 and USD 1,749 thousand in 2024 (ITC, 2025). Compared to 2023, the increase in 2024 is USD 267 thousand, and relative to 2022, USD 502 thousand, indicating a partial recovery following the decline in 2022.

Compared to the beginning of the period, the level in 2024 remains slightly below that of 2020, with a difference of USD 150 thousand, corresponding to a decrease of approximately 7.9%. At the same time, compared to the peak year 2021, the 2024 level is lower by USD 859 thousand, representing a reduction of approximately 33%.

In contrast, compared to the minimum recorded in 2022, re-exports in 2024 are higher by approximately 40%, confirming a recovery trend.

This evolution reflects the volatile and relatively unstable nature of re-exports, influenced by the dynamics of international trade flows and the limited role of the Republic of Moldova as an intermediary in

trade relations with China. At the same time, the concentration of re-exports in a few product categories, particularly electrical equipment, furniture, and industrial goods, contributes to this variability.

Overall, the Republic of Moldova's re-exports to China recorded significant fluctuations during the period 2020–2024, with a peak in 2021, a sharp contraction in 2022, and a moderate recovery in the following years, without exceeding the initial levels.

CONCLUSIONS

The research results highlight that trade relations between the Republic of Moldova and China experienced significant expansion during the analyzed period; however, this evolution is characterized by persistent structural imbalances, driven by the rapid growth of imports and the continuous deepening of the trade deficit.

Moldovan exports to the Chinese market remain relatively low and insufficiently diversified, being dominated by low value-added products, which reflects limited competitiveness. Nevertheless, the slight increase recorded in 2024 suggests the emergence of early signs of stabilization and the possibility of gradual recovery.

In this context, enhancing export competitiveness requires a strategic reorientation toward products with a higher degree of processing and technological content, as well as diversification of the export structure. The integration of technological innovations, the digitalization of processes, and the adoption of sustainable practices become essential factors for strengthening the Republic of Moldova's position on the Chinese market.

Furthermore, intensifying bilateral cooperation in areas such as digital trade, green technologies, and logistics infrastructure can contribute to unlocking export potential and facilitating more effective integration into global value chains, thereby ensuring the sustainable and competitive development of foreign trade.

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