Republic of Moldova

Data Collection Survey for Promoting Cross-Border Logistics

Final Report

August 2026

Japan International Cooperation Agency (JICA)

Oriental Consultants Global Co., Ltd.
Yachiyo Engineering Co., Ltd.

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Republic of Moldova

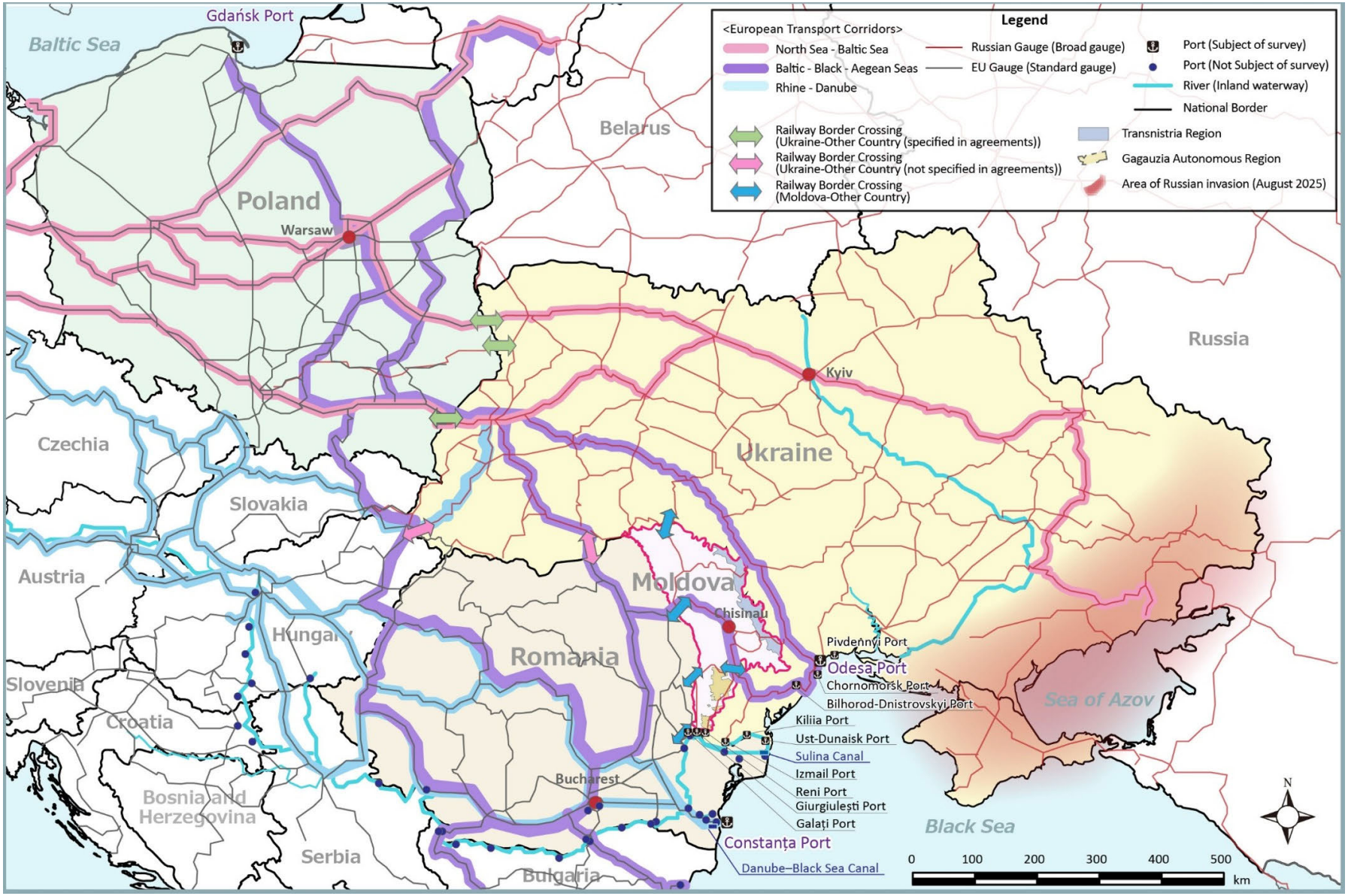
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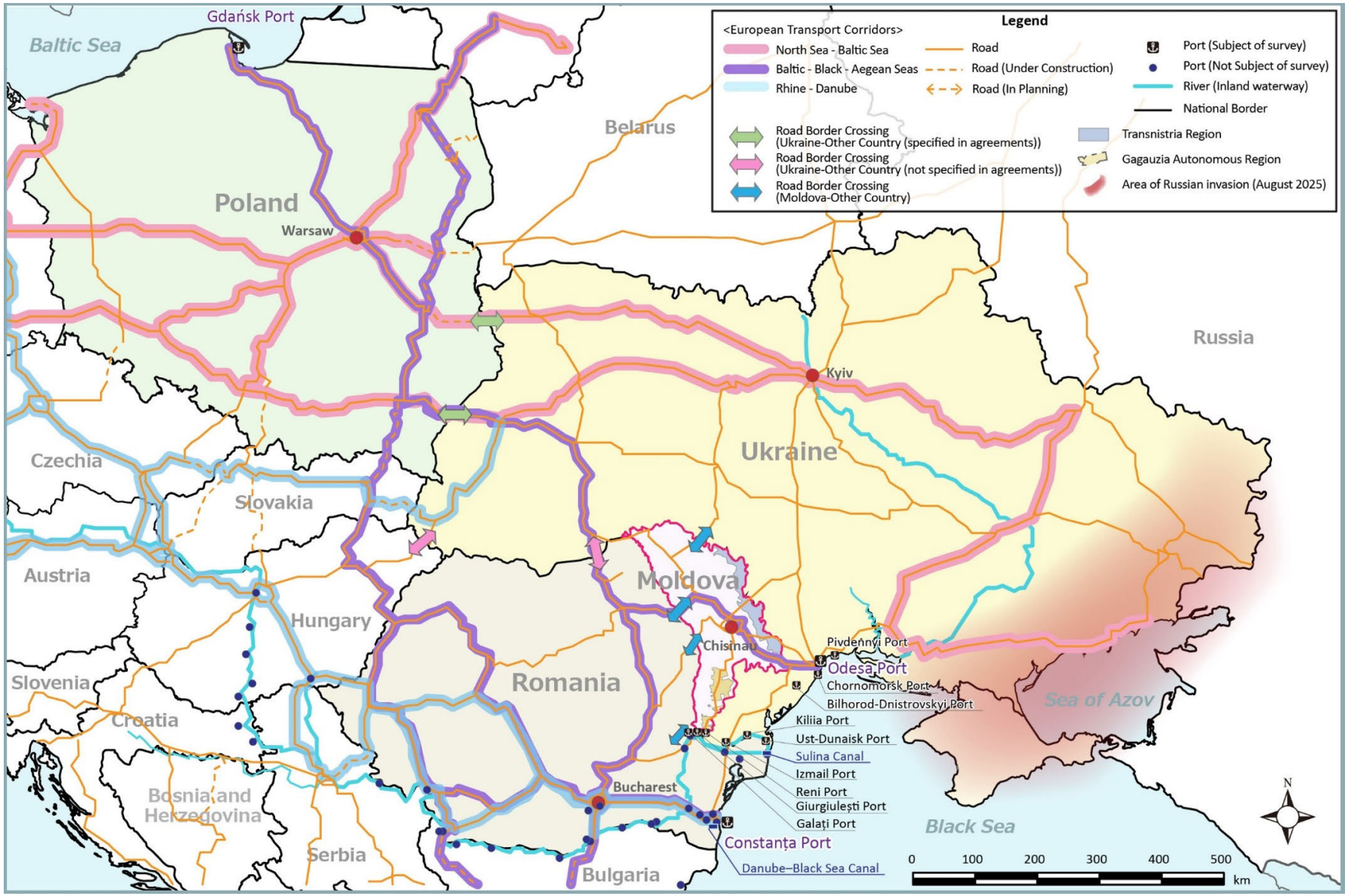
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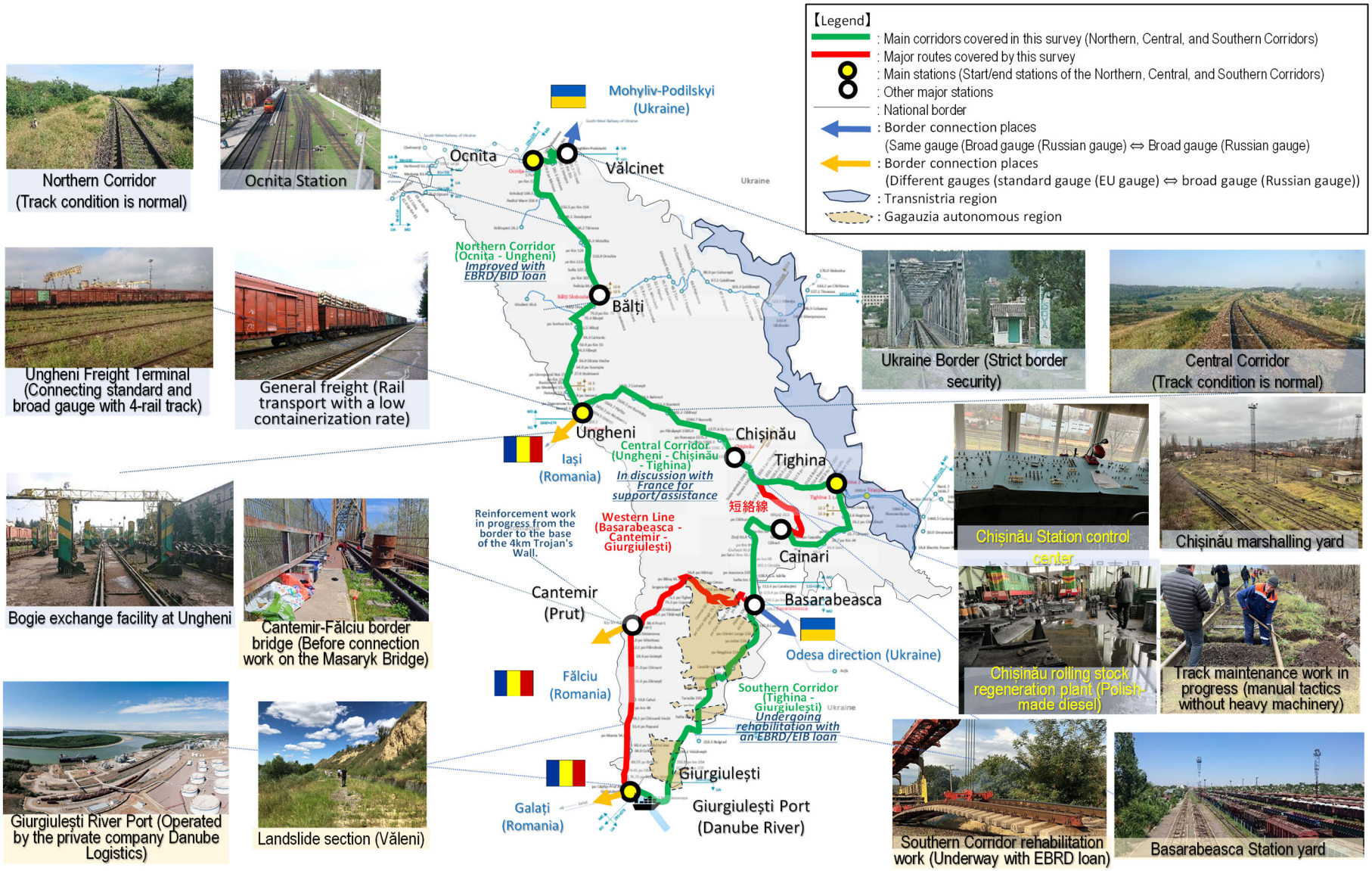
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Location Map 1 (Railways + Inland Water Transport + Ports)



Location Map 2 (Roads + Inland Water Transport + Ports)



Location Map 3 (Moldova)

The Republic of Moldova

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Abbreviations

A	Autostradă
AA	Association Agreement
AAC	Civil Aviation Authority
AADT	Annual Average Daily Traffic
AEO	Authorized Economic Operator
AEOC	Customs Simplifications
AEOF	Authorized Economic Operator - Full
AEOS	Security and Safety
AES	Automated Export System
AFD	Agence Française de Développement
AFIR	Alternative Fuels Infrastructure Regulation
AI	Artificial Intelligence
AIS	Automated Import System
ANSA	Agenția Națională pentru Siguranța Alimentelor
ANTA	National Auto Transport Authority of the Republic of Moldova
ASMO	Automated Customs Clearance System
ARUR	Automated Risk Management System
ASOUP	Automated System for Operational Management of Transportation
ASYCUDA	Automated System for Customs Data
ATA	Admission Temporaire / Temporary Admission
ATS	Automatic Train Stop
AWB	Air Waybill
BAU	Business As Usual
BCP	Border Crossing Point
BI	Business Intelligence
B/L	Bill of Lading
BRT	Bus Rapid Transit
BSGI	Black Sea Grain Initiative
CC	Connectivity Corridors
CCU	Customs Code of Ukraine
CCT	Common Customs Tariff
CEB	Council of Europe Development Bank
CEE	Central and Eastern Europe
CEF	Connecting Europe Facility
CEO	Chief Executive Officer
CESNI	Comité Européen pour l'Élaboration de Standards dans le Domaine de Navigation Intérieure

CESTRIN	Center for Road Technical Studies and Informatics
CFM	Calea Ferată din Moldova
CFR	Căile Ferate Române
CIM	Uniform Rules Concerning the Contract of International Carriage of Goods by Rail
CIS	Commonwealth of Independent States
CITES	Convention on International Trade in Endangered Species of Wild Fauna and Flora
CMR	Convention relative au contrat de transport international de marchandises par route
CN	Combined Nomenclature
CNAPM	Compania Națională "Administrația Porturilor Maritime" SA Constanta
C/P	Counterpart
CRC	Common Risk Criteria
CRMF	Customs Risk Management Framework
CRMS	Customs Risk Management System
CSW-CERTEX	Customs Single Window - Certificates Exchange System
CTC	Common Transit Convention
CTF	Cross-Border Connectivity
DC	Drum Comunal
DCFTA	Deep and Comprehensive Free Trade Area
DEx	Drum Expres
DMU	Diesel Multiple Unit
DPSU	State Border Guard Service of Ukraine
DWT	Deadweight Tonnage
EAIS	Electronic Automated Information System
EaP	Eastern Partnership
EBRD	European Bank for Reconstruction and Development
EIB	European Investment Bank
EIP	Eco-Industrial Parks
EIRR	Economic Internal Rate of Return
EMD	Electronic Customs Declaration
E/N	Exchange of Notes
ENS	Entry Summary Declaration
EORI	Economic Operators Registration and Identification number
EPIC	Facility for Eastern Partnership Investment in Connectivity
ERA	Economic Resilience Activity
ERP	Enterprise Resource Planning
ERTMS	European Rail Traffic Management System
ESG	Environmental, Social, and Governance
ETS	Electronic Transit System

EU	European Union
EUAM	European Union Advisory Mission
EUBAM	European Union Border Assistance Mission to Moldova and Ukraine
EU4Digital	EU for Digital
EU4PMF	Public Finance Management Support Program for Ukraine
EV	Electric Vehicle
EXS	Exit Summary Declaration
FAO	Food and Agriculture Organization of the United Nations
FEZ	Free Economic Zone
F/S	Feasibility Study
G/A	Grant Agreement
GATT	General Agreement on Tariffs and Trade
GDP	Gross Domestic Product
GHG	Greenhouse Gas
GIFP	Giurgiulesti International Free Port
G7	Group of Seven
HP	Homepage
HS	Harmonized System
IBM	Integrated Border Management
IC	Connectivity Inter-Corridors
ICS	Import Control System
ICT	Information and Communication Technology
IFC	International Finance Corporation
IHL	International Humanitarian Law
ILO	International Labor Organization
IMF	International Monetary Fund
IMO	International Maritime Organization
INSP	Inspectoratul Național de Securitate Publică
IP	Industrial Park
IPA	Instrument for Pre-accession Assistance
IR	Indian Railways
IRI	International Roughness Index
IRR	Internal Rate of Return
IT	Information Technology
ITS	Intelligent Transport Systems
JASPERS	Joint Assistance to Support Projects in European Regions
JICA	Japan International Cooperation Agency
JR	Japan Railways

JSC	Joint Stock Company
kph	Kilometers Per Hour
LNG	Liquefied Natural Gas
LPG	Liquefied Petroleum Gas
LPI	Logistics Performance Index
MAIC	Multi-Annual Infrastructure Contract
MASP-C	Multi-Annual Strategic Plan for Customs
MIGA	Multilateral Investment Guarantee Agency
MIRD	Ministry of Infrastructure and Regional Development of the Republic of Moldova
MISRA	Moldova Institutional and Structural Reforms Activity
MoEDD	Ministry of Economic Development and Digitalization
MP	Master Plan
MPGT	Master Planul General de Transport
MRN	Movement Reference Number
NBU	National Bank of Ukraine
NCTS	New Computerized Transit System
NDC	Nationally Determined Contribution
NRRP	National Recovery and Resilience Plan
ODA	Official Development Assistance
OECD	Organization for Economic Co-operation and Development
OSJD	Organization for Cooperation between Railways
O&M	Operation and Maintenance
PAS	Partidul Acțiune și Solidaritate
PCAs	Priority Control Areas
PCI	Pavement Condition Index
PI	Program Invitational
PKP LHS	Polskie Koleje Państwowe Linia Hutnicza Szerokotorowa
PMUD	Planul de Mobilitate Urbană Durabilă
PNRR	Planul Național de Redresare și Reziliență
POT	Program Operational Transport
PPP	Public-Private Partnership
Pre-FS	Pre-Feasibility Study
PV	Present Value
QGC	Quay Gantry Crane
R/D	Record of Discussions
RDNA	Rapid Damage and Needs Assessment
RoRo	Roll-on/Roll-off
RRF	Recovery and Resilience Facility

RTG	Rubber-Tired Gantry Crane
SA	Societate pe Acțiuni
SAD	Single Administrative Document
SAMP	Strategic Asset Management Plan
SEED	Systematic Electronic Exchange of Data
SEZ	Special Economic Zone
SMGS	Agreement on International Goods Transport by Rail
SOE	State-Owned Enterprise
SRA	State Road Administration of the Republic of Moldova
SRT	State Railway of Thailand
SSECU	State Service for Export Control of Ukraine
TA	Technical Assistance
TAF	Telematics Applications for Freight
TARIC	Integrated Tariff of the European Union
TEN-T	Trans-European Transport Network
TEU	Twenty-foot Equivalent Unit
TIR	Transports Internationaux Routiers
TRACES NT	Trade Control and Expert System New Technology
TRS	Time Release Study
TSD	Transit Accompanying Document
TSI	Technical Specifications for Interoperability
UAV	Unmanned Aerial Vehicle
UCC	Union Customs Code
UN	United Nations
UNCLOS	United Nations Convention on the Law of the Sea
UNCTAD	United Nations Conference on Trade and Development
UNDP	United Nations Development Program
UNIDO	United Nations Industrial Development Organization
USAID	US Agency for International Development
USPA	Ukrainian Sea Ports Authority
UZ	Ukrzaliznytsia
VAT	Value Added Tax
WB	World Bank
WCO	World Customs Organization
WTO	World Trade Organization

Chapter 1 Introduction

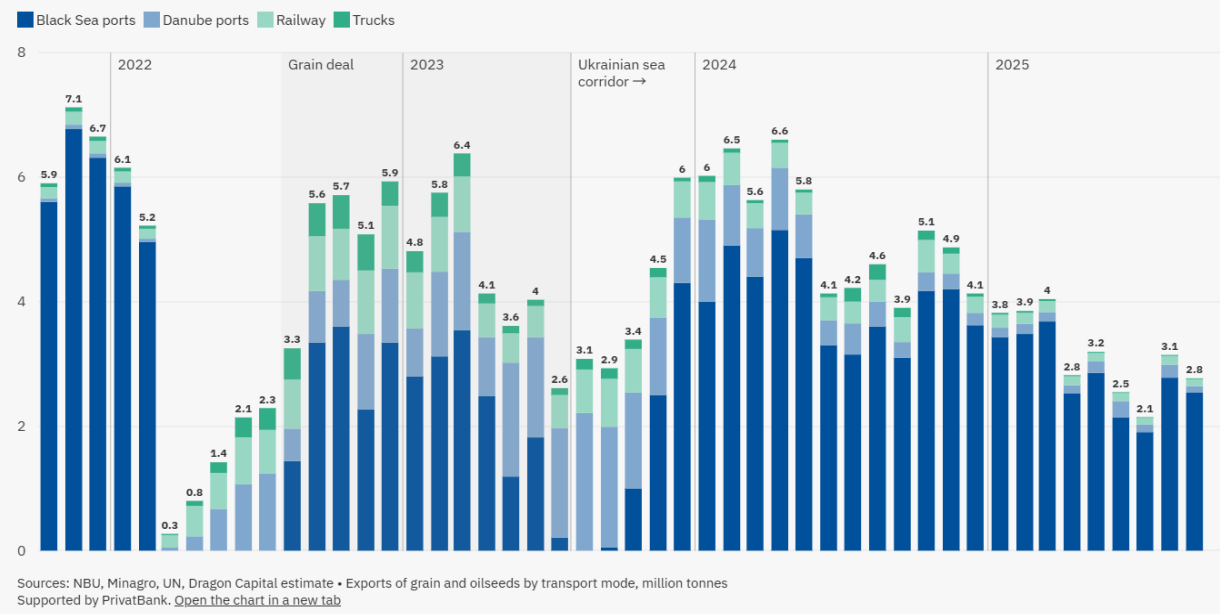
1.1 Background and Objectives

1.1.1 Current Status and Challenges of Logistics in the Wider Region

Before Russia invaded Ukraine in February 2022, approximately 90% of Ukraine's export cargo (by weight) was transported via deep-water ports along the Black Sea coast. However, immediately following the invasion, maritime transport routes faced significant constraints due to port blockades and heightened navigation risks, forcing Ukraine to shift to land and inland waterway transport, using railways, roads, and Danube River ports.

In response to this situation, the European Union (EU) launched the "Solidarity Lanes" initiative in May 2022 to support the establishment and strengthening of alternative transport routes through Ukraine and the neighboring countries. As a result, Ukrainian exports, primarily grain, shifted to routes via ports in Poland and Romania (such as Gdansk, Gdynia, and Constanta).

Under these circumstances, Moldova was a strategic geographic hub connecting Ukraine and Romania, an EU member state, and its railway network served as a transit corridor for shipments from Ukraine to Romania (including the ports of Galati and Constanta). As a result, the freight volume handled by Moldovan Railways Calea Ferată din Moldova (CFM) from 2022 to 2023, particularly grain shipments, increased significantly (Figure 1-1).



Sources: National Bank of Ukraine (NBU), Minagro, United Nations (UN), Dragon Capital estimate • Exports of grain and oilseeds by transport mode, million tones Supported by PrivatBank

Figure 1-1 Ukraine's Grain Exports and Transport Modes

Starting in the second half of 2023, Ukraine's reopening and stabilization of the Black Sea Maritime Corridor led to a shift back toward relatively cost-competitive maritime transport. As a result, demand for

land transport and transit via Moldova declined in 2024, and CFM's cargo volume fell to approximately 50% of 2018 levels.

As can be seen from the above, under normal conditions (when the effects of the Russian invasion are absent and Black Sea maritime routes remain accessible), the choice of routes and modes for wide-area freight transport in Moldova and the neighboring countries (Ukraine, Romania, and Poland) is fundamentally driven by economic considerations, with maritime transport holding the advantage. On the other hand, the selection of transport routes and modes during a crisis (when the Odesa Port is largely unusable) is significantly affected, leading to a structure in which the burden on land transport increases sharply. This study aims to collect and verify information to ensure the stability and sustainability of wide-area logistics centered on Moldova under both normal and crisis conditions.

1.1.2 Current Status and Challenges of Freight Transport in Moldova

Regarding the overall quality of logistics services in Moldova, the Logistics Performance Index 2023 (LPI) published by the World Bank (WB) ranks Moldova 97th out of 139 countries with a score of 2.5 out of 5, placing it near the bottom among Central and Eastern European (CEE) countries (countries that belonged to the socialist bloc during the Cold War)

As of 2024, the total volume of domestic freight transport in Moldova is approximately 47.3 million tons per year, of which road transport accounts for 94.5% (about 44.5 million tons) and rail transport for approximately 5.2% (about 2.5 million tons). The main goods transported by rail are low-value-added bulk cargoes, including grains, construction materials, industrial raw materials, and petroleum products. In contrast, road transport is the dominant mode for high-value-added cargoes and those requiring rapid delivery. Regarding container transport, rail's share is less than 1%, and nearly the entire volume is carried by road. Thus, Moldova's domestic freight transport is highly dependent on road transport.

As described above, the fragility of Moldova's domestic transportation infrastructure, low-quality transport services, and inefficient import/export procedures constitute bottlenecks in establishing a competitive international logistics network via Moldova. Moving forward, the development and expansion of integrated multimodal transport services are expected to be achieved through the effective utilization of road, rail, and waterway networks, ultimately contributing to a highly competitive international freight transport network centered on Moldova.

1.1.3 Current Status and Challenges of Moldova's Railway Sector

The key challenges facing CFM, the state-owned railway operator responsible for the construction, maintenance, and operation of railway infrastructure, include: (1) the aging and deterioration of railway infrastructure and inadequate maintenance; (2) inefficiencies in international transport due to the difference in track gauge with Romania (standard gauge); and (3) chronic shortages of funds for maintenance and operations, as well as a shortage of personnel.

The total length of Moldova's railway network is 1,232 km, the majority consisting of non-electrified single-track sections. As a result of long-term and insufficient investment in railway infrastructure maintenance, track defects have been identified on more than 38% of major railway lines, indicating severe deterioration of the infrastructure. In the Southern Railway Corridor, the average operating speed was below 30 km/h. As of March 2026, when this report was prepared, renovation work is underway with support from the European Bank for Reconstruction and Development (EBRD), the European Investment Bank (EIB), and the EU.

Railway lines within Moldova use broad gauge (1,520 mm), whereas those in Romania (an EU member state) use standard gauge (1,435 mm). At Ungheni and Giurgiulesti on the Romanian border, standard gauge and three-rail sections coexist. Although bogie exchange operations at these border crossings use the dedicated equipment, the process remains non-automated, resulting in longer processing times and higher overall costs for international rail transport services.

Nearly all the locomotives owned by CFM are more than 40 years old, and approximately 60% of the freight cars have exceeded their service life. In particular, the shortage and poor condition of grain hopper cars and open-top cars are limiting transport capacity and reliability, presenting CFM with serious challenges regarding its rolling stock.

From a management perspective, CFM has been mired in chronic deficits, posting a loss of approximately 322.6 million lei in 2024 (equivalent to approximately 2.742 billion yen, calculated using the estimated exchange rate of 1 lei = approximately 8.5 yen as of March 2026), marking the largest deficit in the past five years. The company operates under a structure in which the passenger transport division's unprofitability is subsidized internally by revenue from the freight division, thereby contributing to the freight division's declining price competitiveness. Furthermore, its financial foundation is fragile, as evidenced by the ongoing non-payment of salaries to CFM employees since last year and a shortage of working capital (Note: Unpaid wages have been fully resolved as of July 2026.).

As outlined above, CFM lags behind road transport in all respects, including physical transport capacity, service levels (including rates), and transport quality. Under these circumstances, with a view toward EU accession, Moldova is enhancing and modernizing its rail capacity while promoting integration into the EU railway system, in alignment with the EU's target to double rail transport by 2050. Consequently, actively encouraging a modal shift from road to rail in international freight transport has been designated as a key policy priority. Under this strategy, various initiatives are being considered, planned, or implemented. These include strengthening connectivity with the EU rail network through the standard-gauge conversion of the Ungheni–Chișinău line, developing an intermodal terminal in Chișinău, and undertaking organizational reforms such as separating railway infrastructure management from train operations. These measures are essential prerequisites for enabling Moldova's transport network to function sustainably and effectively as part of international logistics corridors, serving as critical points of discussion when determining the direction of future assistance.

1.1.4 Purpose of the Study

Against this background, the objectives of this study are as follows:

- To conduct a comprehensive review of the regional logistics situation, focusing primarily on Moldova and western and southwestern Ukraine; collect and organize basic information on logistics and freight transport routes connecting Ukraine and Romania via Moldova; and prepare demand forecasts.
- To collect and verify information on existing plans and systems for road, rail, and water transport in Moldova and the neighboring countries, as well as trends in assistance provided by other development partners, to identify logistics challenges in the region, with particular attention to Moldova and Ukraine.
- To formulate recommendations for Japan's short- and medium-term cooperation to address logistics challenges in Moldova and Ukraine.

1.2 Target Survey Area

1.2.1 Definition of the Survey Area for this Study

This study will investigate and research logistics infrastructure at two spatial levels: a broad perspective that surveys logistics across a wide area, including Moldova and the neighboring countries, and a focus on Moldova's domestic transportation networks and infrastructure (particularly railways).

1.2.2 Survey Area from a Broad Regional Logistics Perspective

The survey area, viewed from a broad regional perspective, is defined as follows.

- The entirety of Moldova (excluding the Transnistria region)
- Ten regions in western and southwestern Ukraine (Volyn, Rivne, Lviv, Ternopil, Ivano-Frankivsk, Zakarpattia, Chernivtsi, Vinnytsia, Odesa, and Khmelnytskyi)
- Neighboring countries, namely Romania and Poland. The survey did not encompass the full territories of these countries but instead focused on key regions with logistical ties to Moldova and Ukraine.

Within the above-mentioned broad survey areas, the logistics facilities subject to the survey are as follows:

- Ports
  - Black Sea coast: Odesa Port, Chornomorsk Port, Pivdennyi Port, Ust-Dunaisk Port, Bilhorod-Dnistrovskyi Port (Ukraine), Constanta Port (Romania), etc.
  - Danube River coast: Izmail Port, Kiliya Port, Reni Port (Ukraine), Giurgiulesti Port (Moldova), Galati Port (Romania), etc.
  - Others: Gdansk Port (Poland), etc.

- Rail
  - Rail lines connecting Moldova to major ports in Romania
  - Rail lines connecting Ukraine to major ports in Moldova, Romania, and Poland
  - Key bridges required for rail freight transport operations
- Roads
  - High-standard roads
  - Trunk roads to rail freight stations and major ports

1.2.3 Survey Subjects Focusing on Moldova's Railway Sector

- Three Main Corridors (Northern Corridor: Oknytsia–Ungheni; Central Corridor: Ungheni–Tighina; Southern Corridor: Tighina–Giurgiulesti)
- Three Main Routes (Western Route 1: Basarabeasca–Cantemir (Prut 2); Western Route 2: Cantemir (Prut 2) –Giurgiulesti; Shortcut: Chișinău–Căinari)

1.3 Structure of the Report

The structure of this report is as outlined below. Unless otherwise specified, the information contained in this document reflects findings from research conducted between September 2025 and January 2026.

Chapter 1: Background and Objectives

This chapter outlines the context in which Moldova serves as an alternative corridor between Ukraine and the EU/global markets, following the restrictions on Black Sea maritime transport routes due to Russia's invasion of Ukraine. It also identifies challenges related to domestic logistics and railway systems and defines the objectives and target areas of this study under both peacetime and emergency conditions.

Chapter 2: Overview of Moldova and the neighboring Countries: Ukraine and Romania

This chapter compares the socioeconomic and natural conditions of Moldova, Ukraine, and Romania, analyzing demographic trends, GDP, external environments, and the impacts following the invasion. It aims to understand the basic conditions and regional characteristics of each country as a foundation for considering regional logistics policies.

Chapter 3: Logistics Networks and Plans/Systems in Moldova and the neighboring Countries

Based on the EU's Eastern Partnership (EaP), Trans-European Transport Network (TEN-T), and Solidarity Lanes, this chapter provides an overview of logistics policies, major railways, roads, ports, and inland waterways, as well as related systems in Moldova and the neighboring countries. Additionally, it summarizes support trends from the EU and other donors to present an overall picture of the regional logistics network.

Chapter 4: Freight Flows and Future Demand Forecasts for Moldova and the neighboring Countries

This chapter analyses the major import and export commodities, transport routes, transit times and costs, and transit challenges for Moldova and Ukraine. It also estimates future demand by transport corridor and mode under hypothetical scenarios based on Russia's invasion of Ukraine.

Chapter 5: Promoting Rail Freight Transport in Moldova

This chapter examines the organization, finances, operations, and facilities of CFM. It also analyses bottlenecks, such as aging infrastructure, funding shortages, labor shortages, differences in track gauge, and a shortage of rolling stock. It outlines directions for strengthening freight rail transport, considering the potential for a modal shift from road to intermodal transport (rail and road) as well as external factors.

Chapter 6: Customs in Moldova and the neighboring Countries: Ukraine and Romania

This chapter organizes information on customs arrangements, legal systems, customs clearance procedures, required documents, and systems in Moldova, Ukraine, and Romania. Additionally, user evaluations identify procedural challenges that hinder cross-border logistics.

Chapter 7: Prerequisites for Cooperation Projects and Programs

Based on the assumed scenarios, this section outlines potential areas of cooperation in which JICA could be involved. Considering collaboration with the EU, EBRD, EIB, and AFD: Agence Française de Développement, it presents a short- to medium-term support road map covering CFM track maintenance, organizational reform, human resource development, and improvements in digitalization and customs clearance.

Chapter 2 Overview of Moldova and the neighboring Countries: Ukraine and Romania

2.1 Moldova's Socioeconomic and Natural Conditions

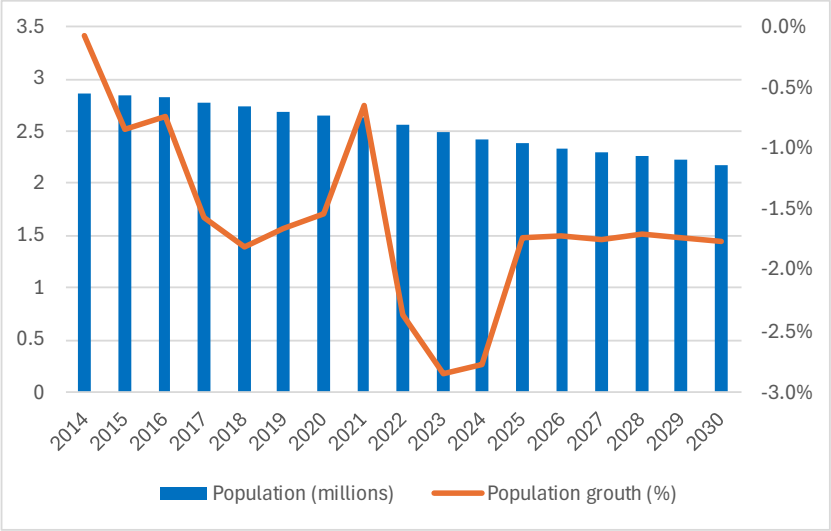
2.1.1 Society and Demographics

The Republic of Moldova is a small, landlocked country surrounded by Ukraine and Romania, with a land area of 33,846 km², roughly comparable in size to Belgium and Denmark among European countries.

Since gaining independence from the Soviet Union in 1991, the country has experienced a prolonged period of population decline. The population, which stood at approximately 3 million in 1992 (excluding the Transnistria region), had decreased to about 2.63 million by 2021, before Russia invaded Ukraine, and further declined to approximately 2.42 million by 2024 (Figure 2-1). This trend is driven not only by low birth rates and an aging population but also by the outflow of young working-age people to EU countries and Russia in search of economic opportunities. According to the National Bureau of Statistics of Moldova, the number of people emigrating from the country reached approximately 130,000 per year in 2023, with the young working-age population (ages 20–39) accounting for 39% of this figure.

Although the influx of refugees from Ukraine led to a temporary population increase beginning in 2022, the overall rate of population decline has continued to accelerate. According to the World Bank, heightened risks associated with Russia's invasion and record-high inflation—including soaring energy prices—have contributed to the rise in emigration.

The International Monetary Fund (IMF) projects that the annual population growth rate will remain at approximately -1.7% from 2025 onward, indicating that the country's population is expected to continue declining.



Source: IMF World Economic Outlook database: October 2025

Figure 2-1 Population and Population Growth Rate of Moldova

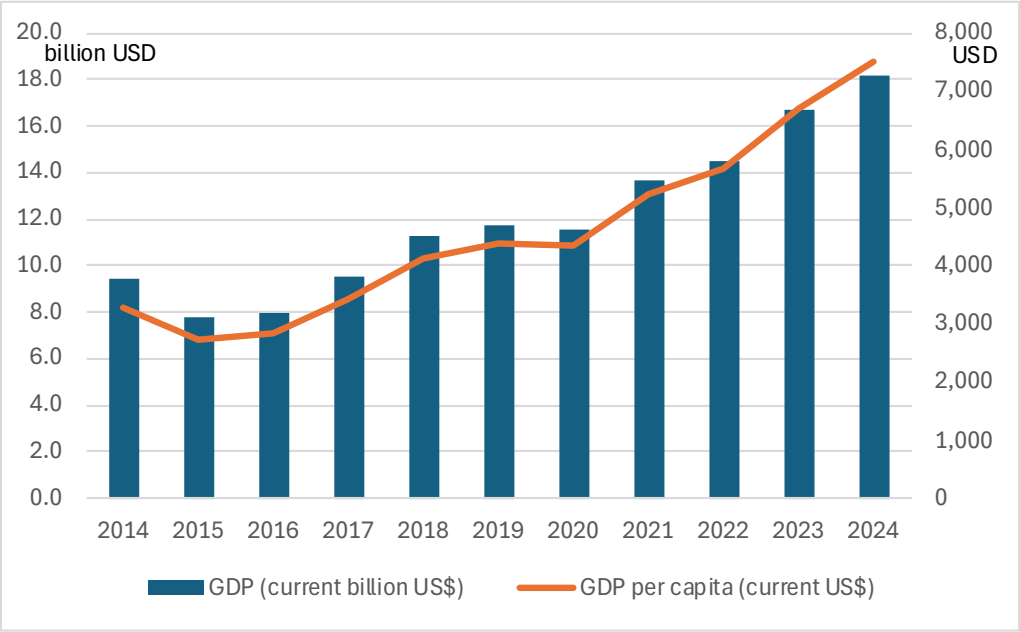
2.1.2 Economic Size and Growth Trends

Moldova's nominal Gross Domestic Product (GDP) for 2024 is approximately $18.2 billion, and its per capita GDP for the same year is $7,511 (Figure 2-2), which remains low compared to the EU average of $34,859[1].

Moldova's economy has generally maintained a growth trend since 2000. The 2014 Association Agreement (AA) with the EU[2] led to the reduction and elimination of tariffs on Moldovan products in the EU market, as well as efforts to improve the environment for trade in services and investment. As a result, the country maintained an average annual economic growth rate of 3.4% from 2014 to 2019 (Figure 2-3).

In 2020, the spread of COVID-19 severely constrained economic activity in the service sector, including retail, accommodation, and food services. In the industrial sector, exports contracted significantly due to temporary factory closures and the economic downturn in the EU, Ukraine's primary export market. Compounded by a severe drought that hampered agricultural production, real GDP growth fell by 8.3%.

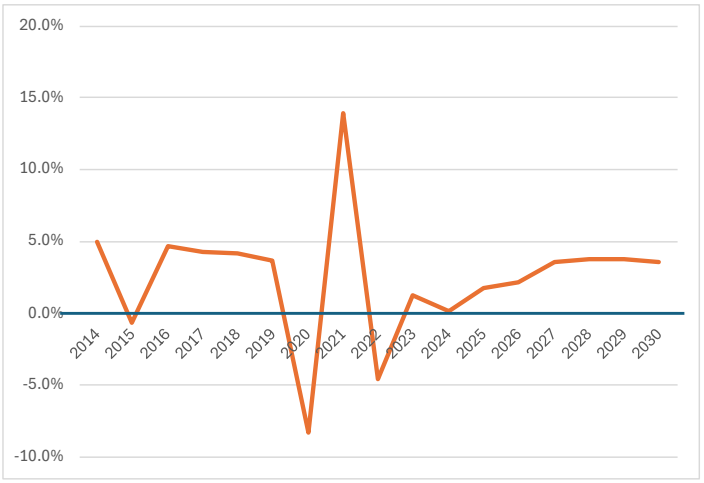
In 2021, the economic growth rate reached 14%, driven by a recovery in agricultural production and increased exports following the reopening of the EU economy. However, in 2022, the growth rate declined to -4.6% due to Russia's invasion of Ukraine, compounded by logistical disruptions, soaring energy prices, and severe damage to the agricultural sector from a record-breaking drought. Economic growth remained sluggish from 2023 to 2024. According to the IMF, the growth rate for 2025 is projected at approximately 1.7%, with the recovery expected to strengthen thereafter and growth rates forecast to exceed 3% from 2027 onward.



Source: IMF World Economic Outlook database: October 2025

Figure 2-2 Moldova's Nominal GDP and GDP per Capita (2014–2024)

[1] The figure converted to U.S. dollars by Trading Economics, compared to the 2024 EU average of €39,680 published by Eurostat
[2] Conclusion of a Deep and Comprehensive Free Trade Area (DCFTA)



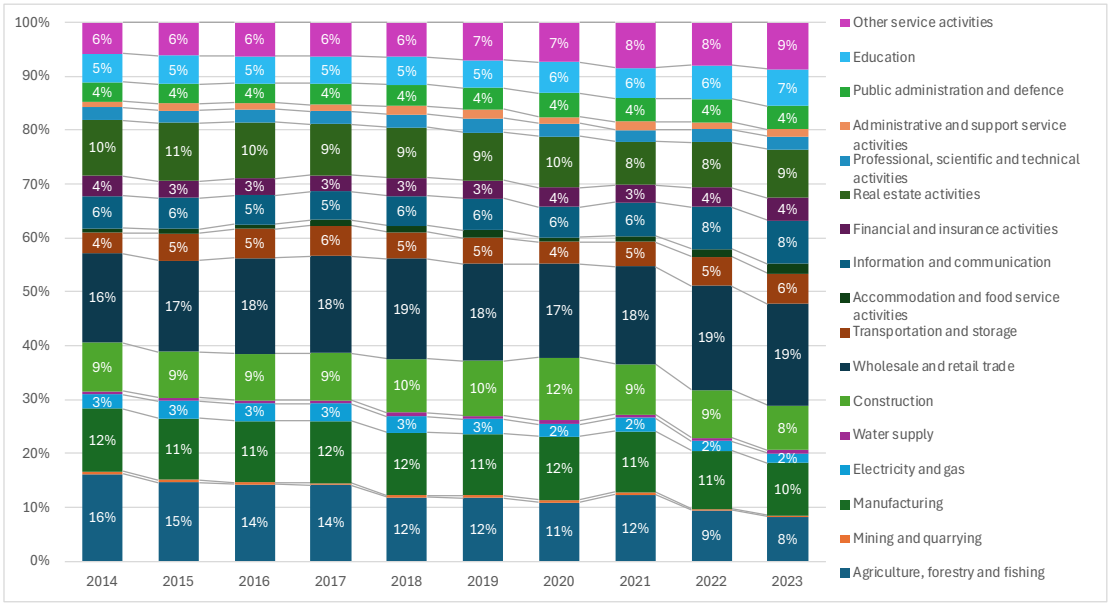
Source: IMF World Economic Outlook database: October 2025

Figure 2-3 Moldova's Real GDP Growth Rate (2014–2030)

2.1.3 Industrial Structure

Moldova's economy is primarily driven by the service sector, which accounted for 71% of GDP in 2023. This was followed by industry at 20% and agriculture at 8% (Figure 2-4).

The agricultural sector experienced a significant decline, shrinking from 16% in 2014 to 8% in 2023. The industrial sector also recorded a slight decrease during the same period. In contrast, the service sector expanded by 12% compared with 2014, supported by growth in wholesale and retail trade, real estate, telecommunications, and transportation.



Source: National Bureau of Statistics of Moldova

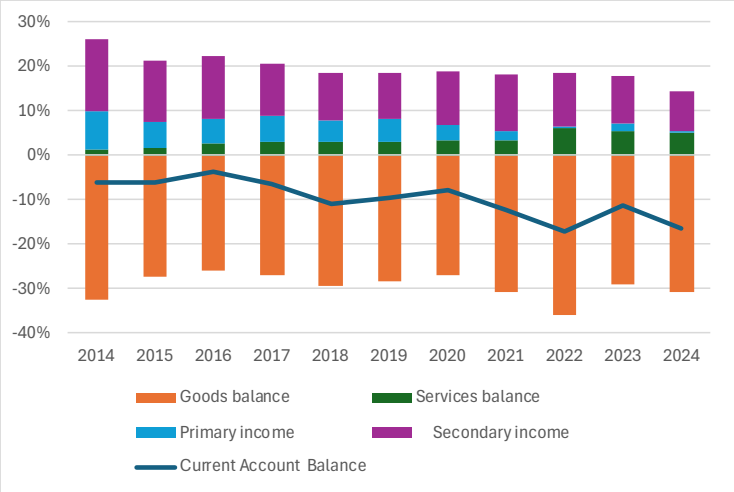
Figure 2-4 Moldova's GDP by Sector (2014–2023)

2.1.4 Fiscal Situation

Moldova's current account balance suffers from a chronic and substantial trade deficit, largely driven by the country's dependence on energy imports. However, this deficit has been partially offset by remittances from workers abroad, reflected in the secondary income balance.

In 2022, following Russia's invasion of Ukraine, the trade deficit widened significantly due to soaring energy prices. Nevertheless, financial support from the EU and other partners, recorded under the secondary income balance, together with the growth in the services balance—particularly in the information technology (IT) sector and transportation services—helped prevent a more severe deterioration of the current account balance.

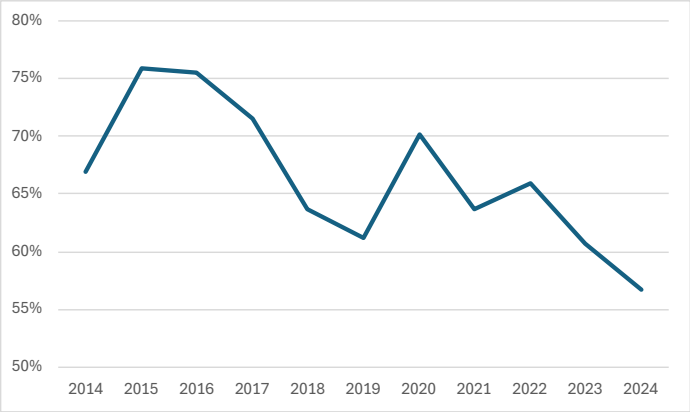
By 2024, however, the current account balance had deteriorated further as emergency assistance from the EU and the U.S. was gradually reduced, while a recovery in domestic demand led to increased imports. As a result, the current account deficit reached 16.6% of GDP, equivalent to approximately $3 billion (see Figure 2-5).



Source: National Bank of Moldova

Figure 2-5 Moldova's Current Account Balance as a Percentage of GDP

Moldova's external debt-to-GDP ratio is projected to decline from 66.0% in 2022 to 56.7% in 2024 (Figure 2-6). According to the IMF's debt sustainability analysis, the present value (PV) of public and publicly guaranteed (PPG) external debt as a percentage of GDP is expected to remain at 18.5% in 2024, well below the risk threshold of 55%; therefore, the risk of external debt default is assessed as low.



Source: National Bank of Moldova

Figure 2-6 Moldova's External Debt-to-GDP Ratio

2.1.5 Impact of Russia's Invasion of Ukraine

(1) Accelerated EU Accession

Moldova formally applied for EU membership in March 2022, and following a decision by the European Council in December 2023, EU accession negotiations officially began in June 2024. The EU announced the "Moldova-EU Growth Plan (2025–2027)," a three-year program worth 1.9 billion euros (approximately 346 billion yen), for Moldova. These funds are tied to progress on key reforms necessary for Moldova's accession, including infrastructure investment, energy diversification, and strengthening the rule of law.

Aiming for EU accession by 2030, the Moldovan government has identified the development of legal frameworks and administrative reforms as key priorities in "Moldova 2030," an updated version of its national development strategy. In particular, the government is working to strengthen governance and enhance state administrative capacity by improving the transparency and efficiency of public fund management and public procurement systems[3].

(2) The Influx of Refugees from Ukraine and Humanitarian Aid

Immediately following Russia's invasion of Ukraine, a large number of refugees began flowing into Moldova. According to the United Nations (UN), as of April 2022, an estimated 430,000 Ukrainian refugees had temporarily crossed the border into Moldova. Although many refugees have since moved on to other countries, as of April 2024, approximately 118,000 remain in Moldova, representing 4.9% of the population—an extremely high proportion by international standards. Many of the refugees staying in Moldova belong to vulnerable groups, such as women with children, older people, and people with disabilities. In response, the Moldovan government is implementing and strengthening a temporary protection system to ensure smooth access to domestic social systems, including healthcare, education, and the labor market.

[3] IMF Country Report No. 24/355, 2024

(3) Transition to Energy Security

Moldova has sought to break free from its reliance on Russia for energy and has been working to diversify its energy sources. Specifically, it has commissioned a new gas pipeline connecting to Romania, reviewed the operational framework of its existing infrastructure, and secured alternative gas supply routes, including liquefied natural gas (LNG) from the EU and Greece. Furthermore, led by the state-owned company Energocom, the country has established a system to store natural gas procured from multiple markets in Ukrainian storage facilities, thereby ensuring a stable energy supply during the winter. In addition, by utilizing a credit line from the EBRD and grant funding from the Norwegian government, Moldova has secured the necessary funds for gas procurement despite soaring international prices[4].

(4) Reorganization of Logistics Routes and Changes in Remittances

As mentioned earlier, due to the blockade of Ukraine's Odesa Port and other factors, logistics routes transiting through Ukraine were rerouted via Moldova. Consequently, Moldova's total domestic freight volume peaked in 2022, immediately following the invasion, but has since begun to decline as the Port of Odesa reopened.

According to the World Bank[5], there was a significant shift in the composition of remittance sources to Moldova in 2023. Specifically, remittances from Commonwealth of Independent States (CIS) countries plummeted by about half due to the impact of Russia's invasion of Ukraine, which caused Moldovan immigrants in the CIS to relocate to other countries. Conversely, remittances from EU countries increased by 15.4% compared to 2022, indicating a shift in remittance sources from CIS countries to EU countries.

2.1.6 Moldova's Natural and Social Environment

(1) Topography and Geographical Features

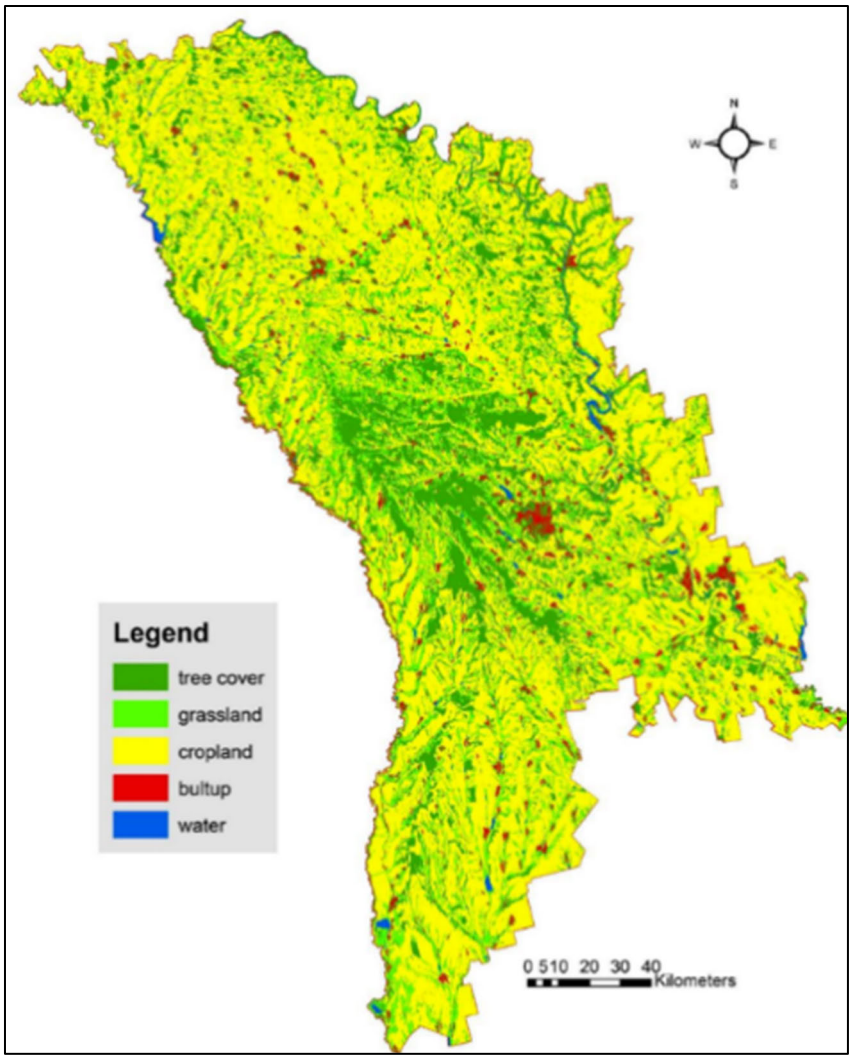
Moldova's landscape consists of relatively flat terrain, including plains, plateaus, hills, and valleys. While the Podolsk Uplands extend in the north and the Black Sea Lowlands in the south, approximately 75% of the country consists of lowlands with elevations below 200 meters. The two major rivers are the Dniester and the Prut, both of which belong to river systems that flow into the Black Sea.

Moldova is blessed with some of the world's most fertile black soil (chernozem). Nutrient-rich black soil and fertile alluvial valleys along the Dniester River basin are found in the north, while carbonated black soil suitable for viticulture extends across the south. Against this backdrop of natural conditions, Moldova is characterized by an overwhelming proportion of agricultural land. According to the National Bureau of Statistics of Moldova, as of 2023, agricultural land accounted for 73.7% of the country's total land area, reaching approximately 2.493 million hectares. The breakdown is as follows: arable land accounts for 55.1%, pastures and grazing lands for 10.0%, and perennial crops (such as orchards and vineyards) for

[4] IMF Country Report No. 24/355, 2024
[5] The World Bank, Moldova Economic Update, April 2024

8.0%. In contrast, forests and natural vegetation cover only 13.8% of the country's territory, amounting to approximately 468,000 hectares (Figure 2-7).

While fertile farmland accounts for most of the country's land area, according to Moldova Country Climate and Development Report (World Bank, November 2024), soil degradation has been confirmed in approximately 29% of the total land area and 43% of farmland, with soil erosion, overgrazing, and inappropriate farming practices posing a serious threat to agricultural sustainability.



Source: Institute of Ecology and Geography, Moldova

Figure 2-7 Land Cover Map of Moldova (2020)

(2) Climate

Moldova is broadly classified into three climatic regions: northern, central, and southern. According to the Food and Agriculture Organization of the United Nations (FAO), the northern and central regions account for approximately 55% of the country's territory and have a relatively mild climate. Annual precipitation ranges from approximately 500 to 600 mm, with most falling between May and October, and the average annual temperature is 7.0 to 9.5 degrees Celsius. In contrast, the southern region, which accounts for about

45% of the country's territory, is a warm, semi-arid area with low annual precipitation of 450 to 550 mm, concentrated between May and October. The average annual temperature is 9.5 to 10.0 degrees Celsius.

In recent years, record-breaking heat and severe drought have become the norm in Moldova. According to the World Bank's "Moldova Country Climate and Development Report," the average temperature has risen by approximately 1.1 degrees Celsius over the past 20 years. It is projected to rise by up to 2.8 degrees Celsius by 2050. In the summer of 2024, a heatwave with maximum temperatures of 40.9°C persisted for 26 days, exacerbating the drought. Furthermore, more than seven severe droughts have occurred over the past 20 years, dealing a significant blow to crop yields.

(3) Disasters

The western region of Moldova, bordering Romania, has geographical characteristics that make it vulnerable to seismic activity from the Vrancea seismic zone. According to a report by the Japan International Cooperation Agency (JICA)[6], a total of six earthquakes with a seismic intensity of 3 to 4 were observed in the capital, Chișinău, over the five years from 2005 to 2010. Furthermore, microseismic activity is relatively high in Basarabeasca County in the south, with approximately 50-120 earthquakes recorded annually. Landslides associated with these earthquakes occur frequently in the southern region.

Furthermore, as mentioned above, the country is strongly affected by climate change, and natural disasters such as floods and droughts occur frequently. Much of the country consists of plains sandwiched between the two major rivers, the Dniester and the Prut, and, due to the terrain's poor drainage, three major floods have hit it over the past 20 years. In particular, the 2010 flood affected approximately 10,000 people, resulting in damage to more than 1,200 homes, which were either completely or partially destroyed or flooded.

2.2 Ukraine's Socioeconomic and Natural Conditions

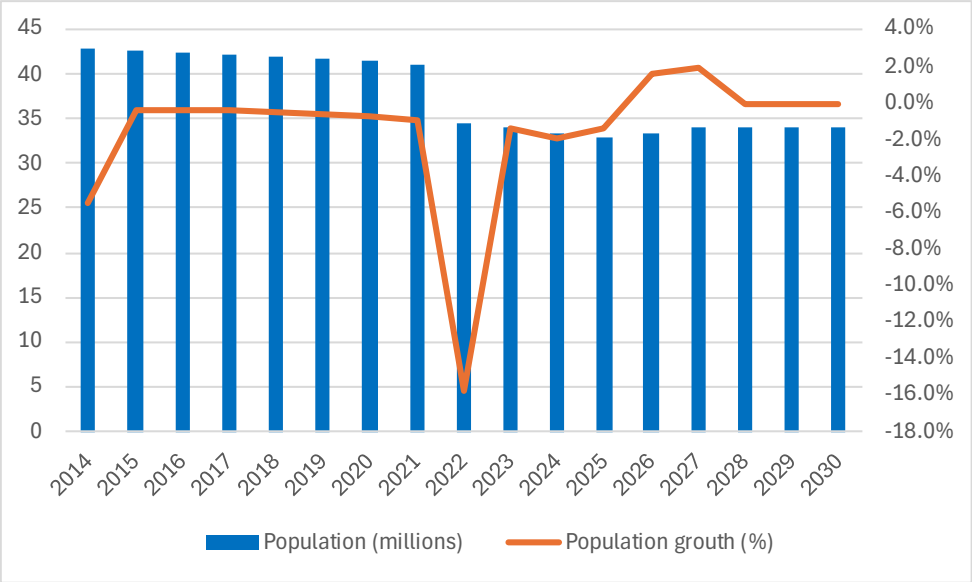
2.2.1 Society and Demographics

Ukraine, which borders Moldova to the east, has one of the largest land areas in Europe (603,700 km²), surpassing even metropolitan France. In terms of demographics, as in Moldova, the population has been in long-term decline since independence from the Soviet Union in 1991. The population, which stood at approximately 51.7 million in 1991, had decreased to about 40.99 million by 2021 (before the invasion) and further shrank to approximately 33.34 million by 2024 (post-invasion). Low birth rates and an aging population largely drive this trend. The natural growth rate (per 1,000 people) in 2021 was -10, indicating a significant population decline, with the rate of decline more than 2.5 times Moldova's[7]. Furthermore, the magnitude of the decline is substantial even when compared to the neighboring countries such as Romania and Bulgaria (Figure 2-8).

[6] JICA Republic of Moldova Firefighting Equipment Improvement Project Feasibility Study Report (2022)
[7] National Bureau of Statistics of the Republic of Moldova, Moldova in Figures, 2024

Furthermore, according to the World Bank's 4th Rapid Damage and Needs Assessment (RDNA), approximately 13.5 million people—about one-third of the population—have been displaced from their homes since the Russian invasion. As of December 2024, approximately 6.8 million people have fled to countries outside Ukraine, causing serious impacts on domestic labor shortages and future demographic composition.

On the other hand, according to IMF projections, demographic trends may temporarily recover starting in 2025, with the population growth rate expected to turn positive at just under 2% annually in 2026 and 2027. Thereafter, while population decline is projected to resume in 2028 and beyond, the rate of decline is expected to moderate to approximately -0.1% annually.



Source: IMF World Economic Outlook database: October 2025

Figure 2-8 Population and Population Growth Rate of Ukraine

2.2.2 Economic Size and Growth

Ukraine’s nominal GDP in 2024 is approximately $190.7 billion (about 30.4 trillion yen). Per capita GDP stands at $5,719, below Moldova's level (Figure 2-9).

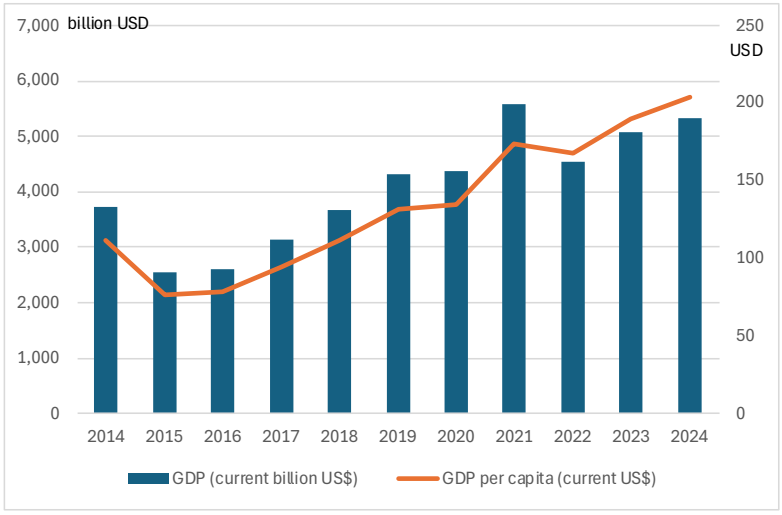
The Ukrainian economy was severely impacted by Russia’s annexation of Crimea and the armed conflict in the eastern regions in 2014–2015, causing real GDP growth to plummet to approximately minus 10%. Subsequently, the economy recovered, growing at an annual rate of around 3% (Figure 2-10).

However, in 2020, the spread of COVID-19 led to restrictions on economic activity in the service sector, particularly the accommodation and food services industries, as well as in the transportation and logistics sectors and parts of the manufacturing sector. Additionally, a severe drought dealt a major blow to the agricultural sector, resulting in a -3.8% growth rate.

Although a recovery was observed in 2021 following the resumption of economic activity, the economy contracted significantly again in 2022 due to the impact of Russia’s invasion of Ukraine. The destruction

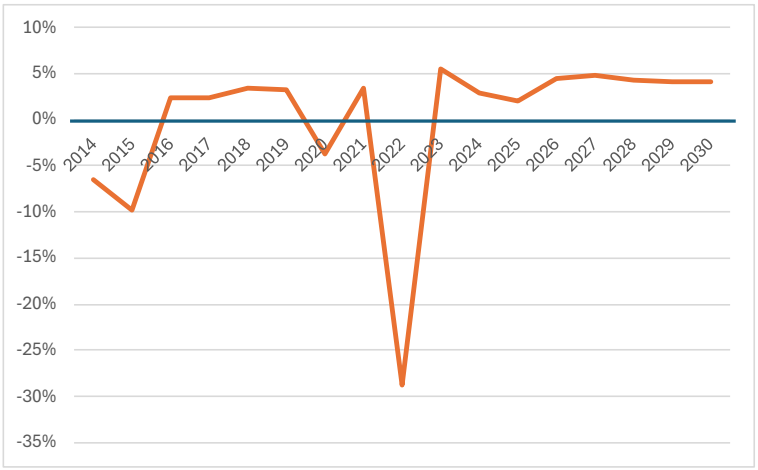
of major heavy-industry production facilities, supply constraints due to the occupation of agricultural production areas, and the blockade of Black Sea ports significantly restricted exports of major commodities such as grain and steel, resulting in an extremely sharp decline in the growth rate to -28.8%.

In 2023, the growth rate rebounded to approximately 6% due to a partial recovery in economic activity. According to the IMF, real GDP growth is projected to remain at around 2.0% in 2025. Still, the recovery trend is expected to strengthen thereafter, driven by reconstruction investment and the normalization of economic activity, with growth rates exceeding 4% from 2026 onward.



Source: IMF World Economic Outlook database: October 2025

Figure 2-9 Ukraine's Nominal GDP and GDP per Capita (2014–2024)



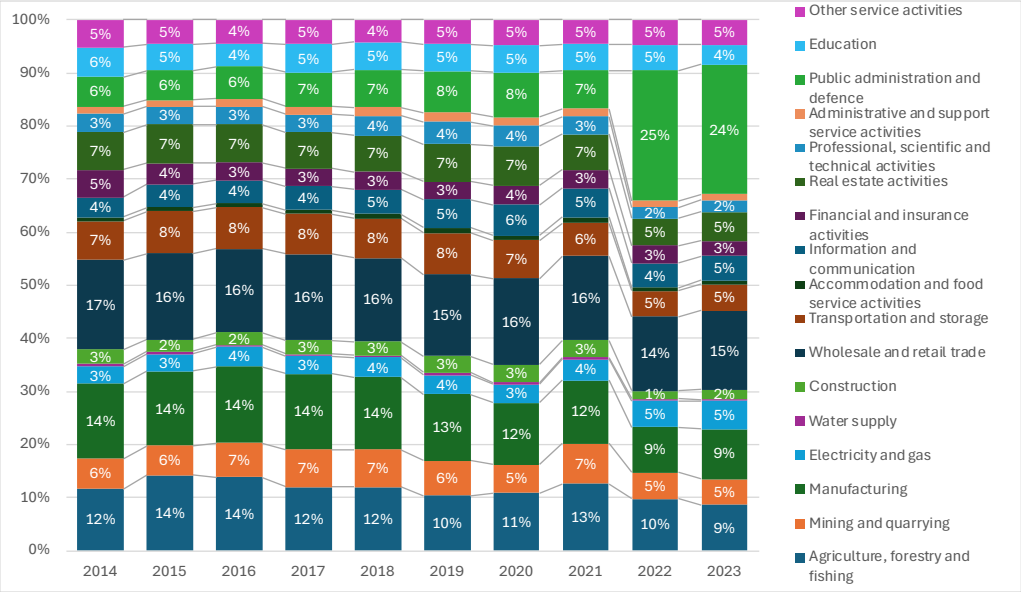
Source: IMF World Economic Outlook database: October 2025

Figure 2-10 Ukraine's Real GDP Growth Rate (2014–2030)

2.2.3 Industrial Structure

While the service sector also makes a significant contribution in Ukraine (70% of GDP), a key difference from Moldova is the notable contribution of the mining sector (5%) (Figure 2-11).

From 2021 to 2023, due to the Russian invasion, the agricultural sector contracted by approximately 4%, and in the industrial sector, value added in manufacturing—centered on agricultural processing, steel, and steel products—decreased by about 3%. On the other hand, since 2022, value added in the "public administration and defense" sector within the services sector has surged. This reflects the expansion of defense-related spending and increased public sector activity under wartime conditions.



Source: State Statistics Service of Ukraine

Figure 2-11 Ukraine's GDP by Sector (2014–2023)

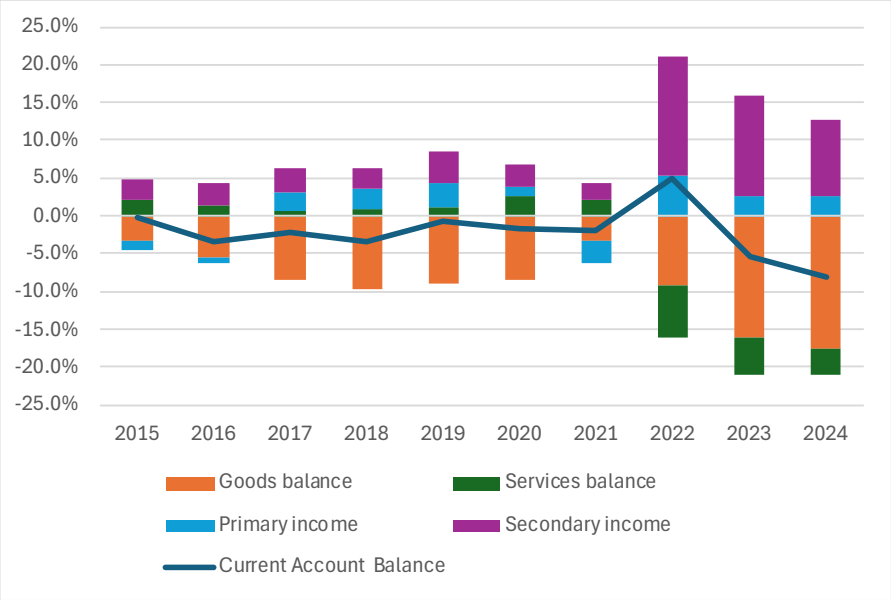
2.2.4 Fiscal Situation

Since 2014, Ukraine's current account balance has remained at around a 2% of GDP deficit. However, in 2022, when Russia's invasion began, the secondary income account (gifts, grant aid, official development assistance (ODA), and remittances) surged due to inflows of grant aid from the international community, such as financial and humanitarian assistance, resulting in a current account surplus. Conversely, the services balance (transportation, travel, finance, intellectual property royalties, etc.) turned into a deficit. This was driven by increased consumption spending abroad—such as withdrawals from bank accounts and card payments at destinations—as many Ukrainians fled the country. Since 2023, the trade deficit has widened further (Figure 2-12).

The external debt-to-GDP ratio rose to 129% against the backdrop of Russia's annexation of Crimea and the conflict in eastern Ukraine in 2015, as well as the resulting severe economic crisis. However, it subsequently declined due to economic recovery and progress in debt restructuring, improving to 65% by 2021. However, since 2022, due to widening fiscal deficits and increased reliance on external assistance, the external debt ratio has risen again and is projected to reach 95% in 2024 (Figure 2-13).

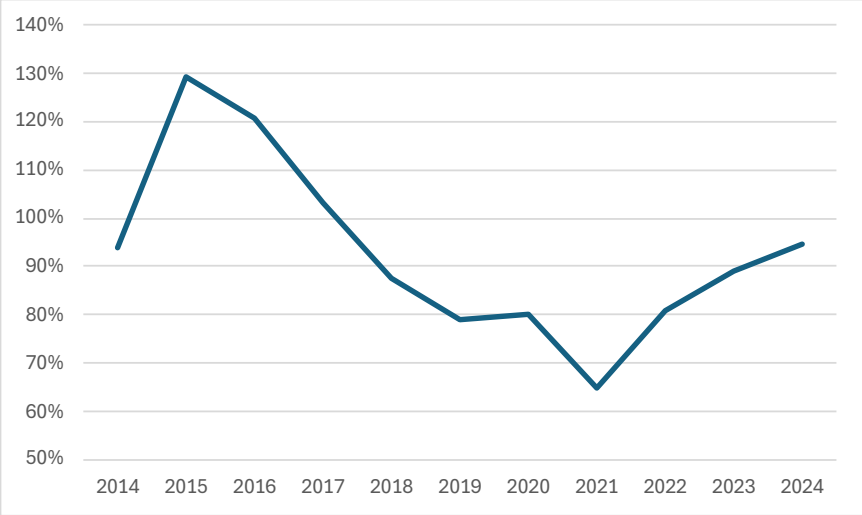
To date, the IMF has not set a threshold for the external debt-to-GDP ratio and has used a public debt-to-GDP ratio of around 70% as a benchmark for assessing debt risk. Against this backdrop, in its 2024 Debt Sustainability Analysis, the IMF presented new ratio targets to restore debt sustainability. Specifically, it

has set medium- to long-term debt ratio targets to reduce the public debt-to-GDP ratio to approximately 82% by 2028 and 65% by 2033.



Source: IMF

Figure 2-12 Ukraine's Current Account Balance as a Percentage of GDP



Source: National Bank of Ukraine

Figure 2-13 Ukraine's External Debt-to-GDP Ratio

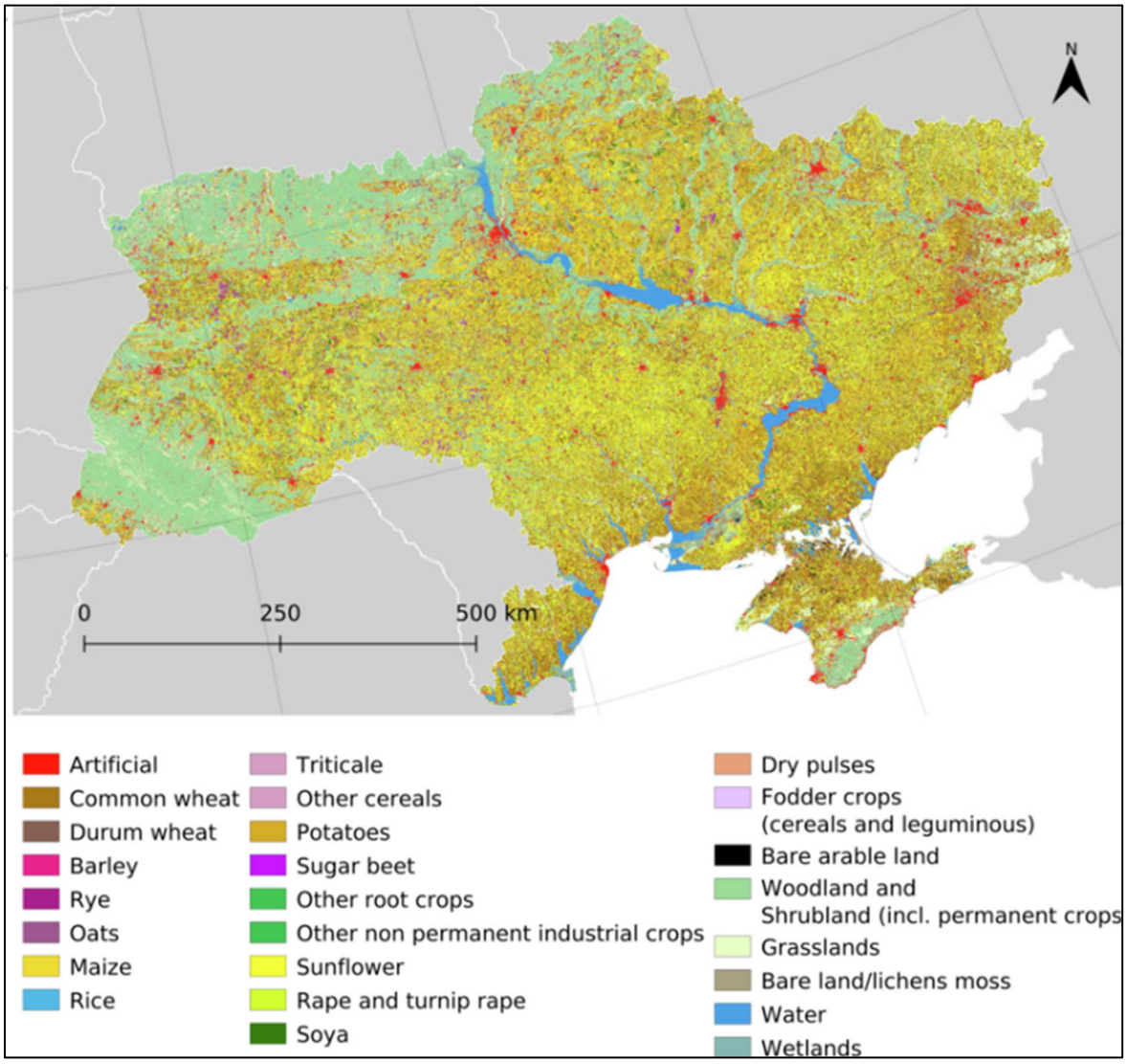
2.2.5 Topography and Geographical Features

Ukraine's territory spans ecological regions ranging from forested areas in the north, mixed forest and steppe zones in the center, to steppes in the south. Apart from the Carpathian Mountains in the west and the Crimean Mountains in the south, the country consists largely of plains. Major rivers include the Dnieper, Dniester, and Siverskyi Donets, which belong to river systems flowing into the Black Sea and the Sea of Azov.

Ukraine features fertile land suitable for agricultural production. The main crops are barley, wheat, corn, soybeans, and sunflowers, which account for about 60% of total production. Due to these natural conditions, a very large portion of Ukraine's land is agricultural. According to a World Bank report (2022)[8], before the Russian invasion, agricultural land covered approximately 41 million hectares, of which about 33 million hectares were under cultivation. Meanwhile, forest cover accounted for only about 15.9% of the country's territory, or approximately 9.6 million hectares, making Ukraine one of the least forested countries in Europe (Figure 2-14).

While farmland occupies a significant portion of the country's territory, extensive environmental damage has been confirmed since the Russian invasion. As of 2024, approximately 21% of farmland is not under government control[9]. Soil contamination from combat, landmine emplacement, destruction of irrigation infrastructure, and forest fires poses serious threats to agricultural productivity and ecosystem sustainability.

[8] WB, Ukraine Fourth Rapid Damage and Needs Assessment, August 2022
[9] WB, Ukraine Fourth Rapid Damage and Needs Assessment (RDNA4), February 2022–December 2024



Source: European Union crop map 2022: Earth observation's 10-meter dive into Europe's crop tapestry

Figure 2-14 Land Use Map of Ukraine (2022)

2.2.6 Climate

While most of Ukraine has a humid subarctic climate, the southern and eastern regions feature arid areas with steppe climates. According to the WB[10], the western, northern, and central regions, which account for about 70% of the country's territory, have a relatively humid climate with warm summers corresponding to the forest and mixed forest-steppe ecoregions. In contrast, the southern and eastern regions, which account for about 28% of the country's territory, are steppe zones characterized by a humid continental climate with hot summers or a cold semi-arid climate and are becoming increasingly arid. Precipitation patterns are shifting. Precipitation is trending upward in the northwest, and summer precipitation is decreasing in the south and central regions, leading to increasing aridity.

[10] World Bank, Building Climate Resilience in Agriculture and Forestry, December 2021

Like Moldova, Ukraine's weather is becoming increasingly extreme, with a particularly marked rise in average temperatures since the 1990s. According to a World Bank report, average temperatures have been trending upward since the 1990s. Since 2007, average temperatures have consistently exceeded the long-term average by 1.5 degrees. Since 2015, the country has experienced its warmest weather in the past 10 years, with average temperatures in 2019 recorded at 2.7 degrees warmer than normal. Against this backdrop of climate change, the frequency of droughts has nearly doubled over the past 20 years, and aridification has been observed even in the formerly humid Polissya region in the north. In 2020, a severe drought resulted in the loss of 234,000 hectares of winter crops. The forest fires that occurred that year caused the most devastating damage in modern history[11].

2.2.7 Disasters

Disasters In Ukraine, the southern region has geographical characteristics that expose it to earthquake risk, but no significant damage from naturally occurring earthquakes has been confirmed in recent years. According to a World Bank report[12], Ukraine is vulnerable to natural disasters such as floods, droughts, and wildfires. Regarding floods, summer flooding in the Carpathian region in the west has traditionally been considered the main risk, with severe damage recorded in 2008, 2010, and 2020. In addition, in June 2023, Russia destroyed the Kakhovka Dam, causing catastrophic flooding in the south (including Kherson Oblast), submerging approximately 620 km^2, thereby surfacing the risk of large-scale flood damage caused by the war[13].

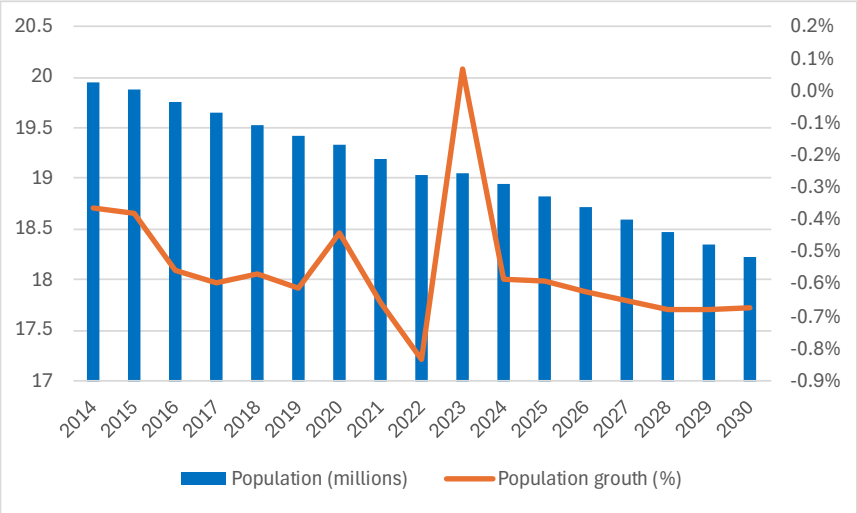
2.3 Romania's Socioeconomic and Natural Conditions

2.3.1 Society and Demographics

Meanwhile, Romania, located west of Moldova, has a land area roughly the same as the United Kingdom (approximately 238,400 km²). The population has been on a long-term decline since peaking in 1990; over the past decade, the total population has decreased by approximately 1 million, from about 19.9 million in 2014 to about 18.9 million in 2024. According to the World Bank, this rate of population decline is the highest among EU member states because of significant income inequality and a very high poverty rate within the EU. Approximately 70% of the poor live in rural areas, and due to a lack of employment opportunities, more than 2 million people, or about 20% of the working-age population (ages 15–64), have migrated to other EU countries over the past decade.

On the other hand, a temporary population increase was observed from 2023 onward due to the influx of refugees from Ukraine and increasing labor migration. However, the IMF projects an annual population growth rate of approximately -0.6% to -0.7% from 2025 onward and forecasts that population decline will continue in the medium- to long-term (Figure 2-15).

[11] World Bank, Ukraine Fourth Rapid Damage and Needs Assessment, August 2022
[12] World Bank, Ukraine Fourth Rapid Damage and Needs Assessment, August 2022
[13] United Nations Ukraine, Post-Disaster Needs Assessment, 2023



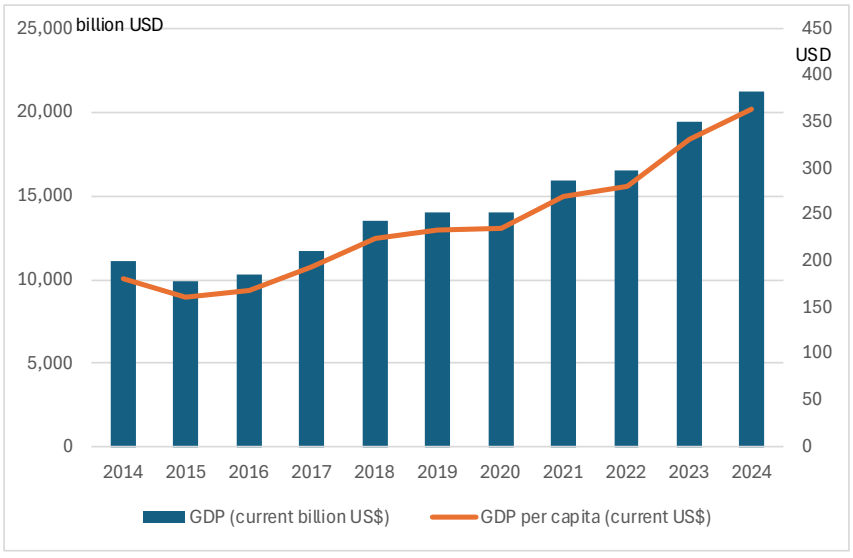
Source: IMF World Economic Outlook database: October 2025

Figure 2-15 Romania's Population and Population Growth Rate

2.3.2 Economic Size and Growth Trends

Romania, which has the largest economy among the three countries, is estimated to have a nominal GDP of approximately $382.9 billion (about 61 trillion yen) in 2024. Its GDP per capita of $20,210 places it within the middle-income range, significantly exceeding that of Moldova and Ukraine (Figure 2-16).

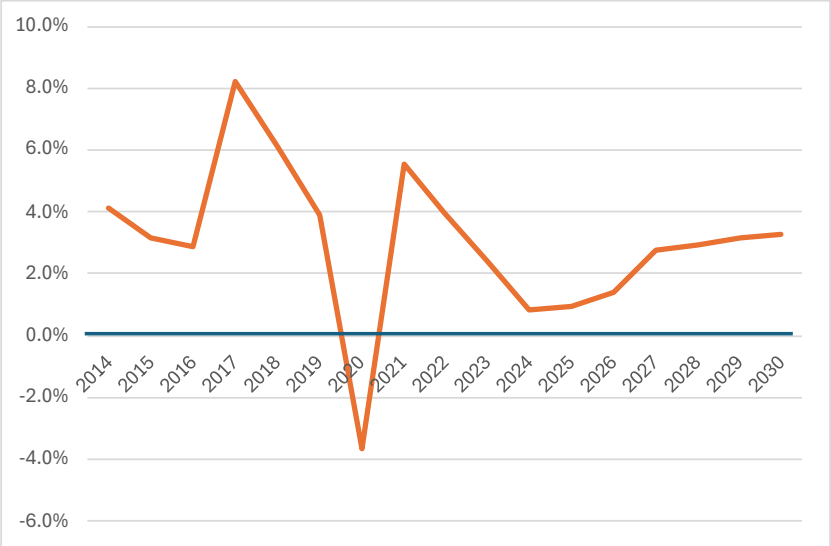
Since 2000, the Romanian economy has experienced rapid growth, spurred by the country's accession to the EU in 2007. In 2020, the spread of COVID-19 led to operational restrictions at factories in the automotive, parts, and transportation machinery sectors, and to stagnation in the tourism industry, resulting in a real GDP growth rate of -3.7%. However, in 2021, economic activity resumed, and the growth rate rebounded to 5.5%.



Source: IMF World Economic Outlook database: October 2025

Figure 2-16 Romania's Nominal GDP (in Billions of U.S. Dollars) and GDP per Capita (2014–2024)

In 2022, despite soaring energy prices following Russia's invasion of Ukraine, domestic demand—particularly private consumption—was supported by government fiscal assistance to households and businesses (such as energy subsidies), enabling the economy to maintain 4.0% growth. According to the IMF, growth rates for 2025 and 2026 will be approximately 1.7%, but the recovery trend will strengthen thereafter, with growth rates of around 3% projected from 2027 onward (Figure 2-17).



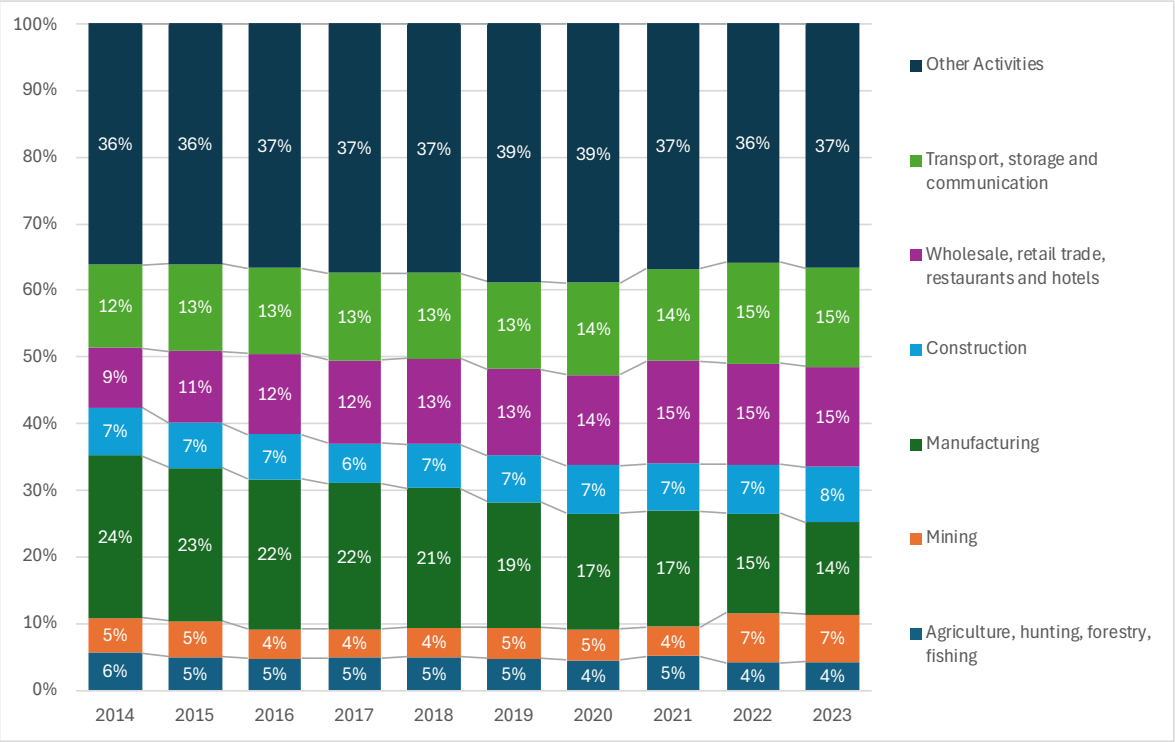
Source: IMF World Economic Outlook database: October 2025

Figure 2-17 Romania's Real GDP Growth Rate (2014–2030)

2.3.3 Industrial Structure

Romania's economic structure is primarily driven by the services sector (67%), while industry accounts for 22%, the highest industrial share among neighboring countries.

In the manufacturing sector, the share of GDP fell significantly from 24% in 2014 to 14% in 2023. The economy has shifted from the once-dominant textile industry to IT services, and the service sector, including transportation, wholesale and retail trade, and the restaurant and hotel industry, is growing (Figure 2-18).



Note: The sectoral GDP shares are calculated based on United Nations (UN) data, but they are slightly higher than the figures for mining and services in the World Bank report.

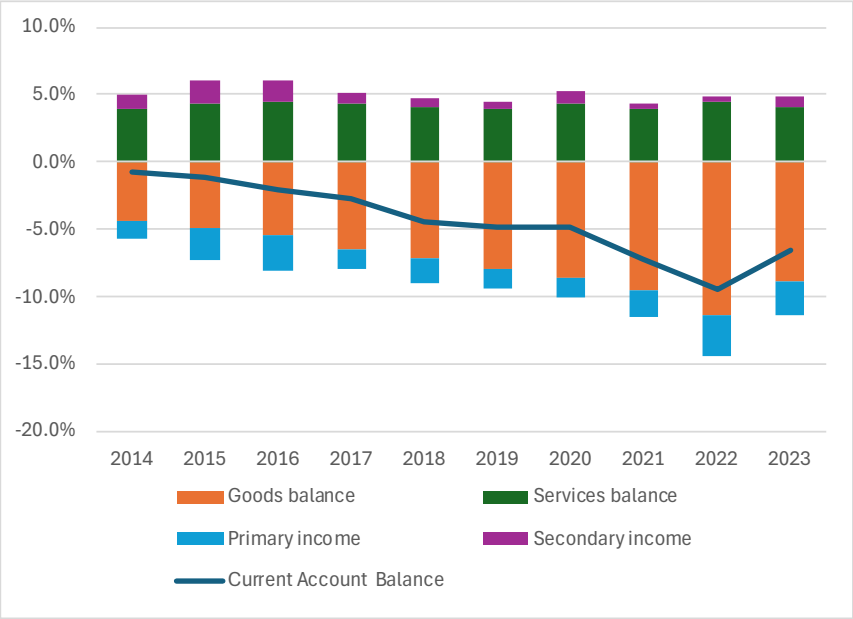
Source: United Nations data

Figure 2-18 Romania's GDP by Sector (2014–2023)

2.3.4 Fiscal Situation

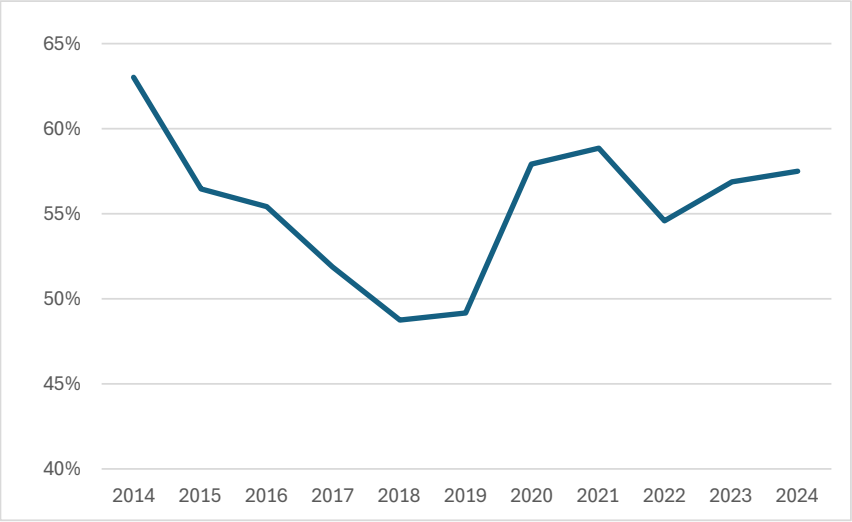
Romania's current account deficit has been widening since 2014. The expansion of the trade deficit has been particularly notable, and the primary income balance has also remained consistently negative. In 2023, the current account deficit narrowed slightly as the pace of the trade deficit's expansion slowed (Figure 2-19).

The external debt-to-GDP ratio has generally ranged between 50% and 60% since 2015 and might reach 57.5% in 2024. The IMF notes that persistent fiscal deficits and deteriorating current account balance pose upside risks that could push public debt levels higher than anticipated. Furthermore, it states that correcting fiscal deficits over the medium term and steadily implementing structural reforms are essential to ensuring debt sustainability (Figure 2-20).



Source: National Bank of Romania

Figure 2-19 Romania's Current Account Balance as a Percentage of GDP



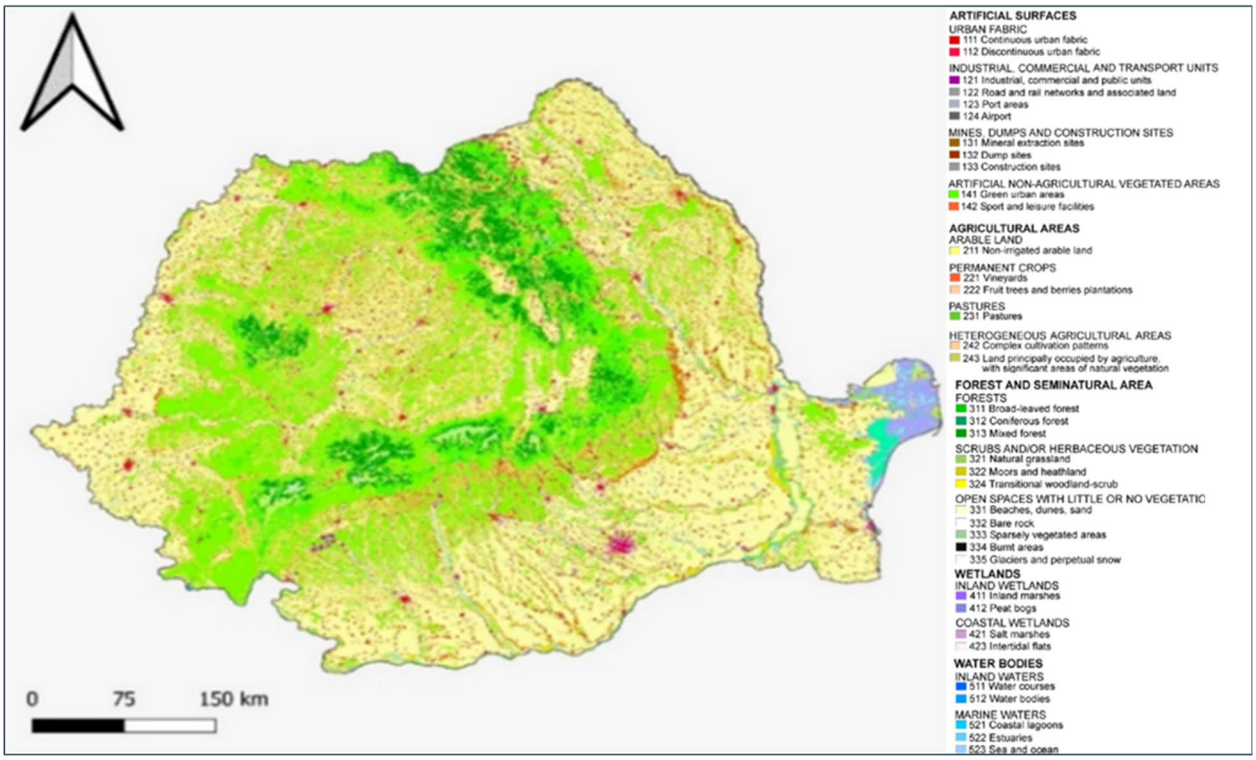
Source: IMF

Figure 2-20 Romania's External Debt-to-GDP Ratio

2.3.5 Topography and Geographical Features

Romania's territory is the most biogeographically diverse among EU member states, encompassing five distinct biogeographic regions: Alpine, Continental, Pannonian, Pontic, and Steppe. The Danube is the country's major river, utilized for hydropower and water transport. Managing its basin is crucial for flood prevention.

Romania is a country blessed with resources suitable for agricultural production, growing crops such as barley, wheat, corn, and sunflowers, with 10.9 million hectares of land devoted to arable farming[14]. Additionally, Romania possesses the largest area of primary forest in the EU, characterized by rich biodiversity and genetic resources.



Source: Assessment of Economic, Social, and Perceptual Impacts of Soil Pollution by Microplastic Particles (MPs) in Romania, 2025

Figure 2-21 Land Use Map of Romania (2018)

2.3.6 Climate

Romania has a temperate continental climate, but there are regional variations in climate patterns. The southeastern and southern regions are particularly prone to drought; according to an assessment by the Romanian Emergency Management Agency, approximately 48% of agricultural land is considered vulnerable to drought.

Romania is no exception to the impacts of climate change, with rising average temperatures and increasing severity of weather-related disasters, such as droughts. According to the World Bank (2023)[15], average temperatures rose by 1.3 degrees between 1901 and 2020, and it is projected that damage from extreme weather events could increase by up to sixfold in the future. In the summer of 2022, a widespread drought across Europe struck Romania, causing the most severe damage in recorded history. This drought reduced agricultural production by at least 25% and decreased hydropower generation by one-third.

[14] World Bank, Romania Country Climate and Development Report, October 2023
[15] World Bank, Romania Country Climate and Development Report, October 2023

2.3.7 Disasters

Romania is one of the countries with the highest earthquake risk in the EU, and the eastern region in particular has geographical characteristics that place it directly in the path of the Vrancea seismic belt, which serves as the epicenter. According to the World Bank, more than 75% of the population lives in earthquake-vulnerable areas, and the capital, Bucharest, is considered the most earthquake-vulnerable capital among EU member states.

It is also among the EU countries at the highest risk of flooding, and flood damage is rising due to climate change. According to records dating back to 1980, a total of 36 major river floods have occurred, affecting approximately 368,000 people and causing 2.6 billion euros in damage.

Chapter 3 Logistics Networks, Plans, and Systems in Moldova and the neighboring Countries

3.1 EU Plans and Policies

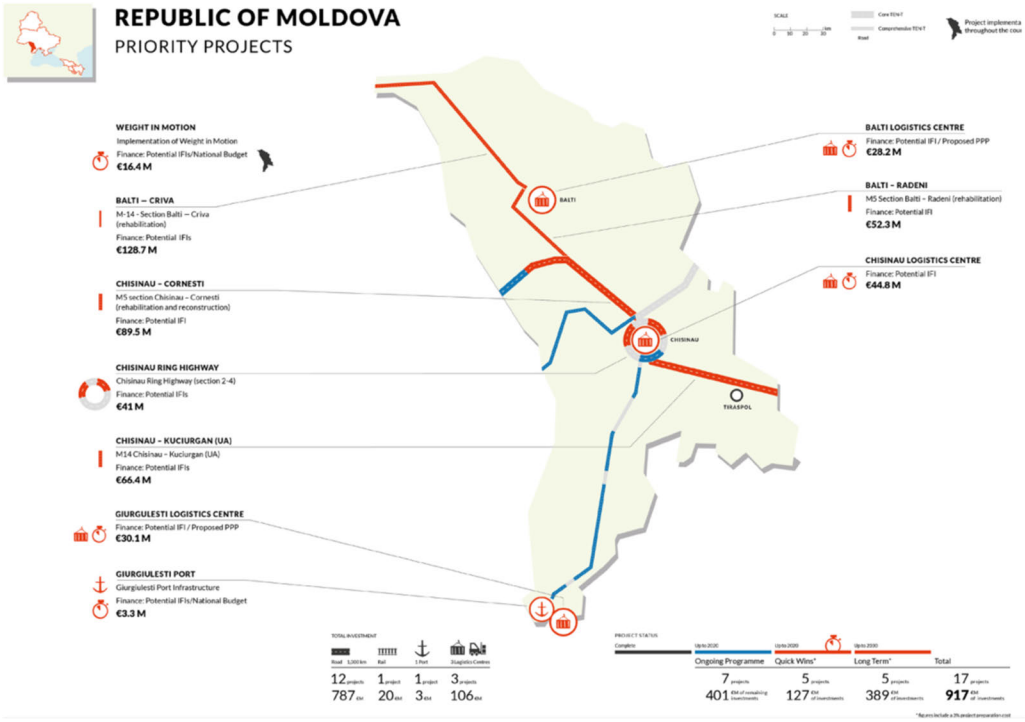
3.1.1 Eastern Partnership (EaP)

(1) Overview

The EaP is a framework for the EU's policy toward Eastern Europe established in 2009, covering six countries: Moldova, Ukraine, Georgia, Armenia, Azerbaijan, and Belarus[16]. The aim is to strengthen political cooperation and economic integration between the EU and these partner countries, and to promote democratic governance, market economies, and the rule of law.

(2) TEN-T Investment Implementation Plan

In 2019, the EU formulated a "Priority Investment List" to integrate the transport corridors of the six EaP countries into the TEN-T. For Moldova, 17 projects (€917 million) are listed, including the development of the Chișinău Ring Road.



Source: Indicative TEN-T Investment Action Plan

Figure 3-1 Priority Investment List for Moldova

[16] Belarus withdrew in 2021. https://eap-csf.eu/content/uploads/2024/07/EaP-CSF-statement_Belarus-EaP-suspension.pdf

(3) Recovery, Resilience, and Reform: EaP Priorities Beyond 2020

The EU Joint Staff Working Document "Recovery, Resilience, and Reform: EaP Priorities Beyond 2020," adopted in July 2021, sets out the following 10 priority objectives for 2025. For the transport sector, the document highlights the construction or upgrading of priority roads and railways related to TEN-T.

1. Investing in a competitive and innovative economy – supporting 500,000 small and medium-sized enterprises
2. Investing in the rule of law – All senior officials must declare their financial assets, subject to verification.
3. Investing in sustainable and smart connectivity – constructing or upgrading 3,000 km of priority roads and railways
4. Investing in human capital and the knowledge society – 70,000 individual mobility opportunities for students, staff, researchers, young people, and youth workers
5. Investing in security and cyber resilience – Enhanced frameworks to identify and address hybrid threats, and capacity building for partners to enhance cyber resilience and combat cybercrime.
6. Investing in sustainable energy – 250,000 households reduce energy consumption by at least 20%
7. Investment in the environment and climate – An additional 3 million people will gain access to safe water services, and air quality will be monitored and improved in 300 cities
8. Investment in Health Resilience – 850,000 healthcare workers will be vaccinated and benefit from improved treatment, facilities, and working conditions.
9. Investing in an inclusive, gender-equal, and diverse society and strategic communication – Supporting 2,500 local civil society organizations, 120 independent media outlets, and 2,000 journalists
10. Investment in Digital Transformation – 80% of households will have access to affordable high-speed internet

Source: Joint Staff Working Document
https://www.eeas.europa.eu/sites/default/files/swd_2021_186_f1_joint_staff_working_paper_en_v2_p1_1356457_0.pdf

ANNEX 1 of the Joint Staff Working Document, titled "Economic and Investment Plan," lists each country's flagship projects; for Moldova, the following five projects are cited. In the transportation sector, the construction of an inland freight terminal in Chișinău (€30 million) and improvements to road and rail connectivity (€780 million) are listed.

Flagship 1: Supporting a sustainable, innovative, environmentally friendly, and competitive economy – Direct support for 50,000 SMEs

Flagship 2: Promoting EU-Moldova trade – Construction of an inland freight terminal in Chișinău

Flagship 3: Improving energy efficiency – Expanding the renovation of district heating systems in residential buildings in Chișinău and Bălți

Flagship 4: Improving connectivity – Integrating Moldova into the TEN-T

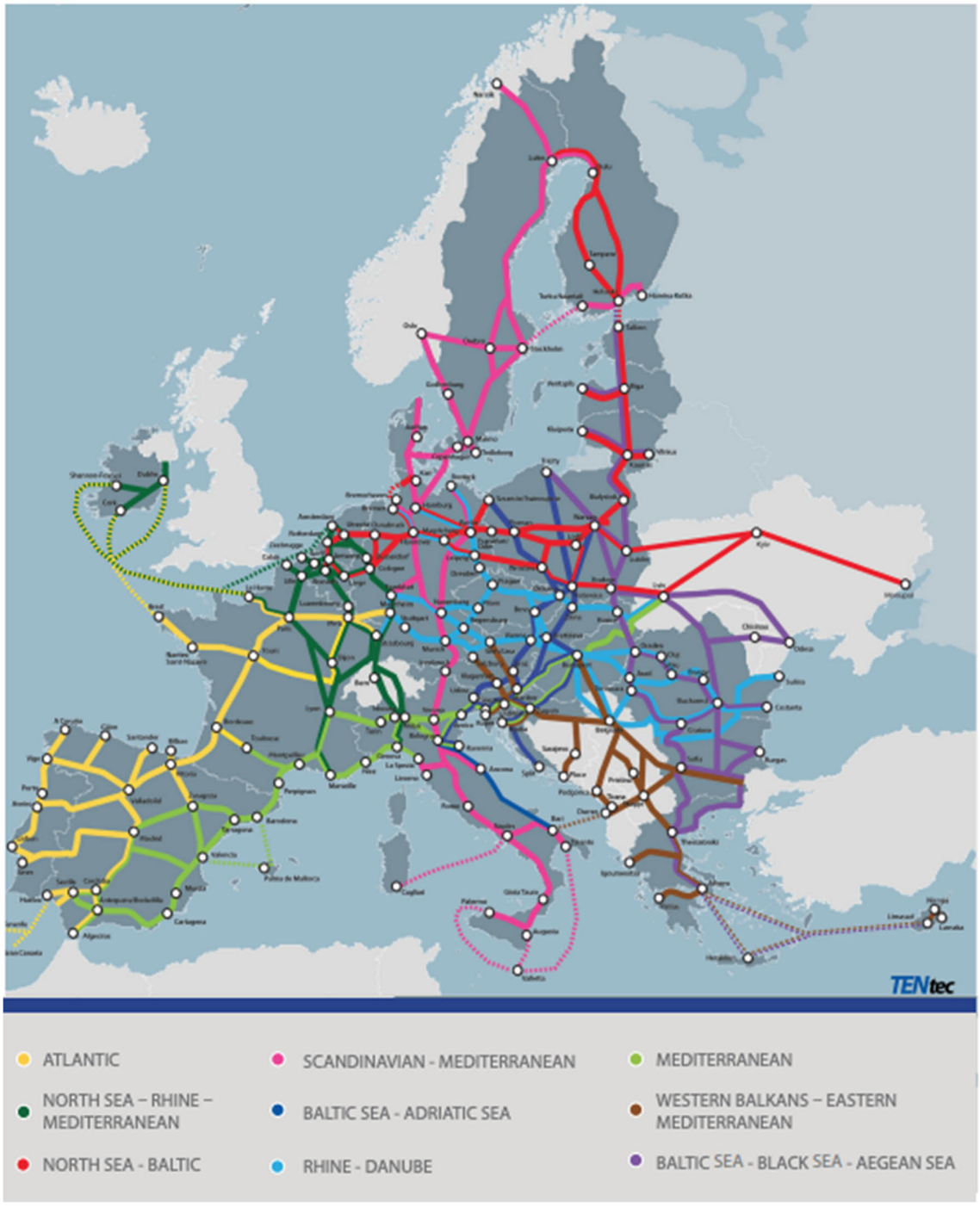
Flagship 5: Investing in Human Capital and Preventing the "Brain Drain" – Modernizing School Infrastructure and Implementing the National Education Strategy

Source: Joint Staff Working Document
https://www.eeas.europa.eu/sites/default/files/swd_2021_186_f1_joint_staff_working_paper_en_v2_p1_1356457_0.pdf

3.1.2 TEN-T Overview

(1) Network Concept

TEN-T is a pan-European network concept that integrates transport infrastructure within and outside the EU. In its 2021 revision, the EU established new routes (TEN-T Extended Core Network) targeting EaP countries, and in July 2022, a corridor connecting Moldova and Ukraine was added (Figure 3-2).



Source: Regulation (EU) 2024/1679 of the European Parliament and of the Council

Figure 3-2 Trans-European Transport Network (TEN-T)

(2) Network Hierarchy

The TEN-T features three tiers under the Regulation (EU) 2024/1679 of the European Parliament and of the Council.

- Core: The most critical transport routes, comprising major trunk lines that should be completed at an early stage (target year: 2030)
- Extended Core: Routes that complement the Core network and enhance the connectivity of the EU-wide network (Target year: 2040)
- Comprehensive: A network covering the entire EU, comprising all infrastructure other than the Core and Extended Core (Target year: 2050)

(3) Development Levels by Mode

1) Rail

The development levels required for the TEN-T rail network by tier are as follows (Table 3-1). The European Rail Traffic Management System (ERTMS) requires safety-related signaling systems and other equipment at all levels. Although no explicit requirements regarding track gauge exist for the Comprehensive Network, standard gauge is effectively the baseline since compliance with the EU's Technical Specifications for Interoperability (TSI) is required.

Table 3-1 Development Levels Required for the TEN-T Railway Network by Tier

Category	Main Required Standards	Deadline
Core Network	• Track Gauge: Construct new lines with standard gauge (1,435 mm) • Axle load: 22.5 t • Electrification • Signaling and Operations Management: ERTMS • Train Length: Capable of handling 740-meter trains • Speed: 100 km/h on freight lines, 160 km/h or more on passenger lines (on major sections)	2030
Extended Core Network	• Same as above	2040
Comprehensive Network	• Virtually the same * There are no specific requirements regarding speed or track gauge. However, since compliance with EU TSIs is required, the design is based on the assumption of EU standard gauge.	2050

Source: Prepared by the JICA survey team based on Regulation (EU) 2024/1679 of the European Parliament and of the Council

2) Roads

The development standards required for each tier of the TEN-T road network are as follows (Table 3-2). For the Core and Extended Core Networks, design standards for high-quality roads, such as dedicated roads, are required.

Table 3-2 Development Standards by Category Required for the TEN-T Road Network

Category	Main Required Standards	Deadline
Core Network	• Dedicated roads or lanes separated by direction (e.g., median strip) • Grade-separated intersections (no at-grade intersections) • Rest facilities: every 60 km • Safe parking areas for trucks: every 150 km • Electric vehicle (EV) charging facilities installed in accordance with the Alternative Fuels Infrastructure Regulation (AFIR)	2030
Extended Core Network	• Same as above	2040
Comprehensive Network	• Same as above * Road structures shall comply with general safety standards. Rest areas: every 100 km. There are no specific provisions for safe parking areas for freight vehicles.	2050

Source: Prepared by the JICA survey team based on Regulation (EU) 2024/1679 of the European Parliament and of the Council

(4) Moldova's TEN-T

Within Moldova, approximately 1,000 km of road and rail networks are designated as TEN-T routes[17]. The route connecting Ungheni on the Romanian border to the Odesa Port in Ukraine via the capital, Chișinău, is designated as the core network (Figure 3-3 and Figure 3-4).



Source: Regulation (EU) 2024/1679 of the European Parliament and of the Council

Figure 3-3 TEN-T (Road) around Moldova

[17] Regarding areas outside the EU, since Regulation (EU) 2024/1679 of the European Parliament and of the Council does not contain a clear table indicating the starting and ending points, this information was derived from the map attached to the regulation.



Source: Regulation (EU) 2024/1679 of the European Parliament and of the Council

Figure 3-4 TEN-T (Rail) around Moldova

Table 3-3 TEN-T Roads in Moldova

Category	Starting Point	End Point	Major Stops
Core Network	1. Ungheni	2. Palanca	3. Chișinău (262 km)
	3. Chișinău	4. Dubossary	60 km
	3. Chișinău	Ring Road	59 km
Comprehensive network	5. Leușeni	3. Chișinău	104 km
	6. Criva	7. Corlăți	8. Bălți (237 km)
	8. Bălți	9. Pîrlița	61 km
	3. Chișinău	10. Giurgiulesti	11. Comrat (212 km)
	12. Anenii Noi	13. Pervomaisk	72 km

Source: Prepared by the JICA survey team based on the annexed map of Regulation (EU) 2024/1679 of the European Parliament and of the Council

Table 3-4 TEN-T Railways in Moldova

Category	Starting Point	Terminus	Major Stops
Core Network	A. Ungheni	B. Basarabeasca	C. Chișinău, D. Căinari
Comprehensive Network	E. Oknytsia	A. Ungheni	F. Bălți
	F. Bălți	G. Rîbnița	
	H. Tighina	I. Cuciurgan	
	B. Basarabeasca	J. Giurgiulesti	
	B. Basarabeasca	J. Giurgiulesti	K. Cantemir

Source: Prepared by the JICA survey team based on the annexed diagram of Regulation (EU) 2024/1679 of the European Parliament and of the Council

3.1.3 Solidarity Lanes

Solidarity Lanes are emergency logistics corridors established by the EU in May 2022 in response to disruptions in grain exports following Russia's invasion of Ukraine (Figure 3-5). The initiative began as a temporary measure to transport Ukrainian grain (approximately 20 million tons;[18]), for which maritime transport had become difficult due to the Black Sea blockade, to EU markets and third countries via land and inland waterways; however, it has since evolved into a policy to strengthen permanent alternative transport routes. Approximately 88.1 million tons of grain were transported to third countries via the EU between March 2022 and the end of 2023.

The main initiatives are as follows.

- Eliminating bottlenecks in rail, road, and port infrastructure
- Strengthening and simplifying border inspection systems
- Introduction of digital logistics platforms
- Institutionalizing trilateral cooperation among Ukraine, Moldova, and Romania

In Moldova, the Ungheni–Chișinău–Giurgiulesti route forms the core of the Solidarity Lanes, strengthening cooperation with the Romanian ports of Galați and Constanța. As a result, the transport of grain, fertilizers, and fuel via Moldova temporarily surged. In July 2023, a feasibility study (F/S) was conducted to assess the feasibility of converting the Ungheni–Chișinău railway line to standard gauge.



Source: EU website (Homepage: HP)

Figure 3-5 Conceptual Diagram of the Solidarity Lanes

[18] https://ec.europa.eu/commission/presscorner/api/files/attachment/878620/Factsheet_EU-UA_Solidarity_Lanes_EN.pdf.pdf

3.1.4 Challenges and Countermeasures in the Logistics and Transportation Sectors for Moldova and Ukraine ahead of EU Membership

As EU candidate countries, Moldova and Ukraine face the following challenges in the logistics and transportation sectors.

(1) Vulnerability of Infrastructure

Problems such as an aging railway and road network, difficulties in connecting railways due to differences between narrow-gauge and standard-gauge tracks, and insufficient port capacity are becoming increasingly apparent. As a countermeasure, the EU is expanding investment support through the Instrument for Pre-Accession Assistance (IPA) and the Connecting Europe Facility (CEF).

(2) Lack of Regulatory and Legal Harmonization

Alignment with the EU transport acquis is insufficient, and improvements to safety, environmental standards, and public procurement systems are particularly necessary. In Moldova, the Ministry of Transport has formulated the “National Transport and Logistics Strategy 2030” and is harmonizing its legal framework to EU standards.

(3) Inefficiencies in Border Crossings and Customs Procedures

Border crossing times between Ukraine and Moldova, as well as between Moldova and Romania, remain lengthy, increasing logistics costs. Through the Border Crossing Support Program, the EU is supporting the standardization of customs facilities (one-stop border) and the implementation of IT systems.

(4) Environmental and Sustainability Measures

A shift toward green transportation—including promoting rail and inland waterways and introducing EVs—is required. Based on the “Green Deal” and the “Sustainable and Smart Mobility Strategy,” the EU mandates environmentally conscious investments even for candidate countries.

Overall, the direction of EU accession preparations in the logistics and transportation sectors for Moldova and Ukraine centers on three pillars: infrastructure development, regulatory harmonization, and environmental measures, with a strong emphasis on regional cooperation (particularly the trilateral cooperation among Romania, Ukraine, and Moldova).

3.2 Logistics Policies, Plans, and Systems in Moldova and the neighboring Countries

3.2.1 Moldova’s Logistics Policies, Existing Plans, and Systems

(1) Logistics Policy Framework

Moldovan logistics policy is in the “National Mobility Strategy 2030,” a policy instrument that will concretize and implement transportation sector objectives based on the national development strategy named “Europe-Moldova 2030.” The "National Mobility Strategy 2030" directly contributes to the implementation

of Specific Objective 2, "Improving Living Conditions," and Objective 10, "Enhancing Mobility through an Efficient, Sustainable, and Safe Transport System," as outlined in "Europe-Moldova 2030."

(2) Priority Areas in the National Mobility Strategy 2030

The vision of the National Mobility Strategy 2030 includes: 1) connectivity with the transport systems of the neighboring countries and Europe, and 2) the construction and modernization of a network compliant with EU transport infrastructure standards, particularly TEN-T standards. Under this vision, the following six overarching objectives and priority areas have been established (Table 3-5).

Regarding rail transport, measures include supporting CFM's internal restructuring process (separation of infrastructure and operations) to implement the EU model of separated infrastructure and operations, strengthening cooperation with relevant European agencies, and establishing interoperability.

Table 3-5 Priority Areas in the National Mobility Strategy 2030

Overall Objectives	No.	Priority Areas
1. Improving the management of road assets, continuously repairing and modernizing the road network, and supporting safe and sustainable road transport	1.1	Enhancing the functional and institutional capacity of departments responsible for formulating and implementing public policies in the road infrastructure sector
	1.2	Ensuring sustainable contractual and financial frameworks for road asset management
	1.3	Continuation of road infrastructure rehabilitation projects
	1.4	Development and Implementation of Road Asset Management Mechanisms and Project Cycle Standards within the Strategic Asset Management Plan (SAMP)
	1.5	Development and Implementation of Vehicle Type Approval, and Promotion of Clean and Energy-Efficient Road Vehicles
	1.6	Adaptation to climate change, reduction of noise pollution, and implementation of circular economic principles in the road construction cycle
	1.7	Access to Intelligent Transport Systems (ITS) and acceleration of the digitalization of road transport systems
	1.8	Improving road network management based on European best practices
	1.9	Development and implementation of road infrastructure safety management systems, and their integration into the project cycle
	1.10	Development of state-of-the-art road design standards and planning and design procedures based on safety system principles
	1.11	Integration of a Comprehensive Approach to Road Safety
	1.12	Improving the safety of vulnerable road users
2. Improving road passenger transport through regular services and transitioning to sustainable mobility	2.1	Establishment of a Data and Information Collection System for Freight and Passenger Road Transport
	2.2	Development of inter-regional and intra-regional mobility plans
	2.3	Promotion of inter-community cooperation for public transportation coordination systems
	2.4	Resumption of the Expansion of Domestic Passenger Rail Transport Services
	2.5	Promoting the Adoption of Sustainable Urban Mobility Plans (Planul de Mobilitate Urbană Durabilă: PMUD) in Major Cities
	2.6	Renovation and construction of urban road networks, and integration of mobility along major urban transport corridors
	2.7	Increasing the Electrification Rate of Passenger Transport Vehicles
	2.8	Improving the level of digitalization of public transportation services
	2.9	Improving the monitoring of service quality provided to passengers
	2.10	Improving traffic flow across the city (bypasses, parking networks, etc.)

Overall Objectives	No.	Priority Areas
3. Efficient, sustainable, and environmentally friendly road freight transport	3.1	Reducing congestion at border crossing points (BCPs)
	3.2	Improving short-term sustainability
	3.3	Promoting Access to International Markets
4. Modern and efficient rail services fully integrated into the European Single Railway Area	4.1	Continuation of the reform process in the railway sector and preparation of the sector for opening to international and domestic railway operators
	4.2	Establishing effective partnerships with EU railway authorities and other relevant bodies to optimize cross-border transport.
	4.3	Develop and promote measures to encourage a modal shift from road freight to rail freight, and support digital initiatives
	4.4	Support the development and financing of intermodal transport solutions to maximize emission-reduction benefits
	4.5	Amendments to legal frameworks to promote private investment in the railway sector, with a particular focus on infrastructure
	4.6	Promotion of transportation methods that contribute to reducing greenhouse gas (GHG) emissions
	4.7	Implementation of compensation agreements for passenger rail transport services, and establishment of specific indicators to monitor and evaluate the quality of these services
	4.8	Expanding the provision of regional and suburban rail services to connect more communities and support sustainable mobility
	4.9	Support improvements to rail services in terms of rolling stock, station infrastructure, frequency of service, travel times, and methods of providing information to passengers.
	4.10	Promoting the manufacture and import of rolling stock in the Republic of Moldova
	4.11	Support for financing sections connecting major passenger transport hubs (bus terminals, ports, airports) with the railway
	4.12	Financial support for the rehabilitation of major railway corridors based on the national project portfolio
	4.13	Implementation of a long-term funding framework for maintenance and budget balancing in infrastructure management
	4.14	Support for funding the modernization of railway signalling systems, safety systems, and traffic management systems, including the adoption of digital technologies
	4.15	Support for improving the interconnectivity of Moldova's railway network with the EU railway network, and for the potential extension of EU track gauge standards to Moldova
5. Support for the development of inland waterway transport	5.1	Revitalization of inland waterway transport through the promotion of construction, rehabilitation, and modernization of river infrastructure in accordance with the principles of international navigability
	5.2	Formulation of a comprehensive plan for the development of inland waterway transport in the Republic of Moldova
	5.3	Harmonization of the domestic legal framework for inland waterway navigation with EU standards and the standards and regulations of the Comité Européen pour l'Élaboration de Standards dans le Domaine de Navigation Intérieure (CESNI)
	5.4	Strengthening the harmonization of standards for vocational training and crew certification through improvements to vocational training and education programs
	5.5	Strengthening the operational capacity and infrastructure of inland ports: revitalizing existing port capacity, and designing and constructing new inland ports equipped with modern facilities and expanded capacity
	5.6	Enhancing the reliability of waterborne transport through the integration of Intelligent Transport Systems (ITS) and the introduction of information exchange systems that centralize information on infrastructure, vessels, port operations, and their capacities
	5.7	Promoting modal shift through the adoption of support measures based on state aid to secure favourable financial conditions for the modernization of inland waterway fleets and to foster an investment-friendly environment

Overall Objectives	No.	Priority Areas
	5.8	Raising awareness among shippers regarding the potential of inland waterway transport and the option of transporting cargo via waterways
	5.9	Raising awareness among stakeholders (government agencies, etc.) regarding the benefits of inland waterway transport and its contribution to policy objectives
6. Development of maritime transport through efficient and adaptable maritime and port systems and sustainable economic growth in this sector	6.1	Ratification and adoption of International Maritime Organization (IMO) conventions and EU regulations concerning maritime safety, security, environmental protection, and coastal zone management
	6.2	Improving the performance of the national flag to ensure the Republic of Moldova is removed from the Paris Memorandum blacklist.
	6.3	Enhance the institutional and human capacity of the maritime administration
	6.4	Strengthen the institutional structure of ports and align them with advanced port systems
	6.5	Formulation of policies to support the labor market in the maritime sector, including the expansion of the workforce for seafarers and other related occupations
	6.6	Developing systematic training programs for navigators and other essential professionals
7. Safe, accessible, and sustainable air transport	7.1	Planning for and understanding future travel needs, and consumer protection
	7.2	Improving access to airports via public transportation
	7.3	Implementation of Environmental Protection Policies
	7.4	Funding for "Green" Infrastructure in the Air Transport System
	7.5	Capacity Building of the Civil Aviation Authority (AAC)
	7.6	Support for enhancing the capacity of air traffic management systems to accommodate increased air traffic
	7.7	Support for the operational capacity of airports in Moldova
	7.8	Development of air transport services, airport business models, and the organization of Moldova's air transport sector

Source: National Mobility Strategy 2030

3.2.2 Ukraine's Logistics Policies, Existing Plans, and Systems

(1) Logistics Policy Framework

In Ukraine, the "National Transport Strategy 2030" is positioned as the top-level plan for the logistics and transport sectors. This strategy was re-approved by a Cabinet of Ministers decision in December 2024, accompanied by an implementation plan for 2025–2027.

(2) National Transport Strategy 2030

The new strategy, formulated following the Russian invasion, advocates for "Build Back Better," aiming not merely for recovery but for a better reconstruction.

The basic structure of the strategy has four pillars.

Priority Area 1: Efficient and Competitive Transportation Systems
Priority Area 2: Innovative Development of the Transportation Industry and Foreign Investment Projects
Priority Area 3: Safe, Environmentally Friendly, and Energy-Efficient Transportation
Priority Area 4: Seamless Mobility and Regional Integration

The strategy sets forth the following four objectives.

Strategic Objective 1:	The revitalization and development of a competitive and efficient transport system integrated into the TEN-T, in accordance with EU policies and standards
Strategic Objective 2:	Ensuring high-quality passenger transport and seamless mobility
Strategic Objective 3:	Safe, people-centered, environmentally friendly, and energy-efficient transport with a focus on decarbonization
Strategic Objective 4:	Enhancing institutional capacity, developing human capital, and ensuring effective governance in the transport sector

The 2025–2027 Implementation Plan sets out a total of 99 action plans across the following sectors (Table 3-6).

Table 3-6 Overview of the National Transport Strategy 2030 Implementation Plan 2025–2027

Sector	Main Activities
Effective management of the recovery and development of the transport sector	• Examine priorities for the restoration and reconstruction of transportation infrastructure damaged during the war • Anti-corruption measures and strengthening of organizational and human resource foundations • Ensuring the independence of accident investigations • Alignment of statistics, systems, and human resource development with EU standards, etc.
Rail Transport	• Avoiding and minimizing environmental impacts in the planning, design, and construction of transport infrastructure • Advancing legal frameworks and institutional reforms for a competitive market in line with EU law • Strengthening safety and accident investigation systems
Road Transportation and Road Management	• Food transportation, safety management, vehicle regulations, and improving the quality of public transportation services • Prevention of overloading and integrated management of accident data • Deregulation of road transport businesses based on EU law, etc.
Maritime and Inland Waterway Transport	• Restoration of shipping operations, port and terminal development, and strengthening of logistics functions using Public-Private Partnerships (PPPs) • Improving safety, environmental compliance, and emergency response systems for ships and ports • Ensuring the alignment of technical standards with EU laws and international standards (IMO and the International Labor Organization (ILO), etc.).
Aviation	• Audits of damage caused by Russian attacks, etc.
Multimodal transport and logistics	• Establishment of multimodal transport, etc.
Public Transportation and Barrier-Free Mobility	• Establishment of public transportation networks, etc.

Source: National Transport Strategy 2030 Implementation Plan 2025–2027

3.2.3 Romania's Logistics Policies, Existing Plans, and Systems

(1) Logistics Policy Framework

The General Transport Master Plan (Master Planul General de Transport: MPGT), formulated in 2014, is the core plan for the Romanian transport sector and serves as a comprehensive master plan (MP), outlining investment priorities for the short, medium, and long-term (2030–2040). A framework for implementing investments utilizing EU funds exists to realize the MPGT. Its basic policy is to develop infrastructure in line with the TEN-T and to renew and modernize existing infrastructure. In 2022, the "Investment Plan for Transport Infrastructure Development 2021–2030" updated the MPGT's implementation strategy.

(2) Priority Projects under the MPGT

The MPGT includes separate plans for five sectors: roads, railways, ports, airports, and intermodal transport. It proposes countermeasures for current challenges, conducts individual cost-benefit analyses for all projects using the National Transport Model (demand forecasting model), and evaluates priorities based on the criteria of Economic Internal Rate of Return (EIRR) and alignment with TEN-T. In the railway sector, urgent renovation projects are listed for sections connecting Bucharest to the Port of Giurgiulesti, Galati, and Iași.

(3) Transport Infrastructure Development Investment Plan 2021–2030

1) Overview

This investment plan is a national strategic document designed to systematically promote the development of Romania's transportation infrastructure over 10 years, from 2021 to 2030, taking into account EU transportation policies (TEN-T Core: to be completed by 2030; TEN-T Comprehensive: to be completed by 2050) and the European Green Deal. While building upon the MPGT approved in 2016, it aims to update the implementation strategy and establish a single, binding medium-term investment framework.

2) Sector-Specific Investment Plans

In the road sector, five major connecting corridors (including east-west and north-south axes) that span the country, along with complementary inter-corridors, will be established, and development of expressways, dedicated expressways (Drum Express: DEx), and bypasses will be advanced. The project covers a total length of approximately 6,624 km (primary network: approx. 2,900 km; secondary network: approx. 3,700 km), with a strong emphasis on alleviating urban congestion and improving traffic safety.

In the railway sector, plans call for the modernization and renewal of approximately 3,275 km of the primary network and 1,228 km of the secondary network, with a focus on enhancing the competitiveness of both passenger and freight services, promoting modal shift, and introducing ERTMS.

For inland waterways and ports, the plan aims to improve navigability on the Danube, strengthen port functions, and introduce environmentally friendly vessels and fuels.

In the aviation sector, efforts will expand the capacity of major airports and reduce environmental impact. Furthermore, the development of intermodal logistics hubs will become a cross-cutting theme.

(4) Investment Scale and Funding Sources

Total investment needs for 2021–2030 are approximately €72.84 billion. The breakdown is as follows: roads (approximately €34.19 billion), railways (approximately €20.63 billion), metro systems (approximately €10.7 billion), inland waterways (approximately €4.46 billion), and airports (approximately €2.86 billion).

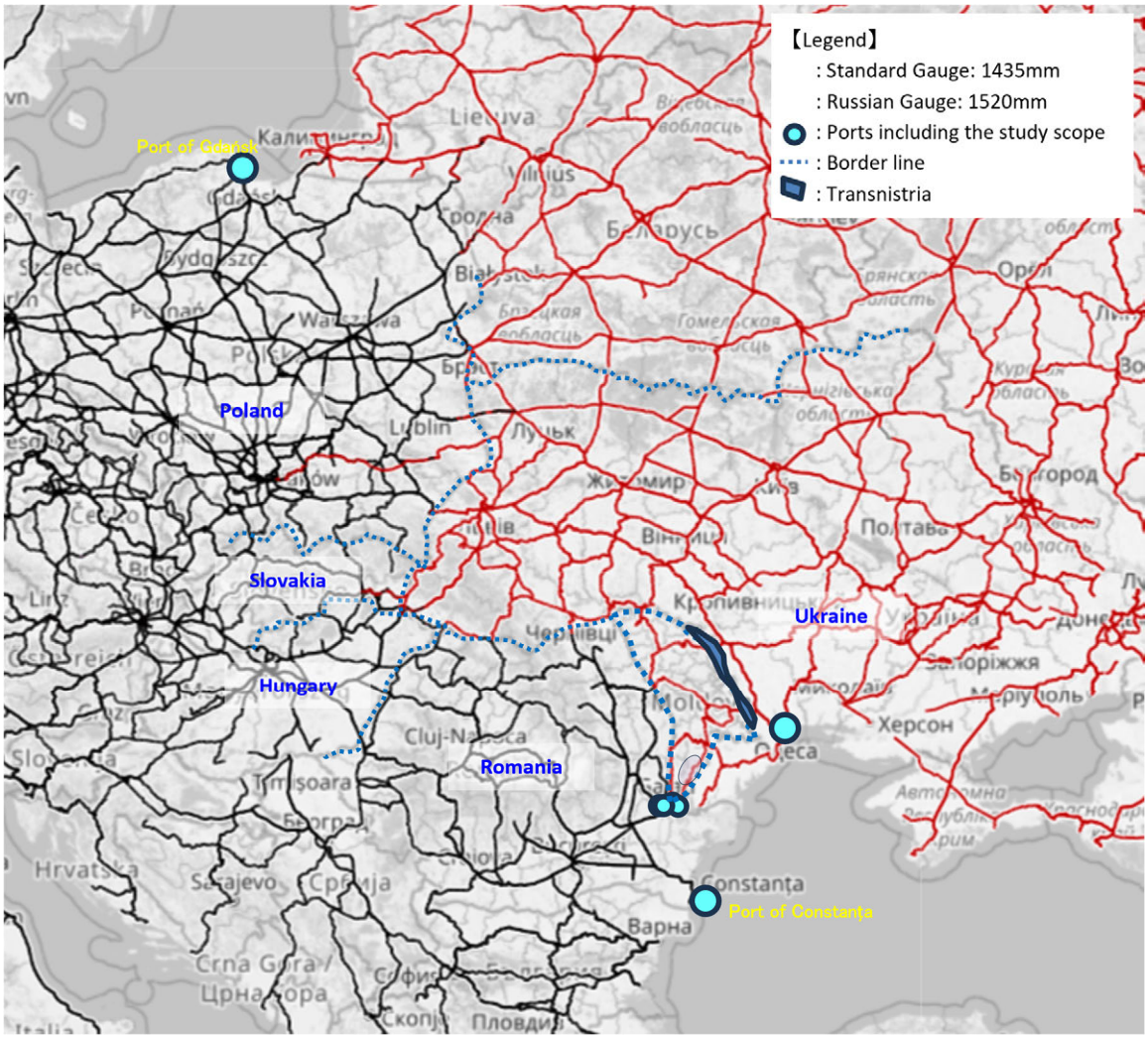
Funding sources include the EU Recovery and Resilience Plan (National Recovery and Resilience Plan (NRRP)/Recovery and Resilience Facility (RRF)), the Transport Operational Program (Program Operational Transport: POT), CEF, the national budget, loans from international financial institutions, and PPPs.

3.3 Logistics-Related Facilities and Systems along Major Import and Export Routes

3.3.1 Rail Freight Transport and Infrastructure on Major Import/Export Routes

(1) Overview of Rail Freight Transport and Infrastructure

Figure 3-6 shows the extensive railway network of Moldova and its neighboring countries. The railway network in this region consists of broad gauge (1,520 mm, the same as Russia) in Ukraine and Moldova, and standard gauge (1,435 mm, adopted by EU countries) in Romania and Poland. Due to these differences in track gauge, direct train service is not possible between Ukraine and Moldova and the other EU countries, requiring either the exchange of bogies at the border or the transfer of cargo to a connecting train.

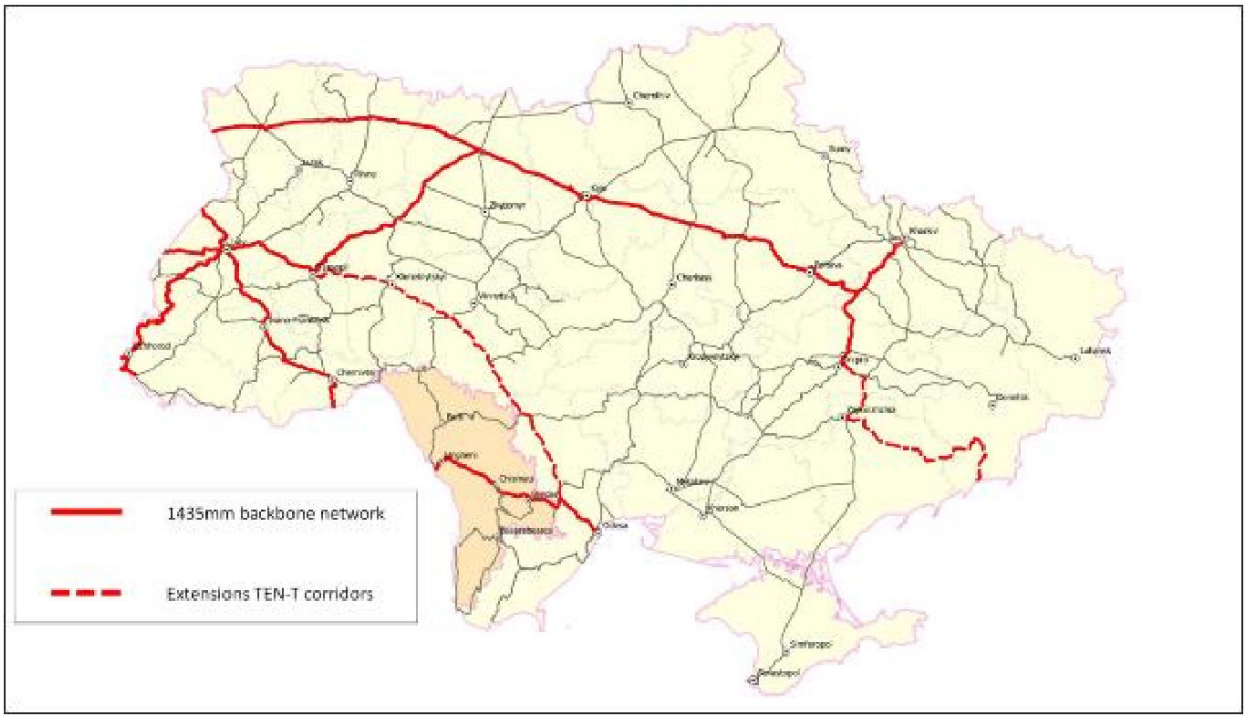


Source: Compiled by the research team based on Open Railway Map

Figure 3-6 The Regional Railway Network of Moldova and its neighboring Countries

Since Russia invaded Ukraine in 2022, the ongoing blockade of maritime transport via the Black Sea has increased reliance on inland transport infrastructure and services, including road and rail transport. In particular, the railway network connecting the four countries—Moldova, Ukraine, Romania, and Poland—plays a crucial role in ensuring economic security in the region and food security for countries importing grain and other commodities from the region. Based on this understanding, the extensive railway network in Moldova and its neighboring countries is positioned as a strategic European lifeline, forming the "Solidarity Lanes" that connect Ukraine with European markets and, via Europe, with global markets.

Figure 3-7 shows the route where track gauge conversion to standard gauge (or the construction of new standard-gauge tracks) should be executed.



Source: Strategy for the EU integration of the Ukrainian and Moldovan rail systems, 2023

Figure 3-7 Proposed Standard Gauge Routes by JASPERS

(2) Characteristics of Moldova's Rail Freight Transport and Infrastructure

1) Overview

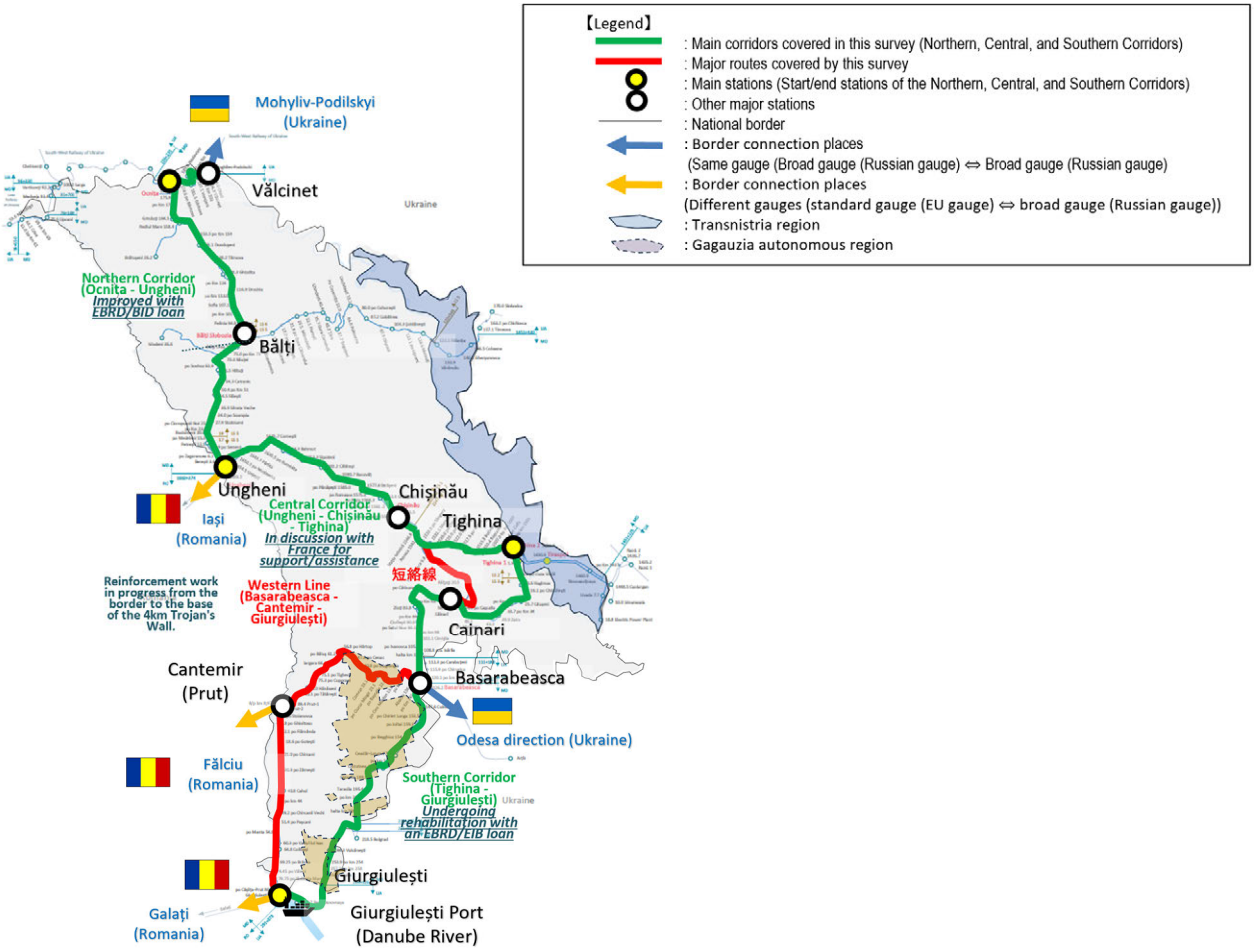
Moldova's railways are managed and operated by the state-owned enterprise (SOE) CFM. The network consists of 1,232 km of non-electrified railways, comprising the following lines (Figure 3-8). Most of the lines are single-track and broad-gauge (1,520 mm).

- Three main corridors: Northern Corridor (Oknytsia–Ungheni), Central Corridor (Ungheni–Chișinău–Tighina), and Southern Corridor (Tighina–Basarabeasca–Giurgiulesti)
- Two main lines: the Western Line (Basarabeasca–Prut 2–Giurgiulesti; a western bypass of the Southern Corridor) and the Shortcut Line (Chișinău–Căinari; directly connecting the Central Corridor and the Southern Corridor),
- as well as branch lines connecting grain warehouses and other facilities.

(Note: The two lines passing through the Transnistria region to Ukraine are excluded from this survey.)

Of the above, rehabilitation work on the three main corridors and the Shortcut Line is currently underway (Southern Corridor) or has been confirmed (Northern Corridor, Central Corridor (excluding certain sections), and Shortcut Line) with support from the EBRD, EIB, and EU. Therefore, once this rehabilitation work is complete, trains will be able to operate at the intended target speeds and frequencies, provided that subsequent maintenance is carried out appropriately.

On the other hand, the Western Line (Basarabeasca–Cantemir–Giurgiulesti) had been out of service due to a large-scale landslide in Văleni (approximately 300 meters wide, Figure 3-11). Although the section affected by the landslide was restored in April 2026 using the government's own funds, the remaining sections have suffered from a lack of maintenance for many years, leaving train operations barely possible only at reduced speeds. According to interviews conducted by the Study Team, demand for the Western Line among users of the Port of Giurgiulesti (shippers, etc.) is high, and prompt repairs and rehabilitation are strongly expected. (No support has been pledged by donors such as the EBRD, EIB, or EU.)



Source: Prepared by the survey team based on CFM materials

Figure 3-8 Overview of Moldova's Railway Lines

Although both freight and passenger train services are operational, the focus is on freight trains. Passenger train operations consist solely of three international round-trip services: Chișinău–Iași, Chișinău–Bucharest, and Bucharest–Kyiv (passing through the Northern Corridor within Moldova).

Rail container freight transport is virtually non-existent, with bulk transport being the primary mode. Bulk cargo consists of bulk commodities such as grains, fuel, edible oils, iron products, scrap iron, and fertilizers. However, due to aging infrastructure and rolling stock, as well as budget and staffing shortages, freight trains do not run on schedule, resulting in low transport reliability. Consequently, shippers who

once used rail switched to trucking, leading to a deterioration in CFM's financial situation. To address this, CFM has raised freight rates, causing even more customers to leave—creating a vicious cycle.

Most grain storage facilities in Moldova have railway sidings built during the Soviet era, eliminating the need for first-mile and last-mile transport by truck. Therefore, if CFM were to provide reliable rail freight cars, set appropriate freight rates, and operate regular train services, rail usage could become more prevalent.

2) On-Board Survey

A ride-along survey using a special vehicle included visual inspections of CFM's train operations and infrastructure (including video recording), performance measurements (speed and vibration), and interviews at stations and logistics facilities. See the summary of the results below.

- The Northern Corridor, Central Corridor, Shortcut Line, and Southern Corridor exhibit sections with both good and poor track conditions. Since rehabilitation work has confirmed support from the EBRD, EIB, and EU, and normal operation will be possible after the improvements, no additional work related to track condition improvement is required.
- Both the EBRD and EIB consider post-construction maintenance and management to be outside the scope of the track condition improvement project and have no plans to provide further support. Track conditions will deteriorate rapidly unless appropriate preventive maintenance is carried out immediately following the improvements.
- The bogie replacement facility at Ungheni Station has a capacity of 172 bogies per day. Since freight train usage at Ungheni Station is virtually zero as of the end of 2025, there is no need to consider additional facilities for bogie replacement at this time, even if rail freight transport via Ungheni Station resumes in the future.
- Regarding the West Line, where landslide damage suspended the train service, the operator of the Giurgiulesti Port is urgently calling for service to resume. Although maintenance is currently underway on the bridge between Cantemir and Fălciu, as of the end of 2025, there are no confirmed plans for assistance from aid agencies regarding the restoration of the West Line.
- Railway signalling systems require upgrades for all lines except the Southern Corridor, which is currently undergoing rehabilitation.
- The number of operational locomotives and freight cars is decreasing. Twelve newly introduced locomotives manufactured in Kazakhstan are currently in service.
- CFM is currently undergoing restructuring. A general agreement on the post-restructured organization was reportedly reached at the time of the survey, but the completion date and other details remain undetermined.

Further details, including other information regarding Moldova's railways, are provided in "Chapter 5: Study on Promoting Freight Transport by Rail in Moldova."



Source: JICA Survey Team

Figure 3-9 Photo 1 Taken during the On-Board Survey (Special Car)



Source: JICA Survey Team

Figure 3-10 Photo 2 Taken during the Ride-Along Survey (Bulk Freight Car (Basarabeasca))



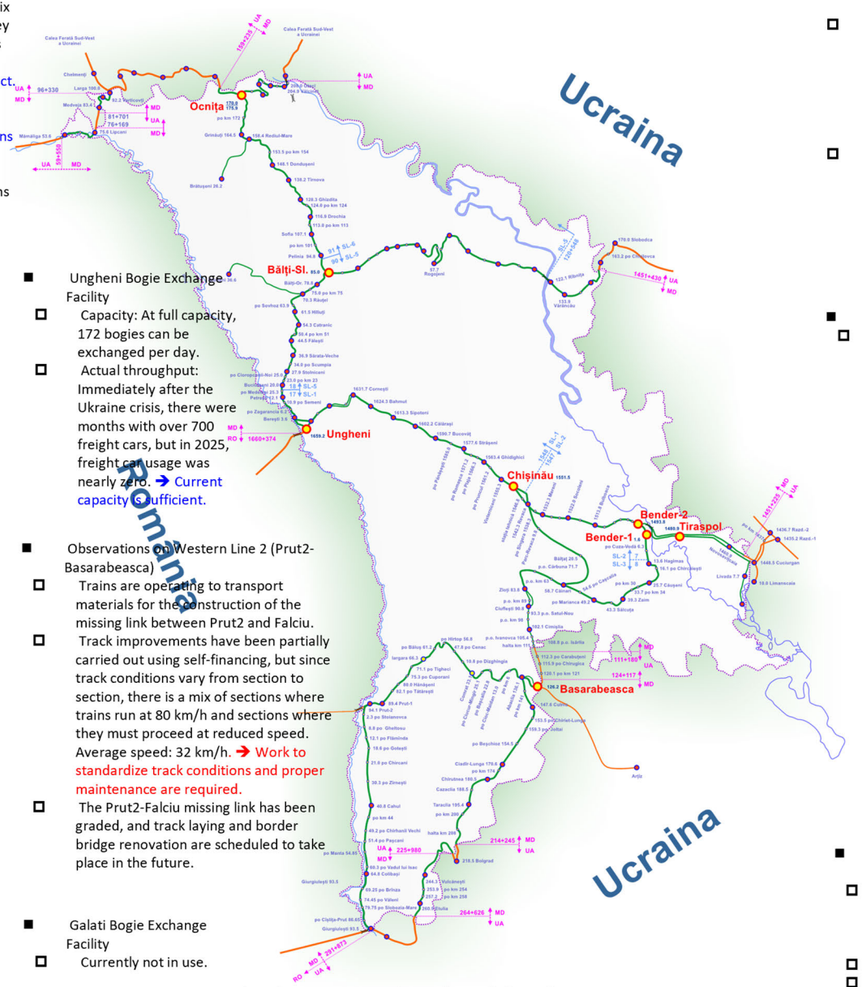
Source: JICA Survey Team

Figure 3-11 Photo 3 From the On-Board Survey (Section Affected by a Large-Scale Landslide in Văleni)

Summary of Findings from the Site Survey (Railway Infrastructure and Border Bogie Replacement Facility)

- Northern Corridor (Valcinet-Ungheni) Specific Observations
  - Although a rehabilitation project for the Northern Corridor has been approved using EBRD/EIB loans and grant assistance, while tender preparations were initially conducted on the premise of a design-build approach, MIRD presented an alternative proposal stating that construction would be carried out directly by CFM and that the EBRD/EIB loans would be used for the procurement of materials and equipment. Consequently, the outlook for the project is currently unclear.
  - Because track conditions vary from section to section, there is a mix of sections where trains run at 50–65 km/h and sections where they must operate at a reduced speed of 15 km/h. The average speed is 37 km/h. ➔ Track conditions need to be standardized. Improvements are planned within the scope of the EBRD/EIB project.
  - The line consists of a mix of sections where all PC sleepers are installed and sections where wooden sleepers predominate (PC sleeper ratio of about 20%), forcing slow speeds. ➔ Track conditions need to be standardized. Improvements are planned within the scope of the EBRD/EIB project.
  - Despite the use of PC sleepers and proper ballast, there are sections where trains are forced to proceed at a reduced speed of 15 km/h due to the risk of rail breakage. ➔ Installation of rail breakage detection equipment is necessary.

- General Observations for the Entire Line
  - Operation: There are many sections where trains must proceed at reduced speed due to insufficient track maintenance.
  - Track: As the track dates back to the Soviet era, it is solidly constructed, and its original condition is not poor. However, due to insufficient maintenance, the following issues are prominent: (1) vegetation along the tracks, (2) weeds on the tracks, (3) increasing track misalignment, and (4) ballast displacement on embankments due to insufficient crown width. ➔ In addition to fundamental rehabilitation work (most of which is scheduled for improvement under the EBRD/EIB scope), continuous maintenance work and preventive maintenance are necessary. While there are some sections with continuous rails, most are connected using rail joints. ➔ Since joint areas are weak points in the track, the use of continuous rails is desirable.
  - Structures: The shoulders of the embankments have eroded, reducing the crown width. As a result, sufficient lateral ballast cannot be placed. ➔ A fundamental solution would require widening the crown width, which involves temporarily removing the track; however, due to the significant budgetary and schedule burdens, interim measures such as installing ballast restraints are necessary.
  - Bridges and culverts also date back to the Soviet era and are deteriorating. Weight restrictions are in place in some areas. ➔ Rehabilitation work is required. With the exception of the West Line, most are scheduled for improvement under the EBRD/EIB project scope.
  - Signaling: Automatic and semi-automatic signals in use since the Soviet era are inoperable in some places, and in such sections, trains are operated using paper tokens. ➔ To increase train frequency, the introduction of automatic signaling and ATS is necessary.
  - Communications: In most sections, communication and power cables run parallel to the tracks on utility poles, but there are sections where only the poles remain and the cables are missing. ➔ Installation is required in sections without cables.
  - Rolling Stock: Freight trains consist of covered cars, open cars, hopper cars (for grain and cement), and tank cars (for oil and edible oil). Container cars are not in use. ➔ Consideration of containerization for higher transport efficiency is necessary.



- Ungheni Bogie Exchange Facility
  - Capacity: At full capacity, 172 bogies can be exchanged per day.
  - Actual throughput: Immediately after the Ukraine crisis, there were months with over 700 freight cars, but in 2025, freight car usage was nearly zero. ➔ Current capacity is sufficient.

- Observations on Western Line 2 (Prut2-Basarabeasca)
  - Trains are operating to transport materials for the construction of the missing link between Prut2 and Falciu.
  - Track improvements have been partially carried out using self-financing, but since track conditions vary from section to section, there is a mix of sections where trains run at 80 km/h and sections where they must proceed at reduced speed. Average speed: 32 km/h. ➔ Work to standardize track conditions and proper maintenance are required.
  - The Prut2-Falciu missing link has been graded, and track laying and border bridge renovation are scheduled to take place in the future.

- Galati Bogie Exchange Facility
  - Currently not in use.

- Findings for Western Line 1 (Giurgiulesti-Cahul-Prut2)
  - Service on the Giurgiulesti-Cahul section is currently suspended due to the Valeni landslide.
  - It has been decided that repair work on the Valeni landslide (approximately 400-meter section) will be funded by the government, and design work is currently underway.
  - The line consists mainly of wooden ties, and no track maintenance has been performed. Rehabilitation work is necessary.
  - Unlike the Southern Corridor, operations are possible without passing through Ukrainian territory, so there are high expectations for the reopening of the Giurgiulesti Port.

- Findings specific to the Central Corridor (Ungheni-Chisinau-Thigina)
  - The plan for AfB to support the Ungheni-Chisinau section has not progressed, and discussions are underway to address this by expanding the scope of the Northern Corridor rehabilitation project funded by the EBRD/EIB.
  - Because track conditions vary from section to section, there is a mix of sections where trains run at 80–85 km/h and sections where they must proceed at 15 km/h. The average speed is 40 km/h. ➔ Track conditions need to be standardized. Improvements are planned within the scope of the EBRD/EIB project.
  - The Ungheni-Chisinau section includes sections that have been doubled-tracked. Additionally, many sections have sufficient right-of-way width to allow for future doubling. ➔ The EBRD is conducting a separate study as part of the TEN-T initiative; while this track could potentially be used for a standard-gauge electrified railway between Ungheni and Chisinau, it is reportedly insufficient to meet the TEN-T standard of 160 km/h operation (with a curve radius of 360 m).
  - An embankment failure has occurred near Bumbata Station, and trains are operating at the slowest possible speed with temporary reinforcements in place.

- Findings on the Shortcut Line
  - This is a shortcut line connecting Chisinau and Basarabeasca, but it has severe undulations, and the track condition is the worst, excluding the closed section of the western line. Many sections require reconstruction starting from the top of the embankment. ➔ Fundamental rehabilitation work is necessary. This is a target for EBRD/EIB loan projects.

- Basarabeasca Station
  - Freight trains bound for Odessa–Southern Corridor–Leni/Giurgiulesti stop here to await customs clearance. Trains consist of approximately 50 cars.
  - Main cargoes include grain, fertilizer, and oil.
  - Customs clearance procedures are conducted for both Ukraine and Moldova. No quarantine inspections are performed.

- Observations on the Southern Corridor (Thigina-Basarabeasca-Giurgiulesti)
  - Rehabilitation work is currently underway with EBRD/EIB funding. The contractor's reputation is poor (delays, shortages of materials and equipment, and low-quality workmanship), but the line is expected to meet certain quality standards upon completion.
  - Maximum speed: 70–75 km/h. Average speed: 40 km/h.
  - Although the three sections crossing Ukraine via the Southern Corridor are not covered by the EBRD/EIB project, UZ reportedly maintains the tracks within Ukrainian territory properly, so these sections do not constitute bottlenecks.
  - Freight trains traveling via the Southern Corridor to and from Giurgiulesti are reportedly facing skyrocketing insurance premiums due to the risk of Russian attacks.

Source: JICA Survey Team

Figure 3-12 Findings from On-Site Surveys, Including Test Rides on Special Trains

(3) Characteristics of Railway Freight Transport and Infrastructure on Major Import/Export Routes in Western and Southwestern Ukraine

1) Railway Development Plans

In Ukraine's railway development plan, the phased introduction of European standard gauge (1,435 mm) for physical integration with the EU has become a key issue in conjunction with the EU's Solidarity Lanes initiative and the extension of the TEN-T network to Ukraine (Figure 3-13).

The strategy from the EIB's JASPERS study recommends maintaining the existing broad-gauge (1,520 mm) network while constructing a 1,435 mm backbone network connecting major domestic hubs (such as Lviv) to the western border, including the Polish border. On the other hand, the World Bank's analysis recommends a cautious, planned approach to effectively utilize limited resources, as introducing standard gauge across the entire Ukrainian railway network would require massive investment, which includes exploring alternative options such as promoting containerization without changing the track gauge and strengthening transshipment facilities at border crossing points (BCPs).



Source: TENtec, Strategy for the EU integration of the Ukrainian and Moldovan rail systems

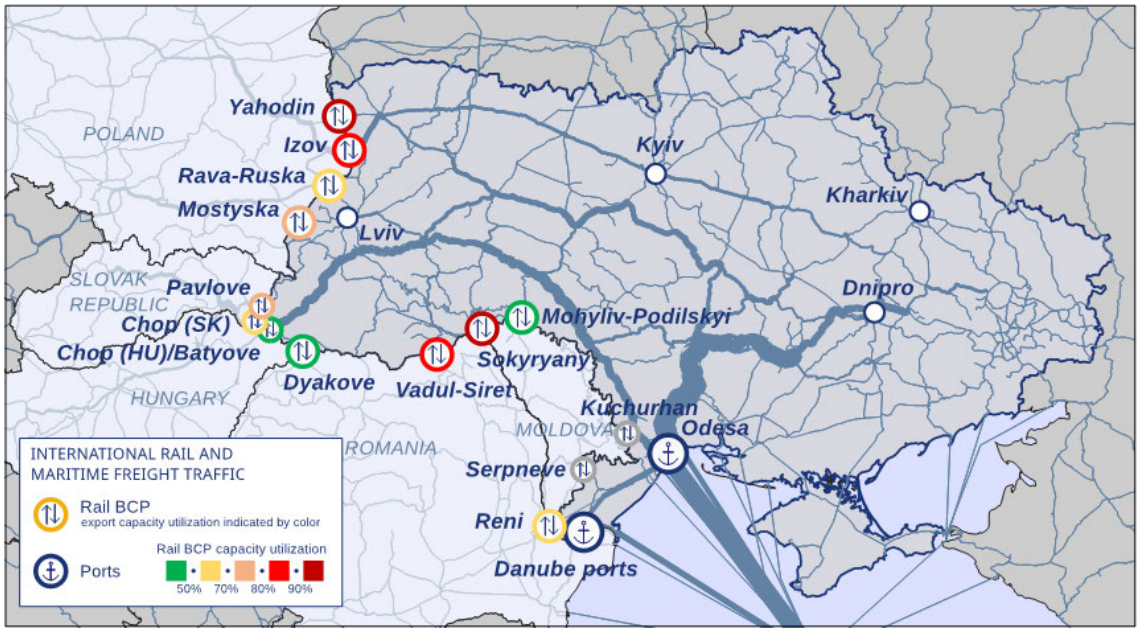
Figure 3-13 TEN-T Core and Comprehensive Rail Networks in Ukraine and Moldova

2) Rail Network and Rail Operations

Ukraine's railway network is managed comprehensively—from infrastructure management to train operations—by the SOE Joint Stock Company (JSC) Ukrainian Railways (Ukrzaliznytsia: UZ). However, the freight car market is partially liberalized, with private companies owning and operating numerous freight cars (primarily open-top cars, etc.). The main cargo consists of bulk goods such as grain and ore.

The biggest bottleneck in international operations is the difference in track gauge (break-of-gauge) with Ukraine's western neighbours; bogie changes and cargo transshipment at BCPs contribute to delays and increased transportation costs (Figure 3-14).

With the launch of Ukraine's own Black Sea maritime corridor in 2024, the share of rail transport in Ukraine's total agricultural exports (total cross-border exports) fell from 15% in 2023 to 7% in 2024, indicating a shift from exports via western land routes (rail and truck) to more efficient and cost-effective maritime transport via the Black Sea.



Source: Ukraine's Transport and Logistics System, World Bank, 2025

Figure 3-14 International Rail and Maritime Freight Flows and Rail BCP Capacity Utilization

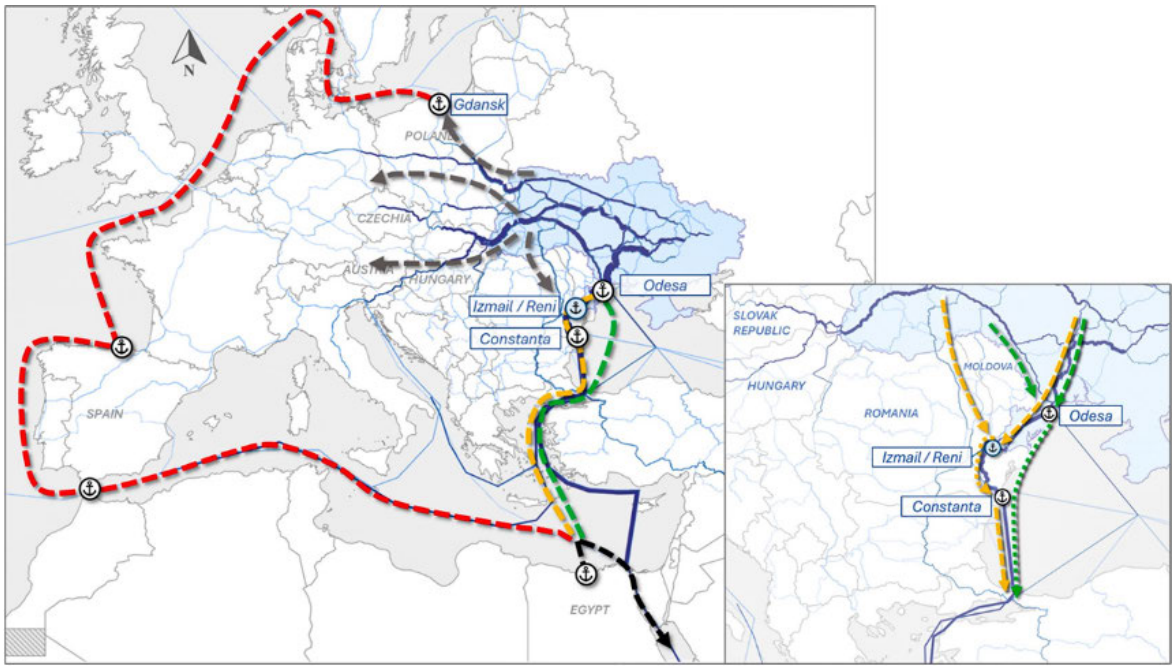
3) Rail Infrastructure Maintenance Status

Ukraine's railway infrastructure and rolling stock had been facing deterioration due to chronic underfunding dating back to before the war. As of 2019, approximately 80% of the railway sector's machinery and equipment had exceeded their service life, and the wear rate for locomotives and freight cars exceeded 90%. In addition, speed restrictions (such as 40 km/h to 60 km/h) have been imposed across a wide area of the network due to track deterioration, reducing transport efficiency.

Furthermore, since the Russian invasion, the railway infrastructure has sustained extensive physical damage, with roads and railways accounting for approximately 83% of overall impairment to the transportation sector. UZ's railway maintenance staff are scrambling to perform emergency repairs while exposed to safety risks, leaving them with no capacity to carry out planned preventive maintenance and accelerating the rise in infrastructure maintenance costs and the decline in service quality.

4) Port Access Railways

Ukraine's imports and exports traditionally pass through deep-water ports on the Black Sea. However, the blockade of maritime transport routes immediately following Russia's invasion of Ukraine, and their recent reopening, have led to changes in port access demand and mode of transport selection (Figure 3-15). Below, we summarize the status and challenges of rail access to the ports around Odesa and the Danube River ports, which serve as major gateways.



Source: Ukraine's Transport and Logistics System, World Bank, 2025

Figure 3-15 Major Export Routes for Diversifying Agricultural Products

a) Status of Rail Access to Odesa and Surrounding Ports

Reopening of the Black Sea Corridor and Recovery of Rail Transport Demand: The three deep-water ports located in Odesa Oblast (Odesa, Chornomorsk, and Pivdennyi) serve as major export hubs for Ukraine's agricultural products and mineral resources. Since Ukraine's independent Black Sea Corridor began operations in the second half of 2023, activity at these ports has rapidly recovered, with ports around Odesa accounting for 85% of Ukraine's maritime exports of grain and oilseeds in 2024. Consequently, demand for freight trains bound for the ports has also rebounded sharply, and the share of rail transport in Ukraine's total port exports rose from 35% in 2023 to 54% in 2024.

Structure of Access Routes and Infrastructure Constraints: The main rail access to the ports around Odesa is provided by the north-south corridor running southward from inland production centers such as Kyiv, Vinnytsia, Dnipro, and Kryvyi Rih; these routes are largely part of an electrified broad-gauge (1,520 mm) network. However, during peak seasons such as harvest time, rail access to the ports tends to become congested.

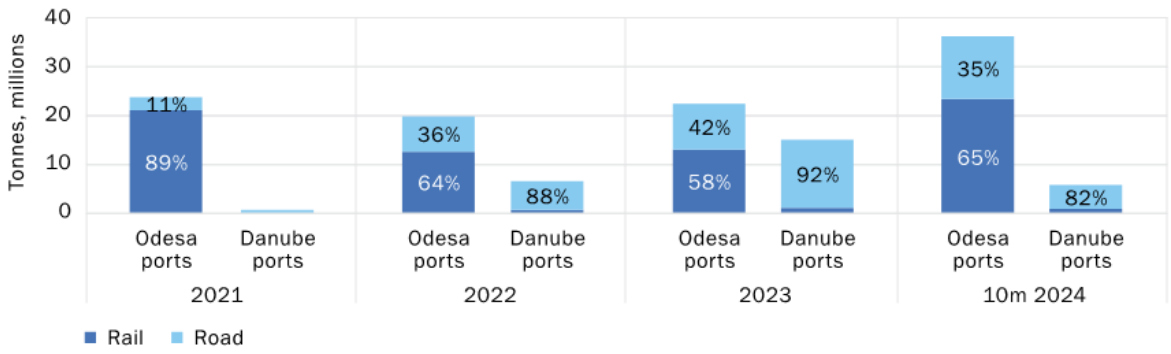
Operational challenges: Due to a shortage of UZ locomotives and freight cars (such as grain hoppers) and the need to address wartime infrastructure damage, train waiting times are increasing for transport from inland consolidation stations to ports, posing a risk to shippers who prioritize predictability in their transport and supply chains, leading them to opt for trucking even at higher costs. To improve access efficiency to ports around Odesa, it is urgent to resolve bottlenecks in the railway infrastructure leading to the ports and to streamline the allocation of freight cars.

b) Status of Rail Access to Ukraine's Danube River Ports (Izmail and Reni)

Importance as an Alternative Route and Changes in Demand: Located along the Danube River in southwestern Ukraine, the ports of Izmail and Reni served as critical alternative export gateways from 2022 to 2023, when the Black Sea route was blocked. In 2023, the Danube River ports recorded historic handling volumes, accounting for 45% of agricultural exports by sea and approximately 19% of maritime imports. However, with the resumption of the lower-cost maritime transport route via the Black Sea, the Danube River ports' share dropped to 13% in 2024, reflecting a shift away from this high-cost route.

Complex rail access via Moldova: Rail access to the Danube River ports involves a geographically and politically complex route. In addition to the line running from Odesa to Izmail and Reni, rail transit via Moldova's rail network is used to access Reni Port and the adjacent Romanian port of Galati. In particular, the route from Berezyne in southern Ukraine into Basarabeasca, Moldova, and then through the CFM's southern corridor to Reni and Galati is being utilized.

Challenges of Rail Access (Cost and Mobility): Moldovan rail transit faces challenges, such as high transportation costs and difficulty predicting schedules due to multiple border crossings and aging infrastructure. Consequently, even in 2024, many companies rely more heavily on truck transport than rail for access to Danube River ports (Figure 3-16). On the other hand, considering the risk of the Black Sea shipping route being blocked again, the ports of Izmail and Reni, along with the rail and road access leading to them, serve as a "life insurance policy" for Ukraine's logistics system. Therefore, to maintain alternative capacity in the event of an emergency, continuous support is required to ensure the competitiveness of rail freight rates on these routes. Maintaining approach waterways (e.g., dredging) and facilitating border crossings are also necessary.



Source: Ukraine's Transport and Logistics System, World Bank, 2025

Figure 3-16 Share of Grain Transport by Mode to the Danube Ports and the Ports of Odesa, Chornomorsk, and Pivdennyi (Comparison of Rail, Road, Etc.)

(4) Key Features of Rail Freight Transport and Infrastructure Along Romania's Major Import and Export Routes

1) Railway Development Plans

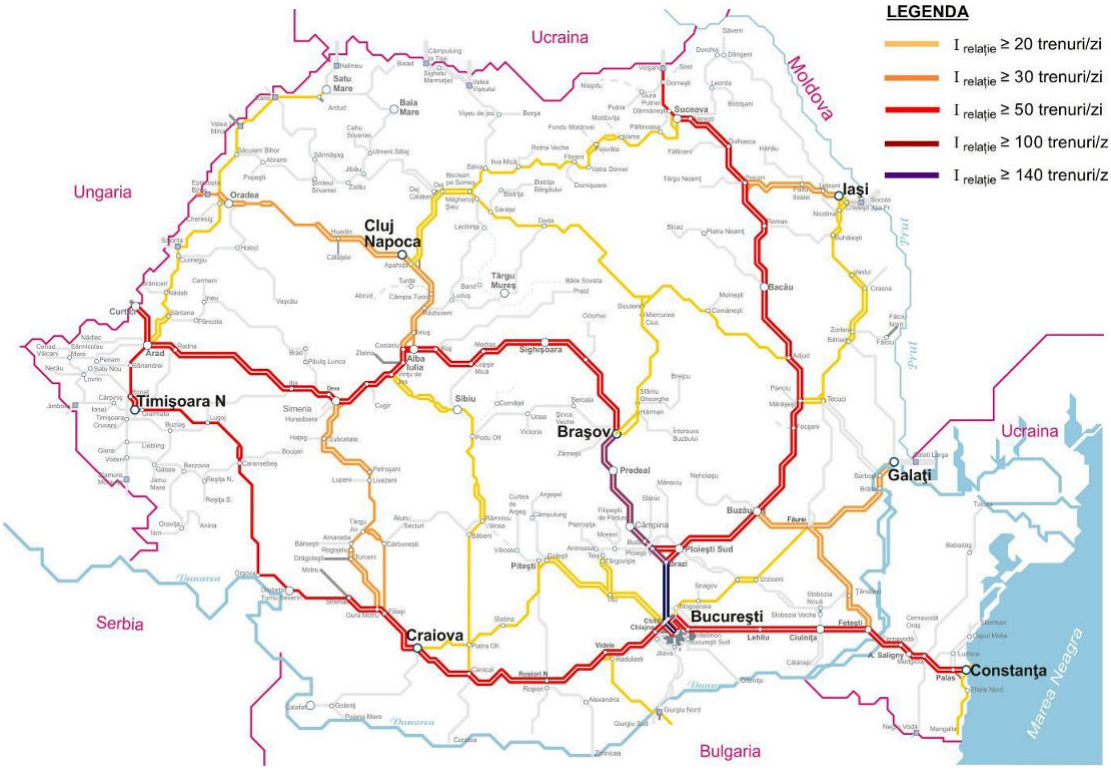
Romanian railway development plan is promoted based on EU transport policy and the "MPGT," as well as the "2021–2030 Transport Infrastructure Development Investment Program (Programul Invitational: PI)," which updates and concretizes the MPGT. The top investment priority is the development of the core and comprehensive TEN-T networks, specifically the modernization of the "Rhine-Danube Corridor" and the "Orient/East-Med Corridor" that traverse the country.

The project involves comprehensive upgrades to the track, ballast, and bridges, as well as the introduction of electrification and ERTMS Level 2 (which uses wireless communication [GSM-R] to transmit movement authority [permission to proceed] directly to trains and displaying signals on the driver's console [DMI]). The goal is to enable freight trains to operate up to 120 km/h, and passenger trains up to 160 km/h. Additionally, to quickly eliminate speed restrictions on the TEN-T corridor, "Quick Wins" projects—which involve track renewal while maintaining the existing alignment without waiting for full modernization—proceed in parallel. Funding sources include the EU's CEF, POT, and the "NRPP (Planul Național de Redresare și Reziliență: PNRR)," which are being fully utilized.

2) Rail Network and Operational Status

Romania's railway network spans a total length of approximately 10,628 km (based on main lines), with infrastructure management handled by the state-owned Romanian Railways (Căile Ferate Române: CFR) Infrastructure Company (Societate pe Acțiuni: SA) (Figure 3-17). The majority of the network is single-track (approximately 7,711 km), while double-track sections total approximately 2,917 km. The electrification rate remains at approximately 40% (approximately 4,030 km), which is below the EU average (approximately 53%) (Figure 3-17).

The standard gauge in Romania is the European standard gauge (1,435 mm); however, in the northern and eastern regions near the Ukrainian and Moldovan borders (such as Dornești, Galati, and Halmeu), some lines use the former Soviet-era broad gauge (1,520 mm), requiring bogie changes and cargo transshipment at border stations. The freight transport market is liberalized, and in addition to the state-owned freight company (CFR Marfă), numerous private operators have entered the market. Although railways play a vital role in long-distance bulk transport, the average commercial speed of freight trains remains low due to infrastructure constraints discussed below. In recent years, there has been a shift toward truck transport, and the decline in rail's modal share has become a significant challenge.



Source: Annex 1, Strategy for the Development of Railway Infrastructure

Figure 3-17 CFR Network

3) Maintenance State of Railway Infrastructure

Romania's railway infrastructure has deteriorated due to years of insufficient maintenance budgets. According to an analysis by CFR SA, approximately 74% of tracks (main lines and sidings), 50% of bridges, and 89% of signaling equipment have exceeded their designated service life or renewal deadlines (Scadente pt reînnoire).

As a result of the failure to implement planned preventive maintenance and large-scale renovations (renewals) at appropriate intervals, speed and weight restrictions are imposed on extensive sections of track due to infrastructure deterioration. Consequently, the actual permissible speed has decreased (to an average of approximately 82 km/h) compared to the infrastructure's design speed (an average of approximately 100 km/h), leading to reduced punctuality and efficiency in transportation. Currently, planning is ongoing to address this situation, including promoting mechanized maintenance by introducing large-scale track maintenance machinery such as multiple tampers and ballast cleaners, and implementing nighttime maintenance to minimize the impact on passenger service.

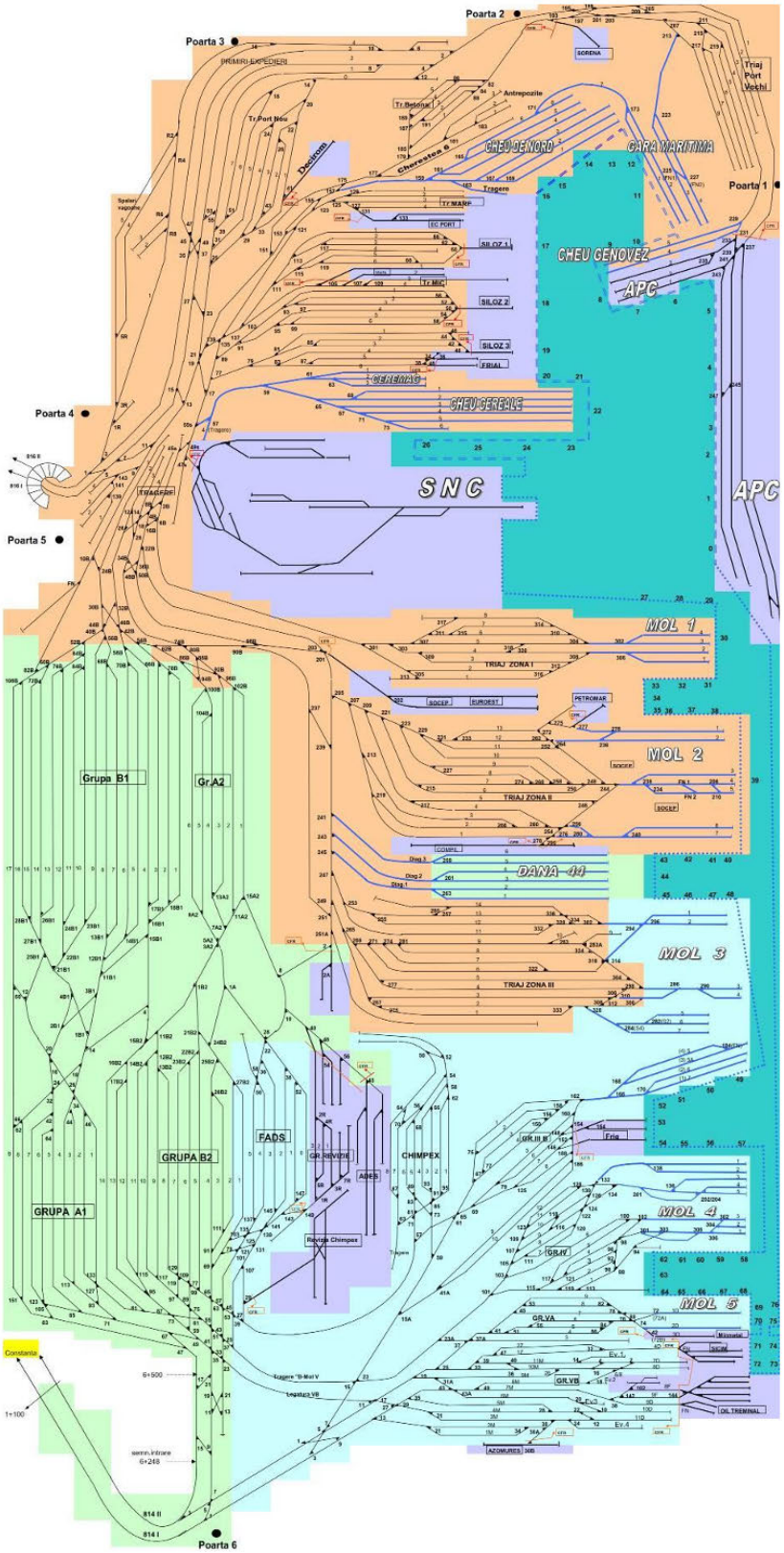
4) Status of Port Access Railways

a) Constanta Port

The Constanta Port is Romania's largest maritime hub, located on the western coast of the Black Sea. It serves as a gateway connecting Central and Eastern European countries via the Danube-Black Sea Canal

and is also the starting point of the TEN-T Danube Corridor. Additionally, it serves as a hub for transporting petroleum products refined in Romania to Ukraine.

The port has its own railway network spanning approximately 300 km, directly connecting to various terminals for grain, ore, containers, and other cargo (Figure 3-18). The majority of domestic rail container transport in Romania originates from this port. However, aging track infrastructure within the yards and capacity shortages on specific access routes had become bottlenecks. To address these issues, capacity enhancement projects are under promotion, including the double-tracking of the access line connecting Agigea Ecluză Station and Constanta Ferry-Boat Station, the expansion of passing and shunting capacity in the hinterland at Valu lui Traian, and the comprehensive modernization of the port's railway infrastructure (Stage II).



Source: Annex 16, Strategy for the Development of Railway Infrastructure

Figure 3-18 Railway Infrastructure and Terminal Access Network within the Constanta Port

b) Galati Port

The Galati Port is the largest river-sea port on the Danube and the second-largest in Romania. With a draft of approximately 7.32 meters, it accommodates ocean-going vessels and serves as a strategic logistics hub connecting the European hinterland with the Black Sea via the Danube River. The port consists of four sectors: the Mineral Terminal, the Old Commercial Port, the Docks Terminal, and the New Basin Terminal.

The New Basin Terminal is transforming into an advanced multimodal platform funded by the EU's CEF and is adjacent to the petroleum products terminal. The Docks Terminal is a multipurpose area handling general cargo and grain, opening container facilities in 2008. The Mineral Terminal supplies raw materials to steel mills and boasts the port's largest cargo handling capacity, though it has been affected by recent changes in market conditions.

The Galati Port is the only port in Romania with rail access to both European standard gauge (1,435 mm) and broad gauge (1,520 mm) tracks. This dual-gauge capability allows freight trains arriving from Ukraine and Moldova to be routed directly to the port facilities without the need for bogie changes at the border or prior transshipment. In particular, in 2022, following Russia's invasion of Ukraine, CFR urgently repaired and reopened a 3.97-kilometer broad-gauge line from the Galati Larga broad-gauge yard at Galati Station to the Port Docuri silo to secure an export route for Ukrainian grain (the Solidarity Lanes). Currently, construction of a multimodal platform is underway at the port to further strengthen transit transport and container handling.

(5) Key Features of Rail Freight Transport and Infrastructure on Poland's Major Import and Export Routes

1) Railway Development Plans

Poland's railway development plan focuses on developing the TEN-T and strengthening connectivity with the neighboring countries (particularly Ukraine).

Expansion of the TEN-T Network. Poland is positioned within key TEN-T core networks, such as the newly established "Baltic Sea - Black Sea - Aegean Sea Corridor," and efforts are underway to strengthen the transport network connecting the Ukrainian border to the Baltic Sea coast and Southern Europe.

Modernization of the Ukraine border connection line. The electrification project (90 km) on the Ukrainian side of the broad-gauge (1,520 mm) line running from Kovel, Ukraine, to Hrubieszów, Poland, was completed in 2022, increasing the transport capacity of this corridor.

Constraints due to construction on major corridors. Infrastructure development and modernization projects are underway on the corridor running from Lviv, Ukraine, via Kraków and Katowice toward Vienna, as well as on the corridor running via Warsaw to ports on the North Sea and Baltic Sea coasts. However, temporary track capacity constraints are expected during the construction period.

2) Rail Network and Operational Status

a) Network Structure and the Strengths of Broad-Gauge Lines

Poland's domestic railway network consists primarily of European standard gauge (1,435 mm). Its greatest strength lies in the existence of the "Polish State Railways Broad-Gauge Metallurgical Line (PKP LHS: Polskie Koleje Państwowe Linia Hutnicza Szerokotorowa)," a broad-gauge (1,520 mm) line that extends deep into the Polish interior from the Ukrainian border (Figure 3-19). This line extends from the Hrubieszów border to Sławków near Katowice, where an intermodal terminal allows block trains from Ukraine to enter directly without the need for bogie changes or cargo transshipment at the border.

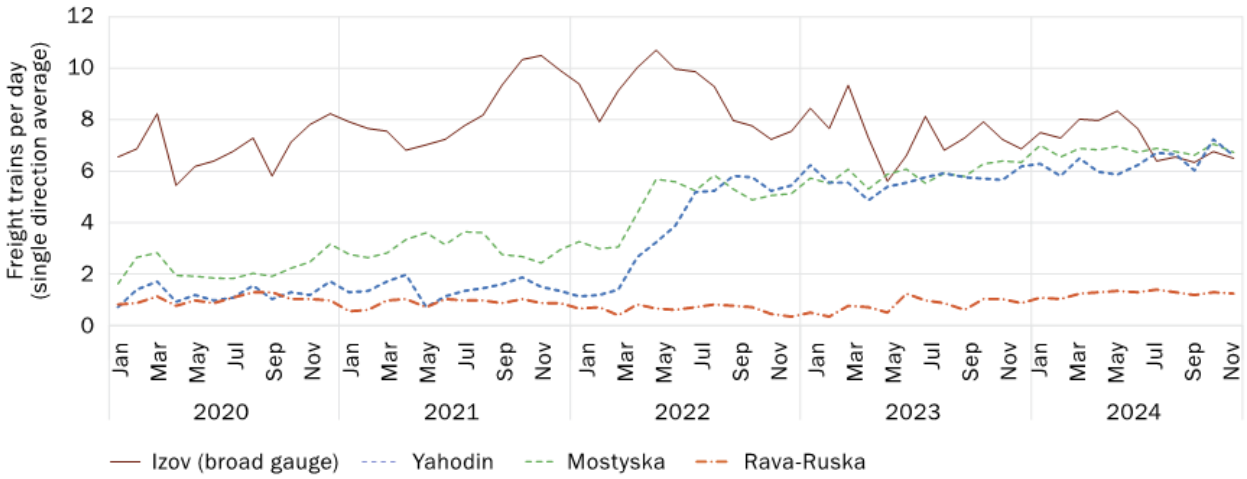


Source: Ukraine's Transport and Logistics System, World Bank, 2025

Figure 3-19 Broad-Gauge (1,520 mm) Section Between Poland and Slovakia

b) Railway Operations and Border Crossing Conditions

Following Russia's invasion of Ukraine, the number of freight trains passing through standard-gauge BCPs from Ukraine to Poland (e.g., Yahodyn–Dorohusk, Mostyska–Przemysl, etc.) temporarily surged; however, as capacity limits were reached, the volume has since plateaued (Figure 3-20). In response to this increased demand, railway operators on the EU side, including those in Poland, are facing a growing shortage of specialized freight cars (such as grain hoppers, refrigerated cars, and tank cars).



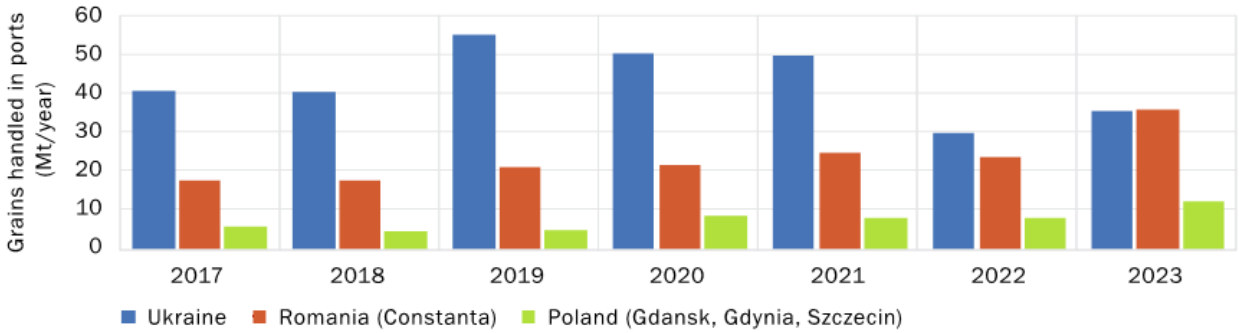
Source: Ukraine's Transport and Logistics System, World Bank, 2025

Figure 3-20 Number of Freight Trains Passing through Major Railway BCPs on the Poland-Ukraine Border per Day

3) Status of Port Access Railways

a) Importance as an Alternative Export Gateway

With Ukraine's Black Sea ports restricted, Poland's Baltic Sea ports (Gdansk, Gdynia, Szczecin, etc.) are functioning as important alternative export routes for Ukrainian grain. Although they do not match the scale of Ukraine's ports or Romania's Constanta Port, grain handling volumes at these ports have remained at a consistent level in recent years (Figure 3-21).



Source: Ukraine's Transport and Logistics System, World Bank, 2025

Figure 3-21 Grain Handling Volumes at Ports in Ukraine, Romania, and Poland

b) Rail Infrastructure Constraints at Ports

There are multiple constraints on rail access and cargo handling infrastructure at Polish ports. According to a 2023 study by the World Bank and others, the following challenges are present.

- Lack of warehouse and storage capacity
- Insufficient capacity to manage and shunt large numbers of rail cars at once.
- Lack of automated unloading equipment

These constraints reduce the efficiency of rail access to ports. For private investors, new investments in expanding rail handling capacity within ports are risky due to high uncertainty for future demand forecasts—such as the status of the reopening of Ukraine's Black Sea corridor—and this uncertainty acts as a barrier to capacity expansion.

3.3.2 Overview of Road Freight Transport and Infrastructure along Major Import/Export Routes

(1) Overview of Road Freight Transport and Infrastructure

The objective of TEN-T is to enable the smooth and efficient movement of people and goods across the entire EU and to create an integrated EU transport area. Specifically, it aims to eliminate cross-border bottlenecks, strengthen economic, social, and territorial cohesion, and promote multimodal and sustainable transport. The core "Core Network" is scheduled for completion by 2030, while the comprehensive "Comprehensive Network" is scheduled for completion by 2050.

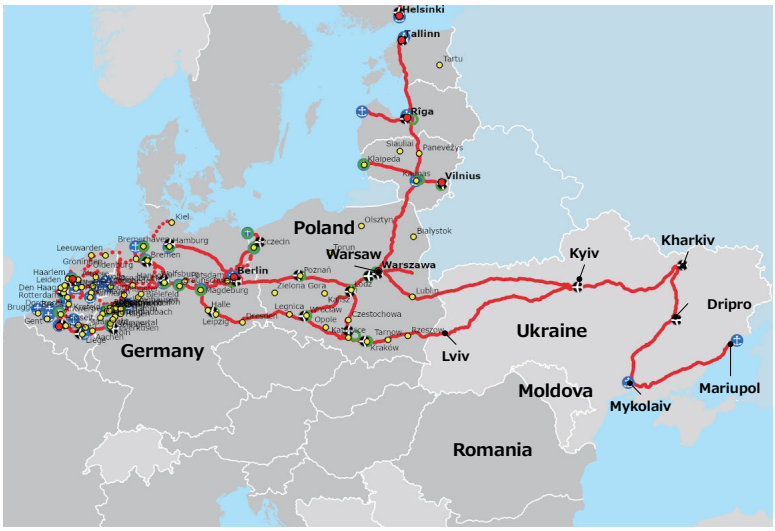
Following Russia's invasion of Ukraine, Ukraine and Moldova—EU neighboring partner countries—joined the TEN-T in July 2022, planning to strengthen connections with Romania's road network, which has been part of the TEN-T from the outset.

The corridors and road networks passing through Moldova, Ukraine, and Romania are as follows (Figure 3-22).

- **North Sea-Baltic Corridor**: This **corridor** links the Baltic Sea (Germany, Poland) with northern and eastern Ukraine, connecting major ports with inland economic regions. It passes through Mariupol in eastern Ukraine, Kharkiv in the north, the capital Kyiv, and Lviv, a major city in the west. It is part of a major route connecting these key cities with the Gdansk Port in Poland and other destinations.
- **Baltic Sea–Black Sea–Aegean Sea Corridor**: This corridor connects the Baltic Sea (Poland, etc.) with the Black Sea and the Aegean Sea. This corridor serves as a major import-export route connecting the important western Ukrainian city of Lviv with Warsaw to Gdansk Port and other Polish Baltic Sea coastal cities, making it Ukraine's economic lifeline. At the same time, as a logistics hub in the Black Sea, it integrates the major Black Sea ports of Odesa in Ukraine and Constanta in Romania into the EU network. In Romania, it forms an east-west route that connects the capital, Bucharest, to the Constanta Port, extending via Timisoara toward Hungary. It also connects, via Romania, to Chișinău, the capital of Moldova, and the Odesa Port in Ukraine, making it an extremely important infrastructure for enhancing the stability of logistics between the EU and its neighboring countries.
- **Rhine-Danube Corridor**: This is a major east-west transport axis crossing Europe, featuring a road and rail network running parallel to the inland waterway network centerd on the Rhine and Danube rivers. The Constanta Port and the capital city of Bucharest in Romania serve as key nodes along the east-west axis of this corridor, connecting landlocked countries such as Hungary to major North Sea and Baltic Sea coastal ports in Germany, including Wilhelmshaven, Hamburg, and Rostock.



The Baltic, Aegean, and Black Sea Corridor
Major Road Network



Major Road Network of the North Sea–Baltic Corridor



Main Road Network of the Rhine-Danube Corridor

Source: European Commission website, with additions by the research team

Figure 3-22 TEN-T Road Network Including Moldova, Ukraine, and Romania

(2) Road Freight Transport and Infrastructure in Moldova

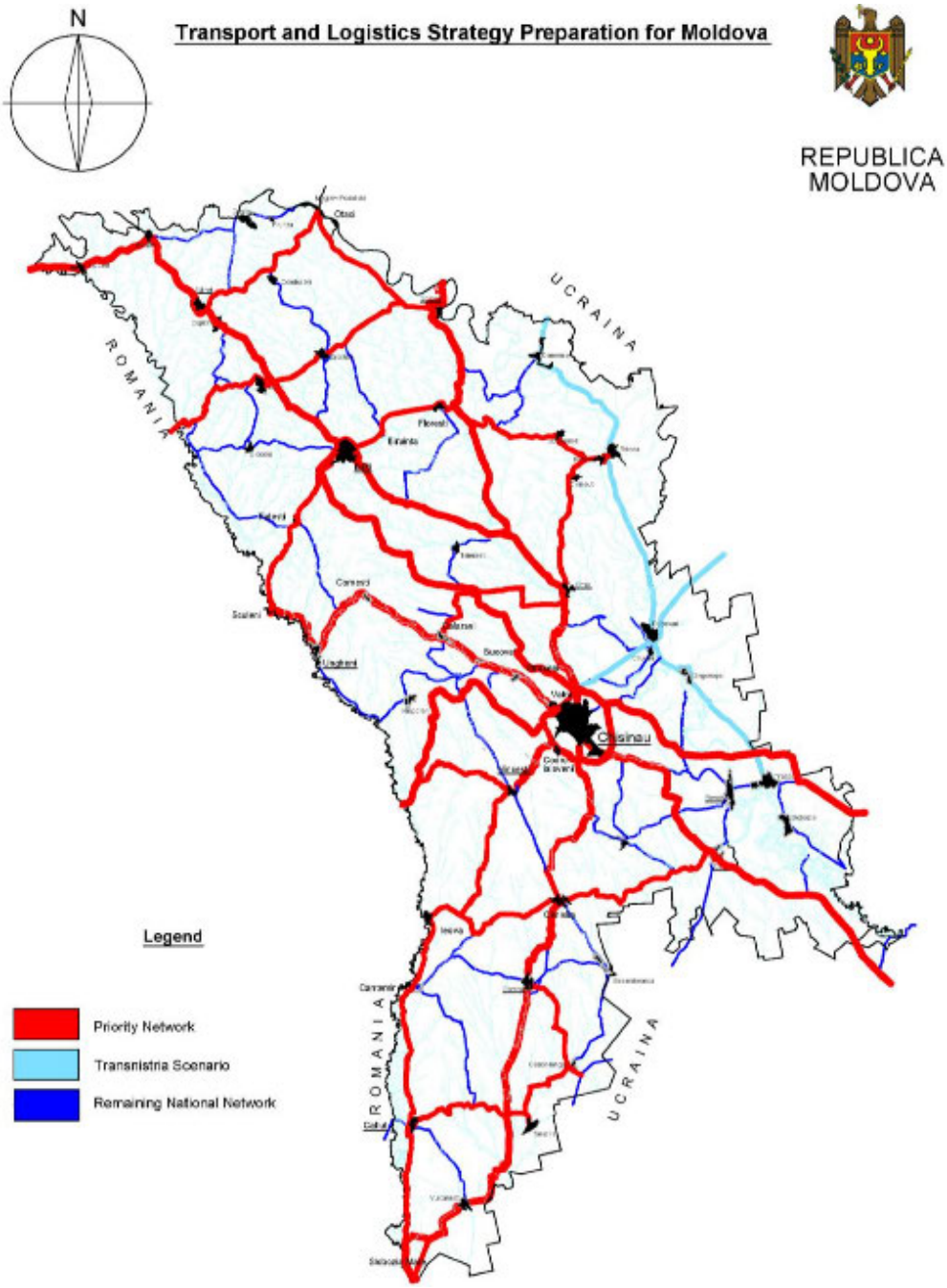
1) Road Improvement Plans

a) Transport and Logistics Strategy 2013–2022

Road development in Moldova is being implemented from the "Transport and Logistics Strategy 2013-2022" formulated by the Moldovan government in 2012 (Figure 3-23). The development objectives for the road sector are as follows:

- To minimize the total cost of road transport to society in a sustainable manner.
- To rehabilitate all roads within the priority network (1,974 km) by 2018 and bring them to a maintainable condition.
- To improve the remaining national highways (1,361 km) by 2022.

- Improve local roads (5,987 km) by 2032.
- To provide year-round access to the national highway system from all regions of the country via local and rural roads.
- Reduce traffic fatalities by 50% by 2020.
- Ensure safe and reliable road passenger transport.

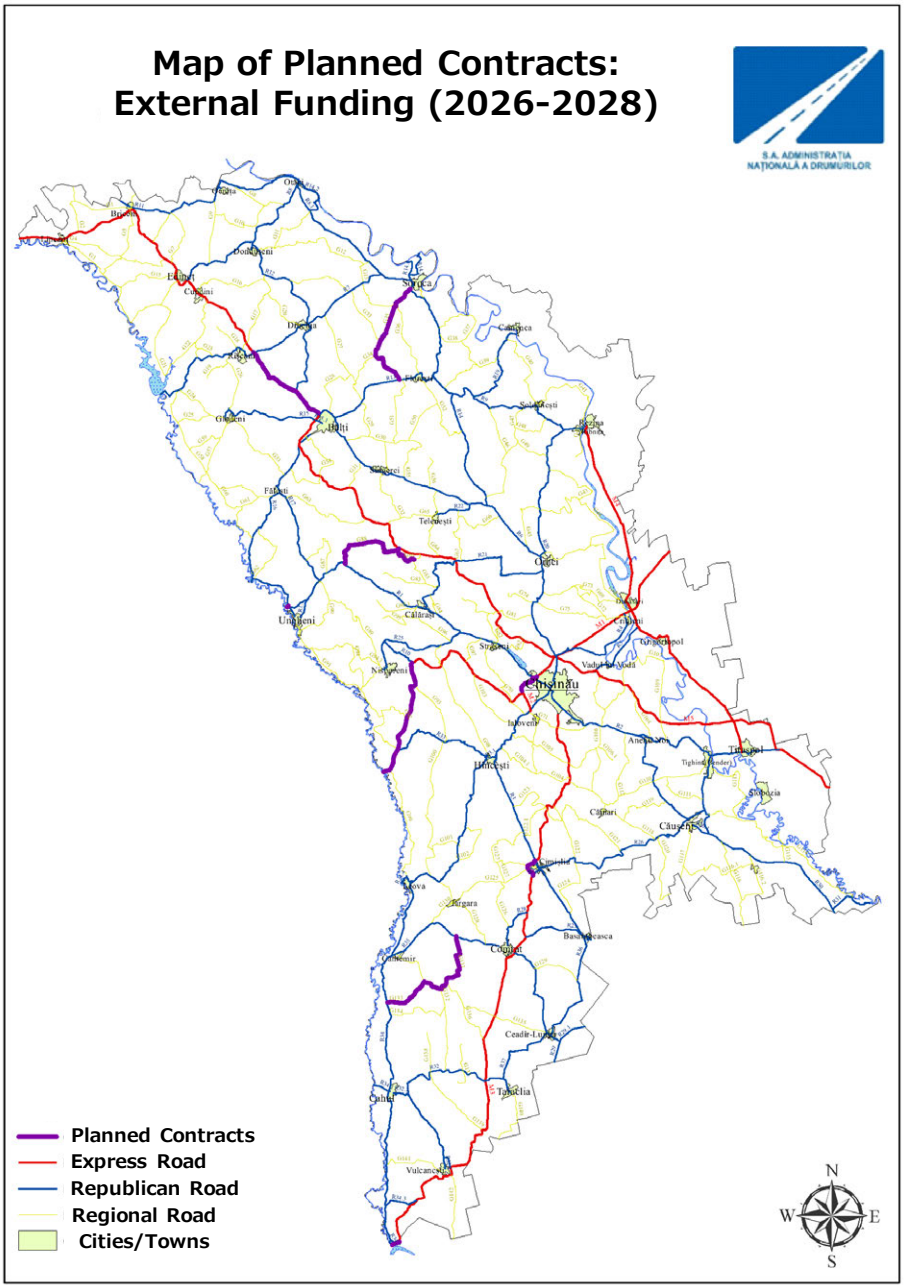


Source: Government of the Republic of Moldova, Transport and Logistics Strategy 2013-2022

Figure 3-23 Priority Road Network Development

b) Investment and Development for 2026-2028

At the request of the MIRD, the State Road Administration of the Republic of Moldova (SRA) is currently drafting a new MP for the road sector, scheduled for release in 2026. The following figure shows a road map obtained from the SRA, indicating the sections planned for development with external funding between 2026 and 2028. Some of the sections planned for development were designated as the Priority Network in the "Transport and Logistics Strategy 2013–2022," suggesting that road development may be behind schedule.



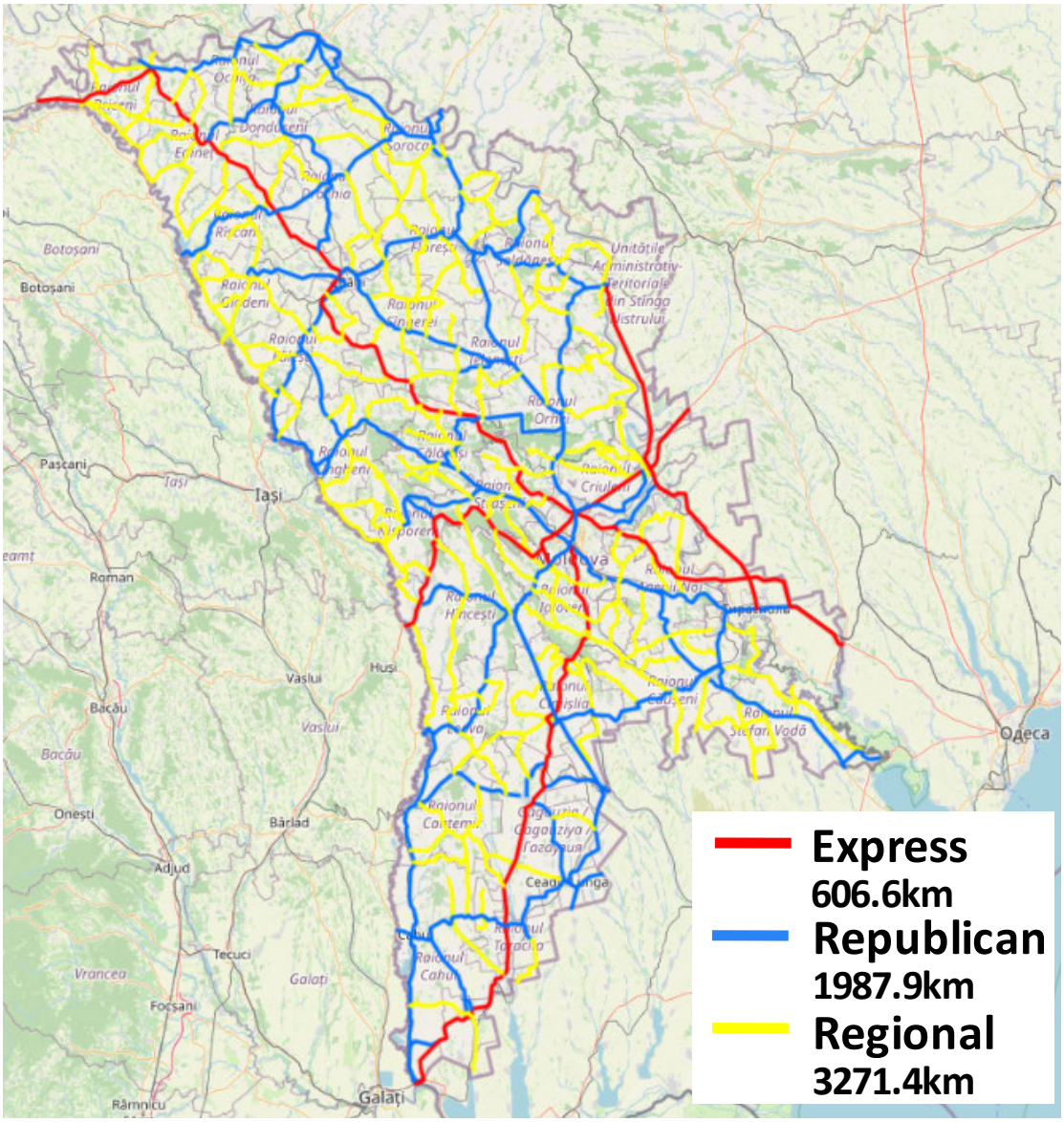
Source: Materials received from the SRA, with additions by the research team

Figure 3-24 List of Routes Planned for Development with External Funding from 2026 to 2028

2) Road Network

Moldova's road network spans 9,386 km (excluding Transnistria), of which 5,865.8 km are under the SRA jurisdiction. The remaining 3,520.2 km consists of local roads managed by local authorities. The road network managed by the State Roads Agency comprises 606.6 km of expressways (Republican Roads), 1,987.9 km, and 3,271.4 km of regional trunk roads (Regional Roads). Route numbers are classified using an initial letter and a number; the initials M, R, G, and L are used for Express Roads, Republican Roads, Regional Roads, and local roads, respectively. Note that there are no DEx roads in Moldova.

Even on the major trunk roads, which have the highest road standards in Moldova, most sections are two-way roads with a single lane in each direction. Furthermore, bypasses are not present, and many sections pass through the centers of urban areas.



Source: SRA website, with additions by the research team

Figure 3-25 Moldova's Road Network by Classification



Single-lane sections (M1: Chișinău–Leușeni)



Two-lane sections (M3: Near Chișinău)



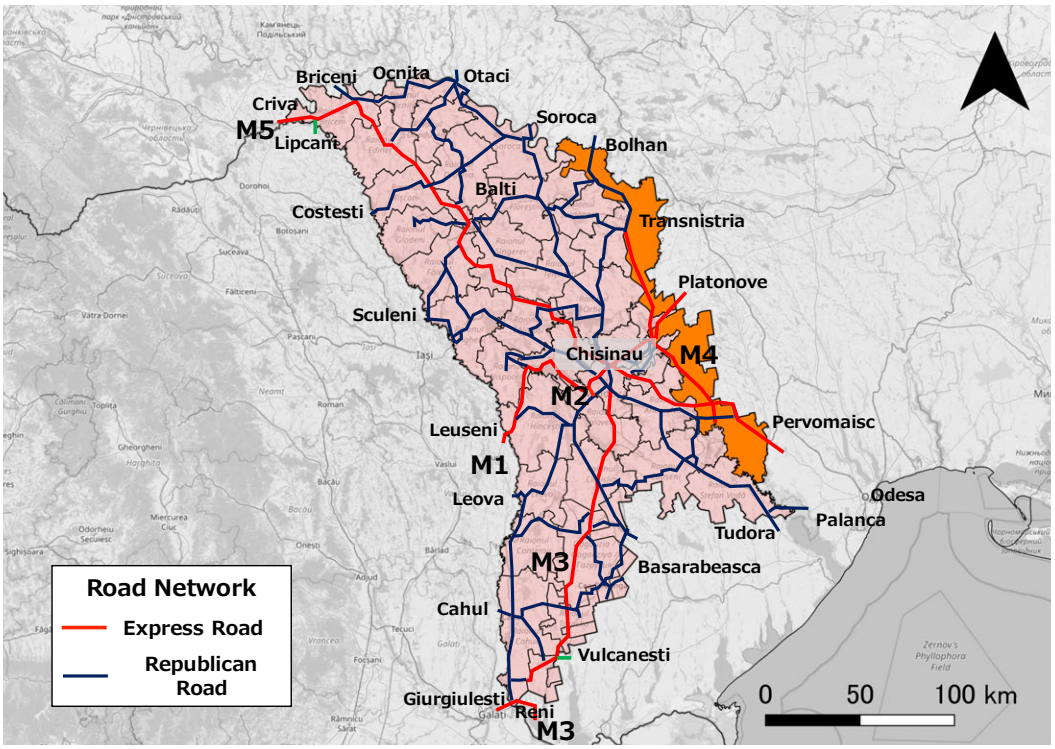
Single-lane sections (M3: Near Chișinău)



Section passing through the center of a settlement (M3: Chirsova)

Source: Photographed by the JICA survey team

Figure 3-26 Road Improvement Status of Major Arterial Roads (Express Roads)



Source: Prepared by the JICA Survey Team

Figure 3-27 Moldova's Major Road Network and Locations of Major BCPs

Moldova is a landlocked country, and road freight for international trade passes through BCPs with its neighboring countries, Ukraine and Romania, except shipments routed through the Giurgiulesti International Free Port (GIFP), which provides access to the Black Sea. According to information from the State Border Guard Service of Ukraine (DPSU), there are 41 road BCPs between Moldova and Ukraine. Meanwhile, there are six road BCPs between Moldova and Romania. Furthermore, the Transnistria region in eastern Moldova (the orange area in the map above) is not utilized as a formal international logistics route for security reasons. Consequently, the actual number of BCPs used for transit between Moldova and Ukraine is even more limited, and many logistics vehicles currently bypass the Transnistria region.



Criva



Briceni



Otaci



Palanca



Tudora



Basarabeasca



Vulcănești



Reni

Source: Photographed by the JICA survey team

Figure 3-28 View of the BCP Between Moldova and Ukraine



Lipcani



Sculeni



Leușeni



Giurgiulesti (Romanian side)

Source: Photographed by the JICA survey team

Figure 3-29 View of the Moldova-Romania BCP

3) Road Infrastructure Maintenance Status

a) Financing of Road Projects

Funding for road project investments consists of the Road Fund and external investment. The Road Fund is part of the national budget with the following purposes:

- Maintenance, repair, and reconstruction of national public roads and roads serving local (municipal) interests
- Road design
- Development of the production infrastructure for departments conducting road maintenance operations, and procurement of machinery and equipment for those departments
- Manufacturing of road construction materials
- Scientific research in the fields of road design and construction
- Road administration

In addition, the sources of funding for the Road Fund are as follows.

- Road tolls on public service vehicles and vehicles not registered in the Republic of Moldova
- Issuance of permits for vehicles with axle loads and dimensions exceeding permissible limits, as well as taxes on activities within road protection zones
- Road usage tax collected from the ownership of vehicles registered in the Republic of Moldova

- A portion of the excise tax on gasoline and diesel fuel
- Fees for the issuance of licenses for road transport activities

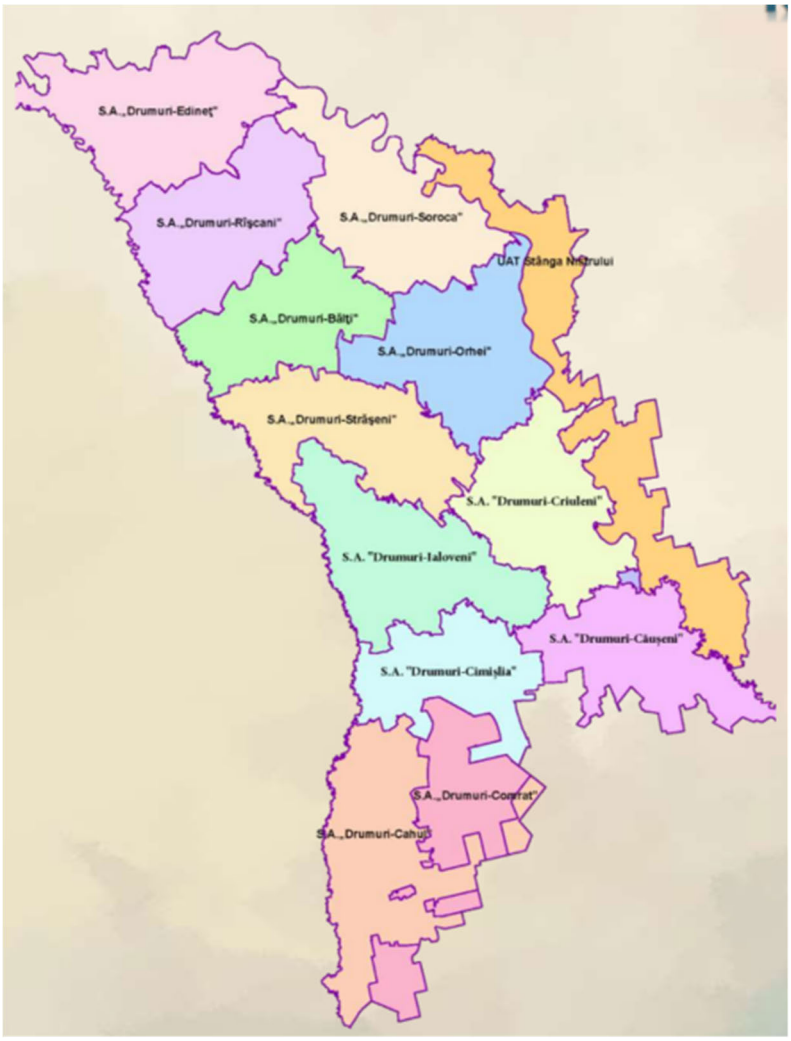
External investment consists primarily of loans from donors and international financial institutions, including financing from the EU, the World Bank, the EBRD, the EIB, and others.

b) Maintenance and Management System

Maintenance of Moldova's road infrastructure is managed by the SRA, which operates under the Ministry of Infrastructure and Regional Development of the Republic of Moldova (MIRD). Specialized external contractors complete major road and bridge repairs through competitive bidding. On the other hand, routine and minor road and bridge maintenance is carried out by 12 road companies (S.A. Dumuri), which are 100% state-owned and managed by the SRA. These road companies divide the country into 12 areas and oversee 39 road operation sectors. The maintenance work carried out by the road companies is as follows.

- Routine Road Maintenance in Summer
- Routine winter road maintenance
- Work and services performed for periodic maintenance
- Road and bridge repair work
- Public Road Management

These 12 road corporations will undergo future organizational restructuring.



Source: SRA

Figure 3-30 12 Road Corporations

c) Road Maintenance Section Selection Process

The SRA conducts an annual evaluation to prioritize maintenance, repairs, and rehabilitation work on public roads based on the following indicators.

- Technical Indicators
  - ✓ Traffic Volume (Annual Average Daily Traffic: AADT)
  - ✓ Heavy Vehicle Mix Ratio
  - ✓ Pavement Condition (Pavement Condition Index: PCI)
  - ✓ Pavement Smoothness (International Roughness Index: IRI)
- Economic Indicators
  - ✓ Investment cost per kilometer of road
  - ✓ Internal Rate of Return (IRR)

- Traffic safety indicators
  - ✓ Frequency of traffic accidents
- Social Indicators
  - ✓ Number of settlements connected to the road
  - ✓ Number of people served per 1 km of road
- Environmental Indicators
  - ✓ Percentage of road sections passing through settlements
  - ✓ Risk of road closures due to geological and climatic hazards

Criterii de stabilire a priorităților, indicatori și evaluări

DRUMURILE REGIONALE CU ÎMBRĂCĂMINTE RUTIERĂ

CRITERIUL:		Nr. maxim de puncte:	Ponderea totală:	INDICATORI ȘI PONDEREA:		Nr. maxim de puncte:	Ponderea relativă:	Ponderea totală:	GRADAȚIA:				
A.	TECHNIC	45	45%	A.1	AADT (veh/zi):	15	33%	15%	AADT (v/d)	Nr. de puncte:			
									> 3 500	15		AADT > 3,501	
									751 – 3 500	10		751< AADT ≤3,500	
									201 – 750	5		201< AADT ≤750	
									≤ 200	1		≤ 200	
				A.2	Procentul de vehicule grele (HV)	5	11%	5%	HV (%)	Nr. de puncte:			
									> 50%	5			
									>30% – ≤50%	3			
									≤ 30%	1			
				A.3	Starea de degradare a părții carosabile (PCI)	10	22%	10%	PCI (puncte)	Nr. de puncte:			
									≤ 25	10	*Foarte rea*		PCI critic - 40
									>26 – ≤40	7	*Rea*		
									>41 – ≤55	5	*Acceptabilă*		
									>56 – ≤70	3	*Bună*		
									≥ 71	0	*Foarete bună și Excelentă*		
				A.4	Rugozitatea (Planeitatea) părții carosabile (IRI) (m/km):	15	33%	15%	IRI (m/km) - asfalt	Nr. de puncte:	IRI (m/km) - pietriș		Nr. de puncte:
									≤ 2,5	0	≤ 3,5		0
									>2.5 – ≤4.0	10	>3.5 – ≤8.0		10
									> 4,0	15	> 8,0		15
					Total:	45	100%	45%					
B.	ECONOMIC	20	20%	B.1	Costuri de investiții pe km (000$/km):	10	50%	10%	Cost de investiți (5000/km)	Nr. de puncte:			
									≤ 100	10			
									>100 – ≤200	6			
									> 200	3			
				B.2	Rata internă de rentabilitate (IRR):	10	50%	10%	IRR:	Nr. de puncte:			
									> 10%	10			
									>6% – ≤10%	7			
									>2% – ≤6%	4			
									≤ 2%	0			
					Total:	20	100%	20%					
C.	SIGURANȚA RUTIERĂ	10	10%	C.1	Frecvența accidentelor de trafic (AT):	10	100%	10%	Frecvența AT:	Nr. de puncte:			
									≥1 – ≤3	3		Joasă: 1-3 AT/an	
									>3 – ≤6	7		Medie: 4-6 AT/an	
									≥ 7	10		Înnaltă: ≥ 7 AT/an	
					Total:	10	100%	10%					
D.	SOCIAL	15	15%	D.1	Numărul de localități conectate de drum:	5	33%	5%	Nr. de localități conectate:	Nr. de puncte:			
									> 6	5			
									>3 – ≤6	3			
									≥1 – ≤3	1			
									< 1	0			
				D.2	Numărul de persoane deservite pe km. de drum:	10	67%	10%	Nr. de persoane/km:	Nr. de puncte:			
									> 900	10			
									>600 – ≤900	7			
									>300 – ≤600	4			
									≤ 300	1			
					Total:	15	100%	15%					
E.	DE MEDIU	10	10%	D.1	Procentul din lungimea drumului care trece prin localități:	5	33%	5%	% de G-drum lungime:	Nr. de puncte:			
									> 50	5			
									>30 – ≤50	3			
									≤ 30	1			
				D.2	2. Risc de închidere a drumului din cauza pericolelor geologice și climatice	5	33%	5%	Risc închidere drum:	Nr. de puncte:			
									Yes	5			
									No	0			
					Total:	10	67%	10%					
Total No. of Points:		100	100%		Check:	100	points	100%					

Source: SRA

Figure 3-31 Example of an Evaluation of Road Maintenance Priority Sections

d) Road Maintenance Status

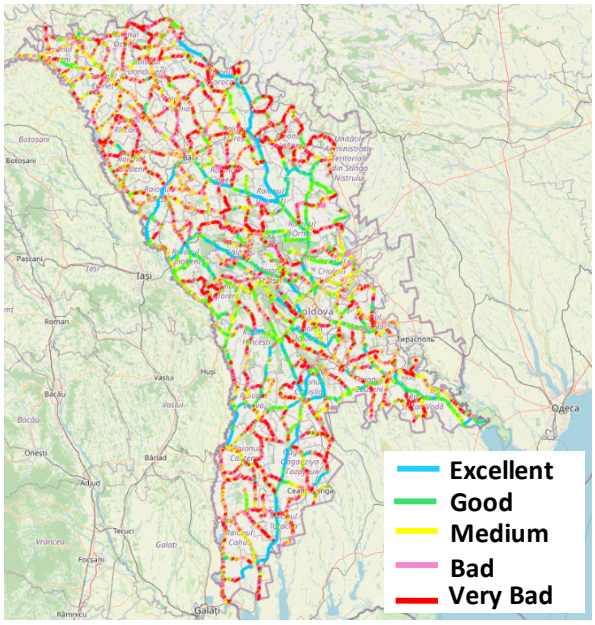
The Moldovan government's road sector faces a funding shortage. New road construction and rehabilitation projects are being carried out with financing from international development financial institutions (donors) such as the EBRD, EIB, and WB. The aforementioned "Transport and Logistics Strategy 2013–2022" set a target of completing the priority network by 2018, but progress has been slow. This delay stems from the 2018 amendment to the Road Fund Law, which changed the allocation rate of the excise tax on petroleum products—the main source of funding—from a fixed provision stipulating that it "shall not fall below 80%" to a system determined based on the annual budget law. As a result, the total annual amount allocated to the Road Fund has become unstable.

Furthermore, since 2015, operational issues have arisen whereby funds from the Road Fund are allocated at the end of the calendar year. As a result of this delay, the SRA has been unable to fully utilize these funds within the year, leading to the return of unused funds to the national treasury and the loss of investments that should have been allocated to road development and repair.

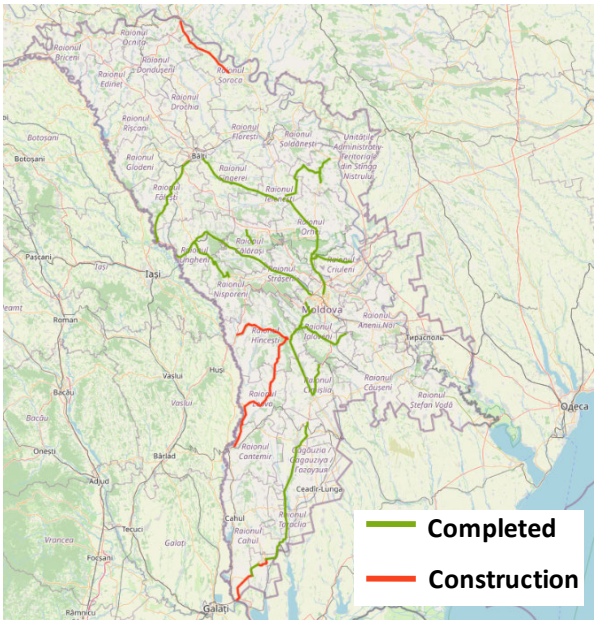
Figure 3-32 shows a map of Moldova's road evaluation results using the IRI, which quantitatively assesses longitudinal road surface irregularities, along with the status of road maintenance carried out by donors. The majority of sections where donors completed maintenance and rehabilitation are indicated as "Excellent" (light blue) or "Good" (light green) based on IRI evaluation results. In contrast, sections where no donor-funded maintenance was carried out are predominantly marked as "Very Poor" (red), indicating that pavement conditions are poor across Moldova.

Even on major trunk roads with the highest road standards, sections where no large-scale repairs by donors or other entities were completed show significant damage, like cracks, ruts, and potholes. In particular, a section of the M5 between Chișinău and Bălți—designated as part of the TEN-T core network—shows significant damage when vehicles pass over concrete slab joints, severely affecting ride comfort. Consequently, many vehicles traveling between Chișinău and Bălți currently use the R6, which runs parallel to the M5 and is in good condition, as a detour route.

Focusing on road pavement conditions, while the majority of Moldova's domestic road network consists of asphalt pavement, certain sections of major trunk roads, such as the M3 and M5, feature concrete pavement. Furthermore, numerous sections of local gravel roads exist, and many unpaved sections remain.



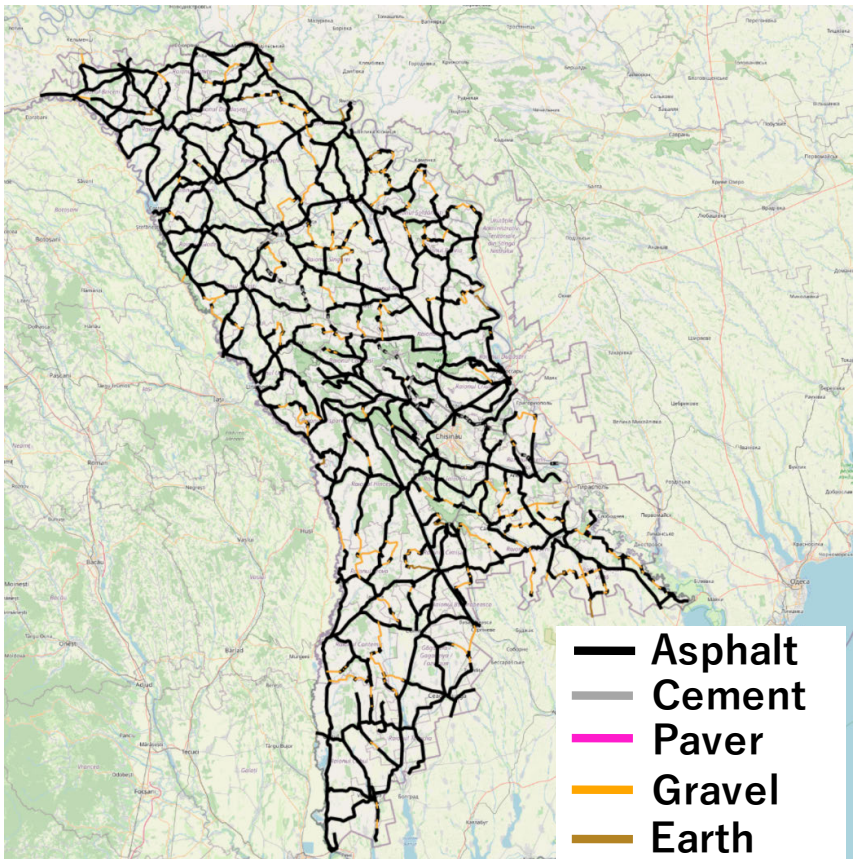
IRI Results



Road Improvement Status by Other Donors

Source: SRA

Figure 3-32 Road Maintenance Status and Road Improvement Status by Other Donors



Source: SRA

Figure 3-33 Road Pavement Conditions in Moldova



Concrete Pavement Sections and Damage Status
(M3: Chișinău–Cimișlia)



Asphalt pavement constructed by the EIB
(M3: Chișinău–Cimișlia)



Concrete-paved sections and damage conditions
(M5: Chișinău–Bălți)



Asphalt-paved section constructed by the EBRD
(R6: Chișinău–Bălți)



Asphalt-paved sections and condition of damage
(M1: Chișinău–Leușeni)



Asphalt-paved sections and damage status on national roads
(R23: Comrat–Basarabeasca)

Source: Photographs taken by the JICA survey team

Figure 3-34 Road Pavement Condition and Road Damage

4) Traffic Regulations

In Moldova, speed limits are set at 50 km/h in urban areas and 90 km/h on roads outside urban areas. Even major arterial roads often pass through urban areas, forcing through-traffic vehicles such as trucks to travel. In sections with a high risk of accidents—such as crosswalks, major intersections, and straight stretches—as well as in sections where speed control is critical, fixed radar detectors under the jurisdiction of the National Public Security Inspectorate (Inspectoratul Național de Securitate Publică: INSP) are installed to enforce speed limits.



Speed limit signs



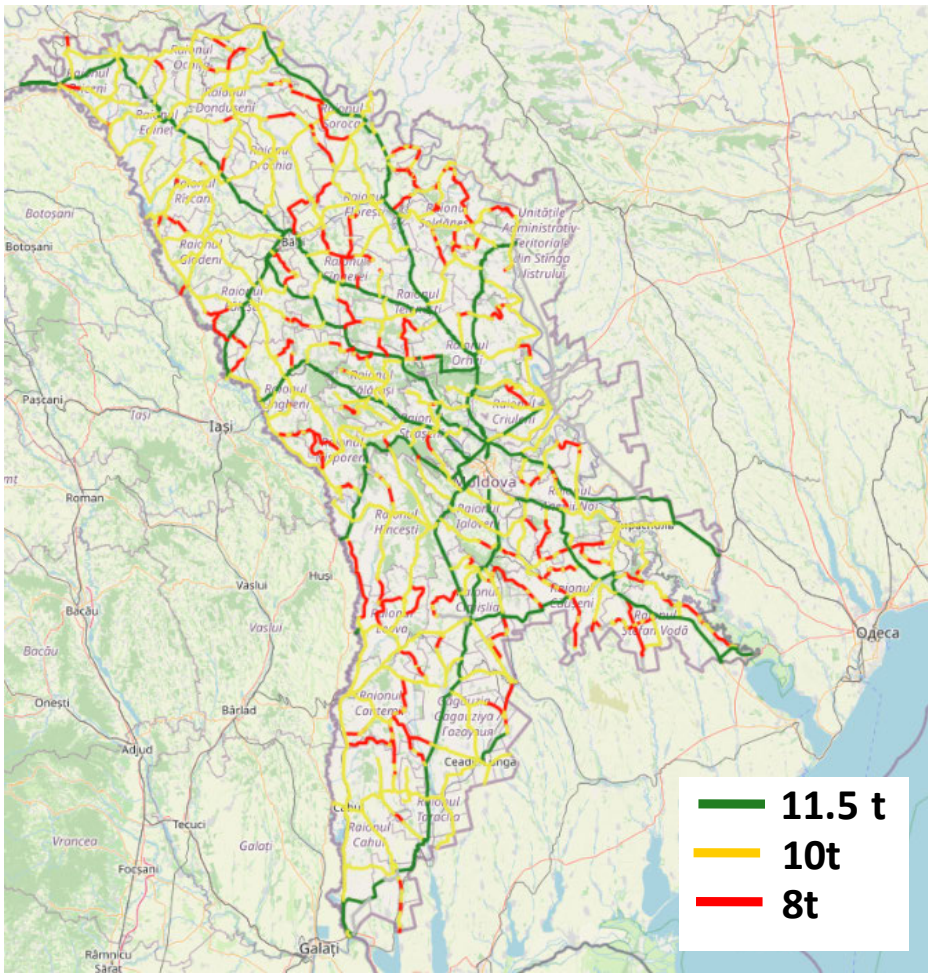
Fixed radar detectors

Source: Photographed by the JICA survey team

Figure 3-35 Speed Limits

As for other traffic regulations, Moldova has established axle weight limits to protect road infrastructure and ensure traffic safety. Axle weight limits are primarily managed by the National Auto Transport Authority of the Republic of Moldova (ANTA), which conducts enforcement operations in collaboration with the INSP on an irregular basis.

On major arterial roads that are part of the international logistics network, axle weight limits have a legal maximum of 11.5 tons. Depending on road conditions, other roads have axle weight limits set at 10 tons or 8 tons. In addition to these permanent axle weight limits, when the Moldovan Meteorological Service issues an Orange Code warning (typically for temperatures of 35°C or higher), vehicles with a gross weight exceeding 12 tons are prohibited from traveling throughout Moldova between 10:00 a.m. and 8:00 p.m. to prevent thermal damage to road infrastructure caused by high temperatures. However, vehicles transporting passengers, perishable goods, animals, medical equipment, fuel, and similar items are permitted to travel even during these restricted hours.



Source: SRA

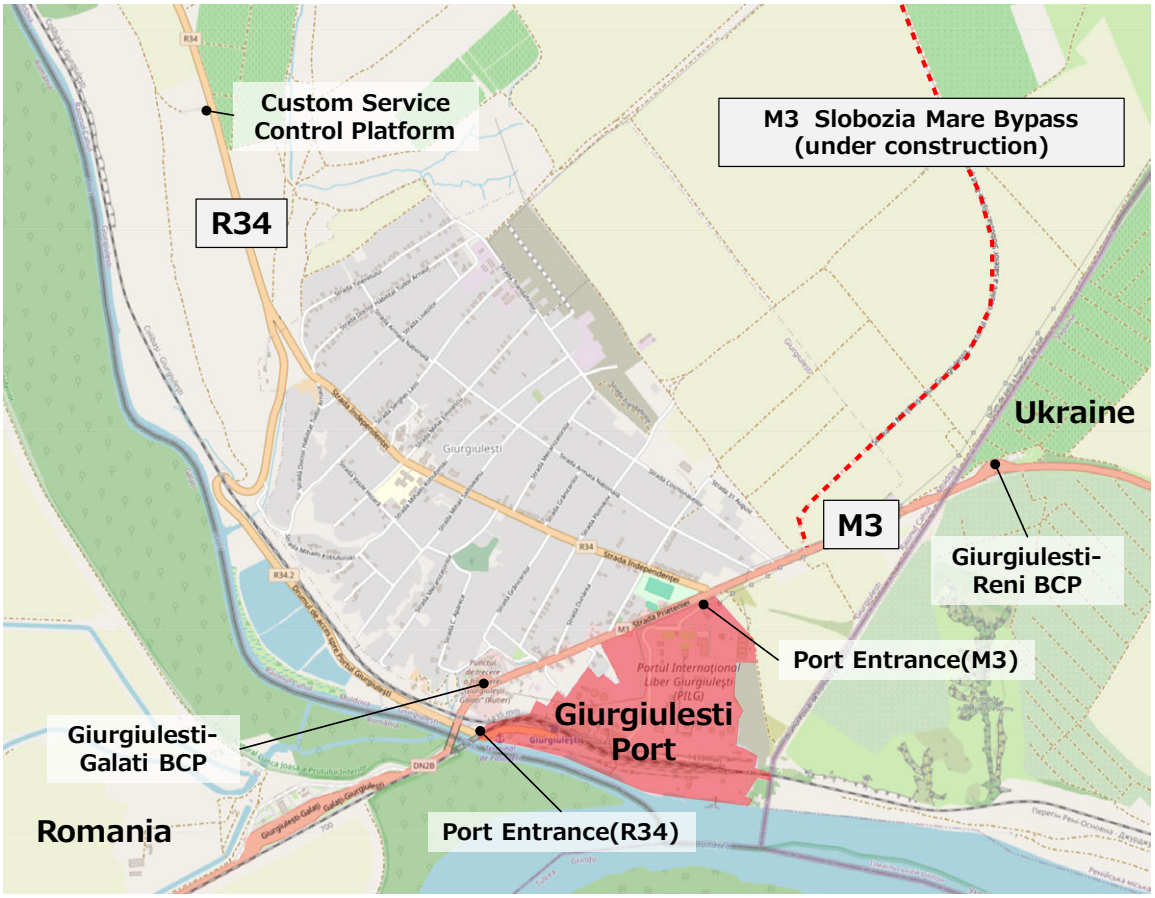
Figure 3-36 Axle Weight Restrictions

5) Condition of Access Roads to Ports

Along the M3, the main access road to the Giurgiulesti Port, the Giurgiulesti-Galati BCP (Romanian border), and the Giurgiulesti-Reni BCP (Ukrainian border) are close to the port entrance. As a result, in addition to vehicles entering and exiting the port, trucks heading toward both borders also congregate in this area, causing chronic congestion. In the past, trucks would also idle within the adjacent village of Giurgiulesti, causing noise, vibration, and exhaust fumes that adversely affected residents' living environment. In response, the Moldovan government has now banned trucks from parking or stopping within the village. As a government measure to alleviate congestion, a dedicated truck waiting area has been established on the R34 north of the Giurgiulesti village, enabling customs clearance procedures there. Furthermore, to prevent large vehicles from entering the settlement, the M3 bypass is constructed in July 2026 with support from the EBRD. The truck-only holding area expansion and detailed design work are currently underway.

Giurgiulesti Port has two entrances and exits. One is the GIFP entrance facing the M3, equipped with petroleum product storage facilities and grain silos. The other is the entrance/exit to the Giurgiulesti

Passenger and Cargo Port, which faces R34 without storage facilities. Since cargo must be loaded directly from trucks onto ships, truck queues continue to form on R34.



Source: Based on OpenStreetMap, with additions by the JICA survey team

Figure 3-37 Access Roads to the Giurgiulesti Port



Road conditions on M3 (Galati BCP–Reni BCP)



Entrance/Exit of Giurgiulesti Port (M3)



Truck queues at the Giurgiulesti Passenger and Cargo Port (R34)



Trucks unloading at the Giurgiulesti Passenger and Cargo Port



Trucks parked on the roadside near the parking lot (R34)



Construction Progress of the M3 Slobozia Mare Bypass



Overview of the EBRD-supported M3 Slobozia Mare Bypass

Source: Photographed by the JICA survey team

Figure 3-38 Access Road Conditions at the Giurgiulesti Port

(3) Road Freight Transport and Infrastructure Along Major Import/Export Routes in Western and Southwestern Ukraine

1) Road Improvement Plans

a) National Transport Strategy of Ukraine 2030

The restoration and development of Ukraine's road network advances in accordance with the overarching plan mentioned earlier (Section 3.2.2), the "National Transport Strategy of Ukraine 2030." Although this strategy was formulated in 2018, before the Russian invasion, it was updated and approved in December 2024 as a new strategy under the banner of "Build Back Better," in light of the extensive damage caused by the invasion.

The new strategy sets forth the following four strategic objectives and establishes implementation plans for three-year periods (2025–2027 and 2028–2030).

Strategic Objective 1:	Restoration and development of a competitive and efficient transport system that complies with EU policies and standards and is integrated into the TEN-T
Strategic Objective 2:	Ensuring high-quality passenger transport and barrier-free mobility
Strategic Objective 3:	Achieving safe, people-centered, environmentally friendly, and energy-efficient transport with a focus on decarbonization
Strategic Objective 4:	Improving governance and institutional capacity in the transport sector

While the Russian invasion has damaged 25,400 km of roads and 344 bridges, the proportion of land transport in international freight has increased from 48% in 2021 to 68% in 2022 due to the temporary occupation and closure of ports and the closure of Ukrainian airspace to civilian flights. The increased demand for land transport has led to insufficient road capacity at EU and Moldovan borders, as well as long wait times at BCPs. However, the Russian invasion has resulted in cuts to the national budget for the maintenance and modernization of transport infrastructure.

To utilize limited resources most effectively, the project is scheduled in three prioritized phases.

Phase 1: Measures and investment projects necessary to urgently address the consequences of Russia's military invasion of Ukraine (particularly the destruction and damage to transport infrastructure). Specifically, projects that contribute to resolving transport capacity shortages in priority logistics sectors (particularly at borders with EU countries and the Republic of Moldova, as well as at ports under Ukrainian control, etc.)

Phase 2: Projects within the existing transport network and infrastructure that require long-term maintenance and repairs.

Phase 3: Measures and investment projects necessary for the improvement of existing transport infrastructure or the development of new transport infrastructure.

b) Ukraine Plan 2024–2027

The Ukraine Plan is a national plan formulated by the Ukrainian government in 2024 for Ukraine's reconstruction and future EU membership. It is a medium-term growth and reform strategy covering four years, from 2024 to 2027. Going beyond mere reconstruction, the plan advocates "Build Back Better" and aims to create a sustainable, digitized nation that meets EU standards. The sectors identified as strategic—and considered to have high potential for economic growth—are "Transportation," "Energy," "Agriculture," "Critical Raw Materials," and "IT & Digital."

The implementation policies for the transportation sector are as follows:

- Formulation of a comprehensive plan for the transport sector
- Improving export logistics capabilities
- Liberalization of the rail transport sector
- Improvement of maritime transport and port services

Policies directly related to the road sector include "Formulation of a Comprehensive Plan for the Transport Sector" and "Improvement of Export Logistics Capabilities." "Formulation of a Comprehensive Plan for the Transport Sector" refers to the aforementioned "National Transport Strategy of Ukraine 2030," which aims to incorporate responses to war damage, infrastructure development compliant with EU standards (TEN-T), the integration of Solidarity Lanes into planning, sustainability, and digitalization, and investment plans through 2030. "Enhancing export logistics capabilities" involves renovating BCPs with Poland, Slovakia, Hungary, and Romania; developing a network of service areas; and simplifying border crossing procedures in line with EU standards.

2) Road Network

The Ministry of Communities, Territories and Infrastructure Development of Ukraine manages Ukrainian roads. The total length of national roads is 47,421.8 km, consisting of 9,348.3 km of international roads, 7,205.1 km of national roads, 9,503.0 km of regional roads, and 21,362.0 km of territorial roads.

Since the Russian invasion in 2022, transportation infrastructure, including roads, has suffered extensive damage. According to RDNA4, a report jointly prepared by the World Bank, the Ukrainian government, the European Commission, and the UN)

The total damage to the transportation sector as of December 2024 amounts to approximately $36.7 billion (about 5.8 trillion yen), with damage to regional roads accounting for 26% of the total and damage to trunk roads accounting for 21%.



Source: Ministry for Communities, Territories and Infrastructure Development of Ukraine website, with additions by the research team

Figure 3-39 Ukraine's Road Network

3) Road Infrastructure Maintenance Status

The Ministry of Communities, Territories and Infrastructure Development of Ukraine is a central executive body responsible for implementing national policy in the road sector and for constructing and maintaining public roads. It also oversees the development, modernization, and maintenance of business continuity plans for roads and railways.

Regional Infrastructure Reconstruction and Development Bureaus, as subordinate organizations of the Agency, comprise 24 bureaus in each region, the Autonomous Republic of Crimea, and the city of Sevastopol. As the direct implementing entities for reconstruction projects, these bureaus perform the following roles:

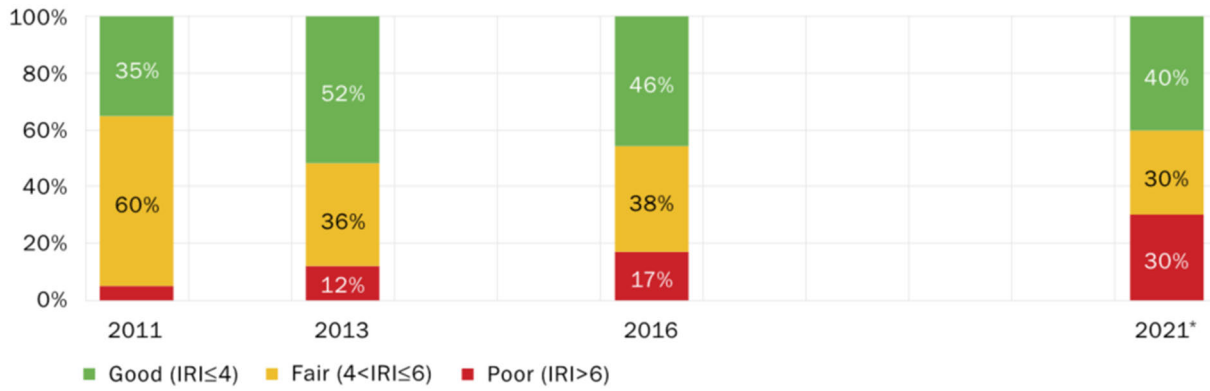
- On-site management and execution of reconstruction projects: It comprehensively implements restoration projects for national highways, bridges, public facilities, and energy infrastructure, from design through bidding and contract management.
- Construction and maintenance of public roads: It manages and supervises the construction, reconstruction, major repairs, and operational maintenance of public roads of national significance.

JSC Automobile Roads of Ukraine is a JSC under the supervision of the Agency for Infrastructure Reconstruction and Development. It collaborates with regional bureaus and other organizations to support operational activities and the development of the road sector. Its main roles are as follows:

- Execution of public road operation and maintenance (O&M): Based on commissions and plans from regional offices, the company engages in the following operational activities
- Winter maintenance: Snow removal operations and the spreading of anti-skid materials and salt (accounting for approximately 38% of the total budget in 2024)
- Road surface repairs: Maintenance work such as removing damage and deformations from roads, and patching
- Traffic safety measures: Installation of road signs and guideposts, renewal of road markings, repair of guardrails, etc.
- Infrastructure restoration: Routine repairs of damaged constructed structures (such as bridges) and operational maintenance to prevent premature failure

In Ukraine, a Road Fund was established in 2018, leading to increased infrastructure investment. However, due to insufficient maintenance funding combined with a lack of information on road conditions, which prevented proper prioritization, the condition of the road network continues to deteriorate. As shown by the IRI ratings for Ukraine in the figure below, road conditions have not improved since the introduction of the Road Fund in 2018.

Due to the Russian invasion in 2022, road repair programs were suspended with a few exceptions, and the deterioration of road infrastructure is accelerating. Indeed, RDNA4 indicates that road infrastructure continues to deteriorate due to limited maintenance, as national funds are allocated to military needs.



Source: Ukraine's Transport and Logistics System: Current and Prospective Opportunities and Challenges (WB)

Figure 3-40 Observed (2011–2016) and Estimated (2021) Road Pavement Conditions in Ukraine

4) Condition of Port Access Roads

Information on port access roads in Ukraine was unavailable for this study due to security concerns, as ports are critical to Ukraine's national security.

(4) Road Freight Transport and Infrastructure on Romania's Major Import and Export Routes

1) Road Improvement Plans

a) Investment Plan for the Development of Transport Infrastructure for the Period 2020–2030

Road development in Romania is proceeding in accordance with the "Investment Plan for the Development of Transport Infrastructure for the Period 2020–2030," an implementation strategy for the national MP, the "MPGT." This plan focuses primarily on aligning with the "Core Network" (to be completed by 2030) and the "Comprehensive Network" (to be completed by 2050) of the EU's TEN-T.

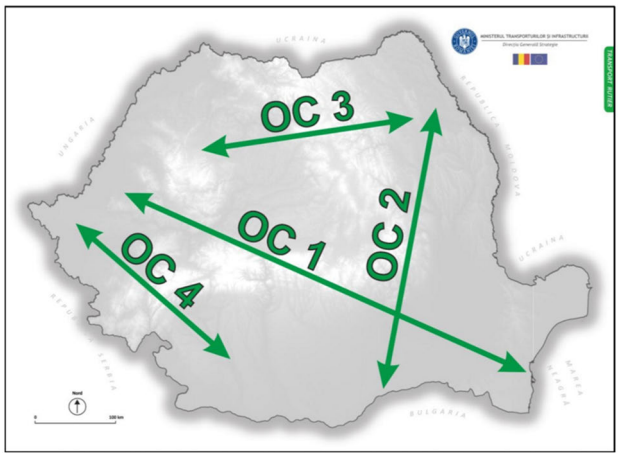
The following objectives have been set specifically for the road sector:

- To improve mobility for residents and freight transport within the TEN-T Core Network and Extended Network by developing expressways and the DEx network
- To ensure that residents and businesses have access to the TEN-T Core Network and Comprehensive Network by developing domestic connectivity corridors (CC)
- Ensure a safe and functional road transport network that contributes to reducing the number of traffic accidents and shortening travel times
- To ensure international access through connections with the neighboring countries
- Ensure an environmentally friendly transport network by implementing the outer ring road project

Four major axes have been established to connect Romania's historical and development regions and link them to the neighboring countries.

- OC1 (East-West Axis): The most important axis connecting Central Europe, Central Romania, and the Black Sea

- OC2 (North-South Axis): An axis connecting northeastern and southern Romania, serving as the north-south connection for the entire continent
- OC3 (Moldavia-Transylvania Axis): A transit axis connecting the countries of Eastern Romania with Central Europe
- OC4 (Southwest Axis): An axis crossing the Muntenia, Oltenia, and Banat regions, connecting the southern and midwestern parts of the continent



Source: Investment Plan for the Development of Transport Infrastructure for the period 2020-2030

Figure 3-41 Romania's Four Major Corridors

To develop these major axes, the plan aims to establish a road network with the three types of corridors, each designed to serve a specific function. Under this framework, corresponding projects are being considered for each corridor type.

- Connectivity Corridors (CC)

  These are the most critical trunk routes connecting major development regions, economic growth hubs, and industrial centers at the national level.

  - CC1 (Transcarpati): An east-west backbone route extending from Constanta (Black Sea) through Bucharest, Pitești, and Sibiu to the western Hungarian border (Nadlac)
  - CC2 (Siret Road): A north-south axis that runs through eastern Romania, connecting the Ukrainian border (Siret) to the Bulgarian border (Giurgiu) via Bucharest
  - CC3 (Moldavia): A route connecting Sibiu, Brașov, and Bacau, linking southern Transylvania with the Moldavia region
  - CC4 (Montana): A route crossing north-central Romania, extending from the Moldavia region through Transylvania (Cluj-Napoca, etc.) to the Hungarian border (Bors)
  - CC5 (Danubius): A major southern and western axis running from Bucharest through Alexandria and Craiova to Lugoj in the west

- Inter-Corridors (IC)

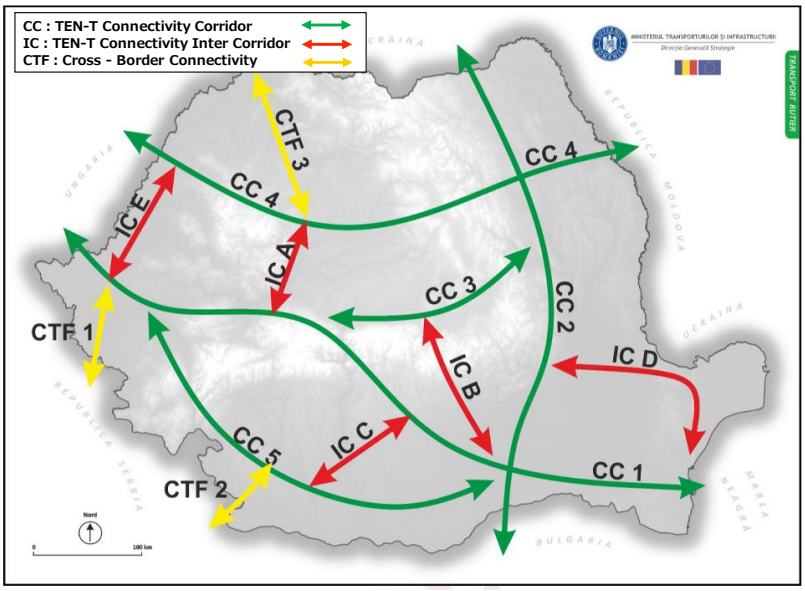
  These are connecting corridors designed to link major CCs and enhance the flexibility and fluidity of the network.

  - ICA (Ardeal): Connects Sebes and Turda, linking CC1 (East-West Axis) and CC4 (Central-Northern Axis)
  - ICB (Snow Motorway): Connects Ploiești and Brașov, linking CC2 (North-South Axis) and CC3 (Moldova Connection Axis)
  - ICC (Oltenia): Connects Pitești and Craiova, linking CC1 (East-West axis) and CC5 (Southern axis)
  - ICD (Dobrogea): From Buzău/Focsani, via Braila and Tulcea to Constanta, connecting CC2 (North-South axis) and CC1 (East-West axis) on the eastern side
  - ICE (Banat): Connects Timisoara and Arad, strengthening connectivity in the western region

- Cross-Border Connectivity (CTF)

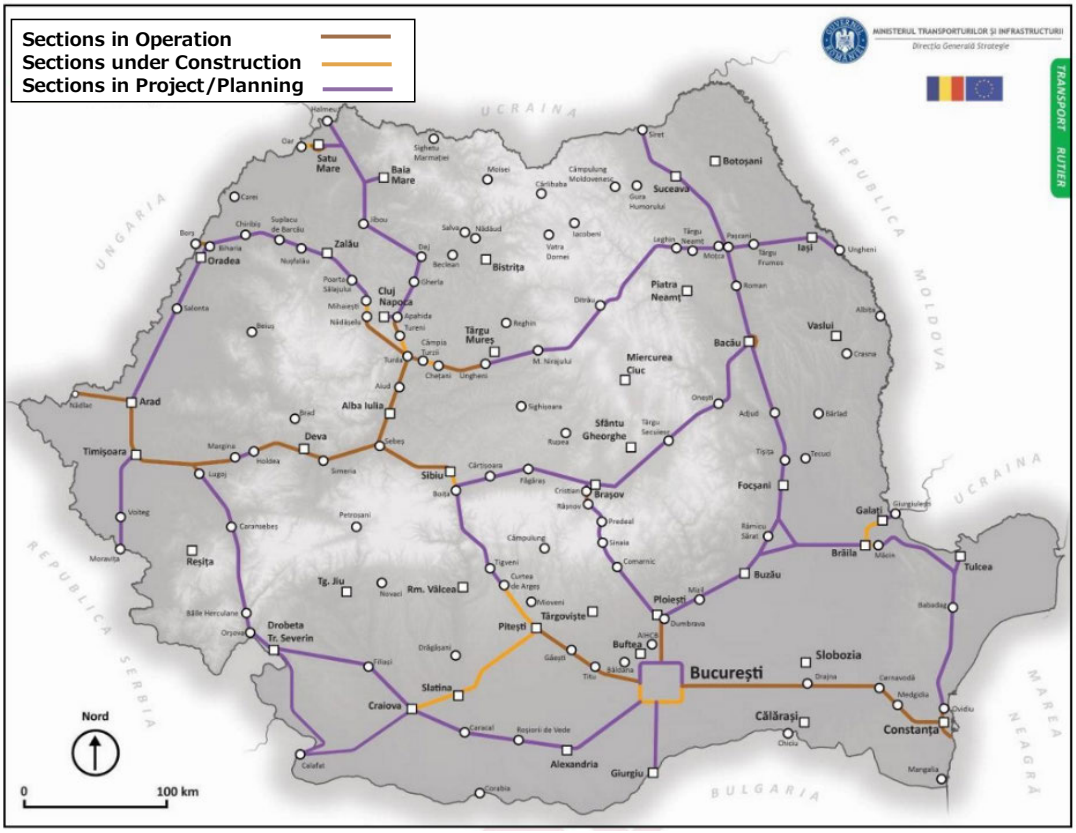
  These corridors connect the domestic network to major transport corridors in the neighboring countries, ensuring international accessibility.

  - CTF1 (Banat): Connects Timisoara to the Serbian border (Moravita) and provides access to Southern Europe
  - CTF2 (Tracia): Connects from Craiova and Drobeta-Turnu Severin to the southern Balkans via the Bulgarian border (Calafat)
  - CTF3 (Somes): Connects from Turda/Cluj-Napoca via Satu Mare to the Hungarian and Ukrainian borders



Source: Investment Plan for the Development of Transport Infrastructure for the period 2020-2030, with some additions by the research team

Figure 3-42 Road Corridors in Romania



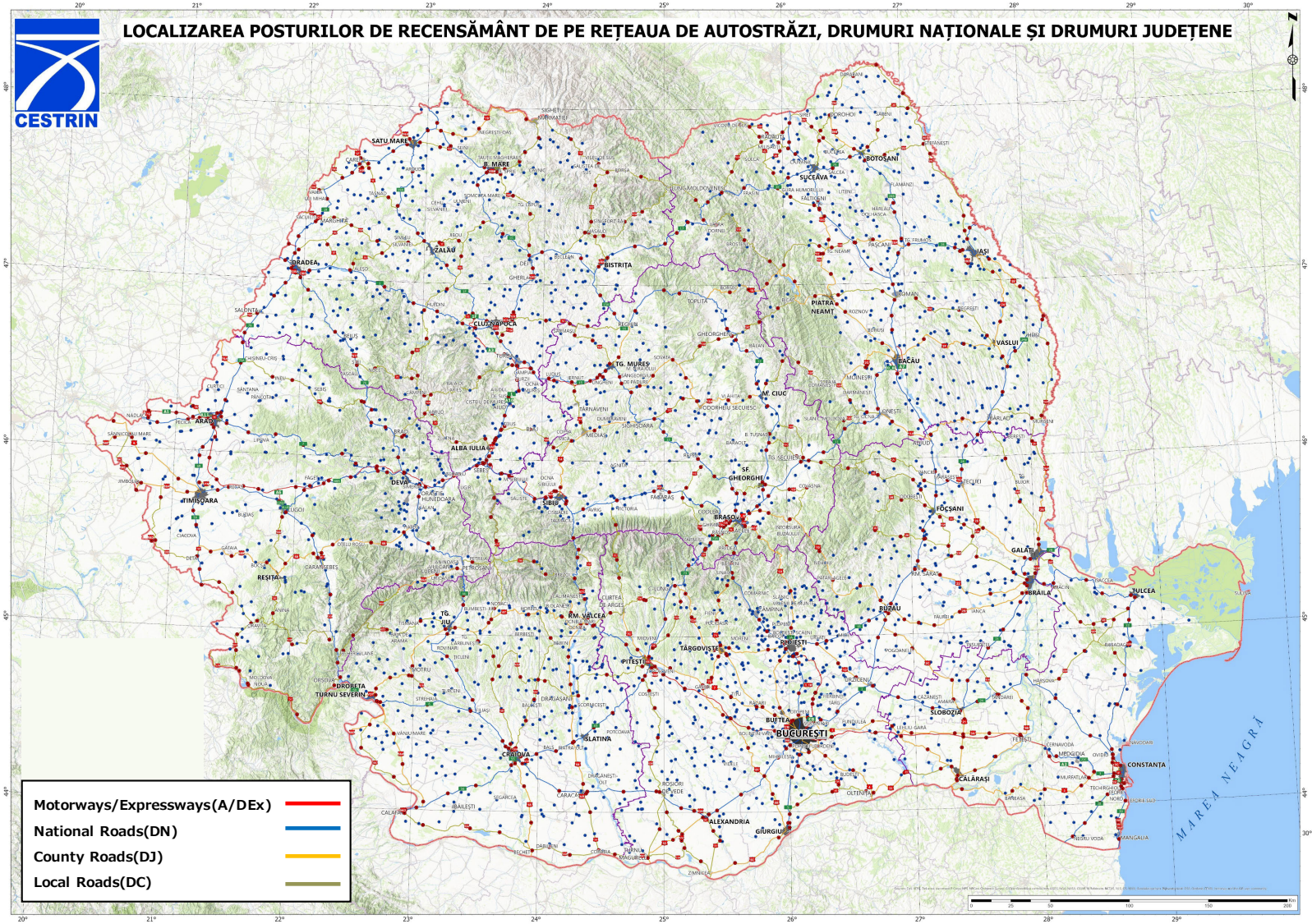
Source: Investment Plan for the Development of Transport Infrastructure for the period 2020-2030, with some additions by the research team

Figure 3-43 Status of Road Development on the Main Network (Motorways/DEx) (During Plan Formulation)

2) Road Network

Romania's road network is classified into highways (Autostradă: A), DEx, and national roads (Drum Național: DN)—all managed by the Romanian Road Infrastructure Administration—as well as county roads (Drum Județean: DJ) and municipal roads (Drum Comunal: DC), which are managed by local authorities. As of the end of December 2024, the total length of the road network was approximately 86,847 km, comprising approximately 17,994 km of national roads (motorways: approximately 1,137 km, DEx: approximately 121 km), approximately 35,091 km of county roads, and approximately 33,762 km of municipal roads.

The Romanian government is constructing expressways on major trunk roads with extremely high traffic volumes, while building DEx roads on sections with moderate traffic volumes or where construction costs need to be low to ensure early opening. In terms of specifications, both road types generally feature grade-separated intersections; however, compared to expressways, DEx roads have narrower shoulders and lane widths. Consequently, the speed limit on expressways is set at 130 km/h, while that on DEx roads is 120 km/h. On national highways, the speed limit is 100 km/h on sections designated as European Motorways and 90 km/h on other sections. The speed limit on county and municipal roads is 90 km/h. Additionally, the speed limit within urban areas is 50 km/h for all road classes.



Source: Adapted by the research team from the website of the Center for Road Technical Studies and Informatics (CESTRIN)

Figure 3-44 Romania's Road Network

3) Road Infrastructure Maintenance Status

Road construction and maintenance in Romania are carried out by the Romanian Road Infrastructure Administration, which operates under the authority of the Romanian Ministry of Transport and Infrastructure. The central headquarters of the Romanian Road Infrastructure Administration is in Bucharest, with eight regional offices throughout the country.

As of the end of December 2024, the total 86,847 km of public roads comprised 51.5% (44,752 km) of paved roads, 23.7% (20,563 km) of lightly paved roads, and 24.8% (21,532 km) of gravel and dirt roads.

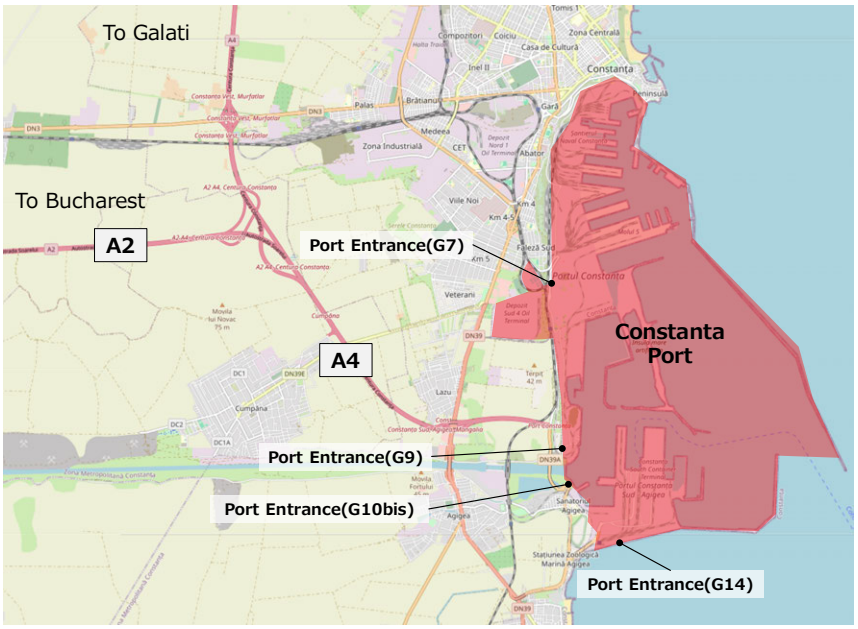
Much of Romania's road network is aging and has exceeded its service life. According to the 2024 annual report of the Road Infrastructure Administration, published in 2025, approximately 55% of the road network managed by the Road Infrastructure Administration is in operation beyond its legal and technical service life, as the approved state budget falls significantly short of the repair costs requested by the Road Infrastructure Administration. In fiscal year 2024, the approved national budget amounted to approximately 45% of the Road Infrastructure Management Corporation's requested amount.

4) Condition of Port Access Roads

a) Constanta Port

Constanta Port has two major areas: the North Port and the South Port. The North Port primarily handles bulk cargo, including grain and energy resources, while the South Port primarily handles containers, vehicle transport, and heavy and oversized cargo. There are four port entrances and exits primarily used by trucks: Gate 7, the main entrance to the North Port; Gate 8, dedicated to grain transport vehicles; Gate 10bis, the main entrance to the South Port; and Gate 14, which serves a secondary role.

The Constanta Port is directly connected to Romania's highway network. From the port, one can access Bucharest via the A4 and A2 highways. Additionally, the A4 has been partially constructed toward Ukraine and Galati, allowing large trucks entering and exiting the port to reach the port without passing through urban areas such as Constanta. In recent years, in response to the increase in grain exports resulting from the conflict in Ukraine, plans have been proposed to develop truck-only parking facilities near the port areas and to implement projects such as expanding the road connecting the North Port and South Port to four lanes.

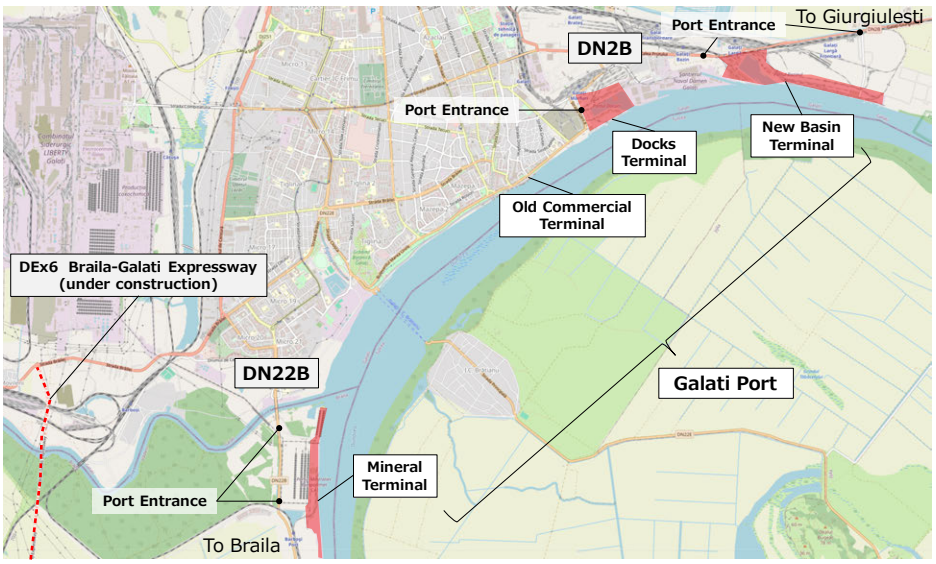


Source: Based on OpenStreetMap, with additions by the research team

Figure 3-45 Access Roads to Constanta Port

b) Galati Port

A key feature of the Galati Port is its proximity to the city center. While this is advantageous for supplying the urban area, the impact of heavy vehicles on urban traffic remains a challenge. To resolve this bottleneck, construction is underway on the "Braila-Galati Expressway" (design speed: 120 km/h), which connects adjacent cities. It is expected to strengthen connectivity to the Port of Constanta and the TEN-T network, while also serving as a major artery for hinterland logistics.



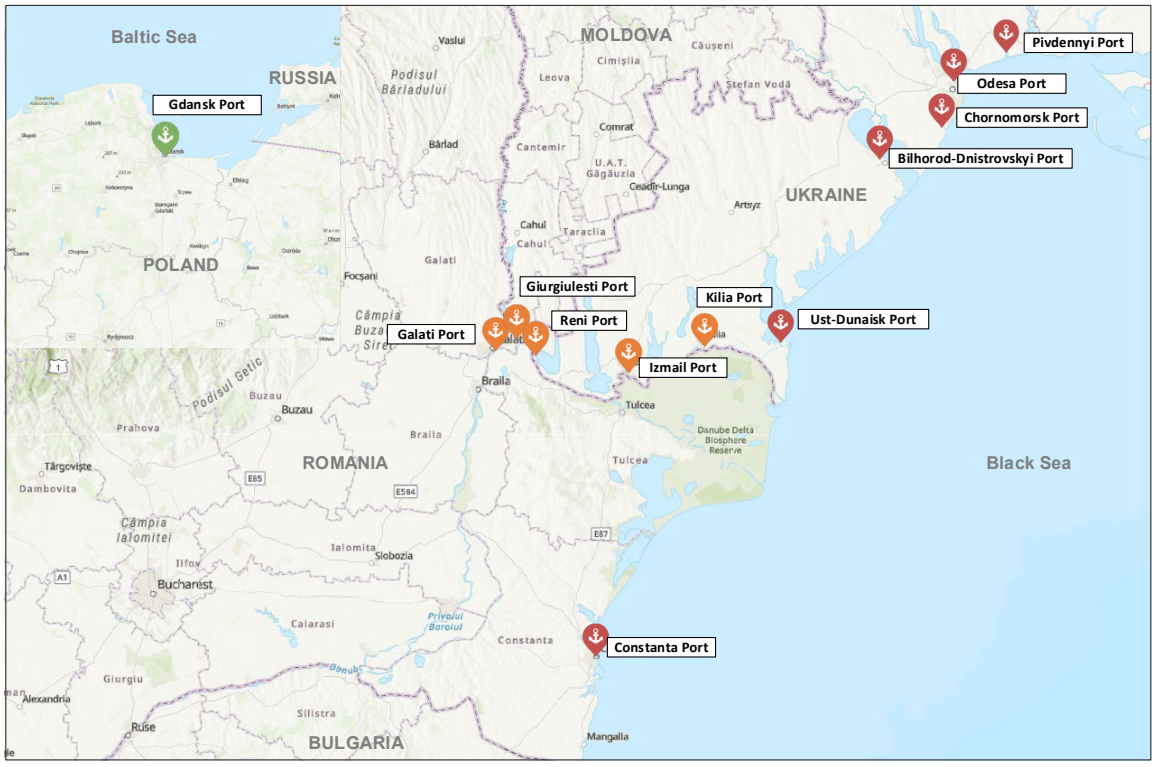
Source: Based on OpenStreetMap, with additions by the research team

Figure 3-46 Access Roads to Galati Port

3.3.3 Major Ports and Inland Waterways on Key Import/Export Routes

(1) Port Overview

The ports covered in this survey are shown in Figure 3-47, including five Ukrainian ports on the Black Sea coast (Odesa, Chornomorsk, Pivdennyi, Ust-Dunaisk, and Bilhorod-Dnistrovskyi), the Constanta Port in Romania, the Gdansk Port in Poland on the Baltic Sea coast, three Ukrainian ports on the Danube River(Izmail, Kiliya, and Reni), two ports in Moldova (GIFP and the public Giurgiulesti Port), and the Galati Port in Romania.



Source: Compiled by the research team based on OpenStreetMap

Figure 3-47 Locations of Surveyed Ports

The following outlines the roles and functions of the surveyed ports by country.

Ukraine: The ports of Odesa, Chornomorsk, and Pivdennyi serve as the nation's core "international seaport hubs" handling grain, iron ore, and containers, and are central to foreign exchange earnings and the transport of strategic goods. Meanwhile, the ports of Izmail, Kiliya, and Reni serve as "alternative river export hubs" connecting to the EU via the Danube River, and their importance is growing as logistics diversification hubs in the event of a Black Sea blockade. Furthermore, the ports of Ust-Dunaisk and Bilhorod-Dnistrovskyi serve as regional logistics and inland waterway hubs, playing a complementary role. This multi-layered structure of seaports and river ports forms the backbone of the country's logistics resilience.

Romania: As one of the largest "international hub ports" on the Black Sea, the Constanta Port handles containers, grain, and petroleum products, serving as a maritime gateway at the eastern edge of the EU. It holds strategic importance as an alternative export hub for Ukrainian grain. The Galati Port, as an "industrial

river port" along the Danube, handles steel and grain and serves as a hub connecting inland waterways with Black Sea shipping routes. The two ports are linked by the Danube-Black Sea Canal, forming a wide-area logistics network that integrates sea and river ports.

Moldova: GIFP serves as an "international commercial port," handling petroleum products, grain, and general cargo, and is the only maritime access point for the landlocked country. It is strengthening foreign investment and transit functions through a free port regime. The adjacent state-owned Giurgiulesti Port is a "regional complementary port" that supports public logistics functions. Both ports are connected to the Black Sea via the Danube River and serve as vital lifelines for the national economy.

Poland: The Port of Gdansk is a deep-water international container hub on the Baltic Sea capable of accommodating large vessels. It serves as a major logistics hub connecting Northern Europe, Western Europe, and the Atlantic region. At the same time, it functions as an energy import hub for oil, LNG, and other resources, thereby supporting the country's energy security. In recent years, it has also served as a northern corridor for transporting aid supplies and grain to Ukraine, positioning it as a strategic gateway in the restructuring of logistics across Central and Eastern Europe.

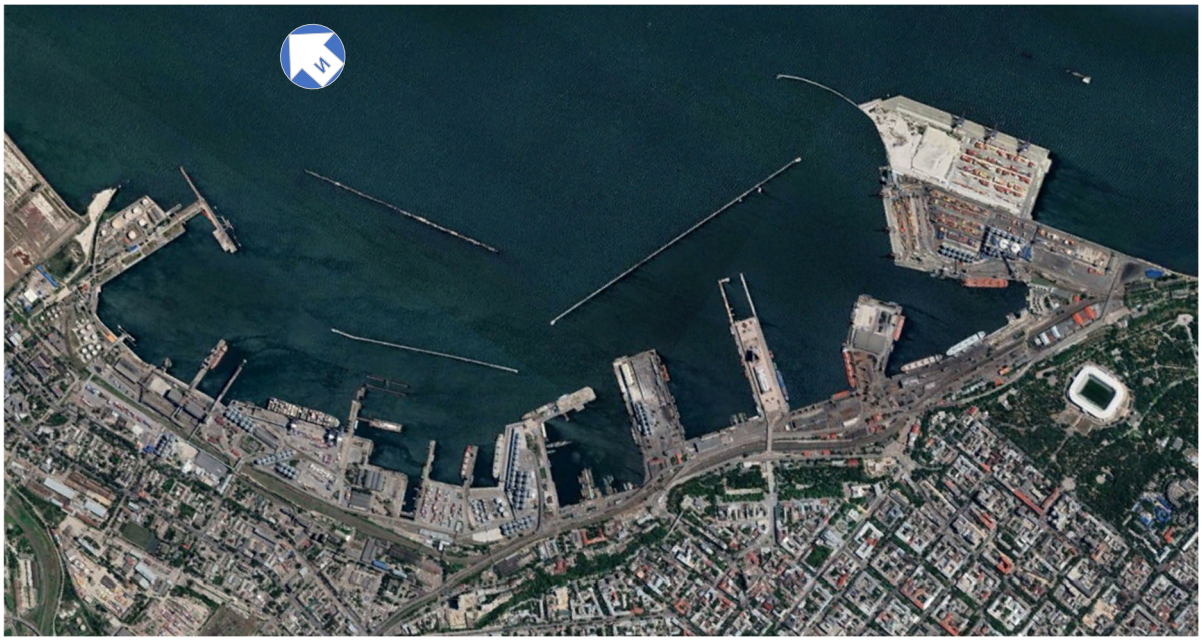
Furthermore, comparative overview tables for each port are presented in Table 3-7 and Table 3-8, and their summaries are provided below.

1) Black Sea Coast

a) Odesa Port (Ukraine)

The Odesa Port, located on the Black Sea coast in southern Ukraine, is one of the country's largest seaports and serves as a national import-export hub under the Ukrainian Sea Ports Authority (USPA). It plays a vital role as a core port supporting the national economy and strategic logistics.

Figure 3-48, the port infrastructure comprises approximately 8–9 km of total berth length with 40–45 berths, and water depths range from 8 to 13.5 m. Although the port area is limited to approximately 140–150 ha, it is equipped with terminal facilities primarily dedicated to grain and general cargo. The port mainly functions as a major grain export hub with large-scale silos. In addition to large quay cranes, belt conveyors, pipelines, harbor cranes, and crane barges, the port is equipped with Quay Gantry Cranes (QGC) and Rubber-Tired Gantry Cranes (RTG), enabling it to handle both containers and bulk cargo.



Source: Google Earth

Figure 3-48 Odesa Port

Table 3-7 Comparative Overview of Target Ports (1/2)

Category		Black Sea						Baltic Sea
Country Name		Ukraine（UA）					Romania（RO）	Poland（PL）
Major Port		Odesa Port	Chornomorsk Port	Pivdennyi Port	Ust-Dunaisk Port	Bilhorod–Dnistrovskyi Port	Constanta Port	Gdansk Port
								
Characteristics		One of the largest seaports under USPA, National import-export hub	Planned deep-water port under USPA, Complementary hub port to Odesa Port	Largest and deepest commercial port under USPA, Core hub for bulk exports	An estuary port on the Kiliya branch of the Danube River under management by USPA, in coordination with the Port of Kiliya	An inland water and regional logistics port in the lagoon at the mouth of the Dniester River under management by USPA	Biggest EU Eastern Seaport Connecting between EU and Asia	Gateway seaport for Central and Eastern Europe on the Baltic Sea
Infra Status	Location	Black Sea coast in southern Ukraine	Black Sea coast in southern Ukraine	Black Sea coast in southern Ukraine	Danube River Mouth (Kiliya)	Odesa Oblast, southern Ukraine	Black Sea coast in eastern Romania	Baltic Sea coast in northern Poland
	Total Berth Length(km)	8-9	6-7	3.0-3.5	0.2-0.3	1.2-1.4	31	24
	Berth Number (nr)	40-45	30	15-18	2-3	9-10	156	41
	Depth (m)	8-13.5	14-16	18-19	5-7	5-7	7-19	10-15 (17.5)
	Port Area (ha)	140-150	300	500	10-15	60-70	3,864	1,066
	Major Terminal	Container, Cereal, Gen. Cargo, RoRo(Roll-on/Roll-off)	Container, Cereal, Gen. Cargo, RoRo	Container, Cereal, Dry-bulk (iron ore and coal), Liquid-bulk, Gen. cargo/Multi-purpose cargo	Cereal, Gen. Cargo (Simple wharves)	Gen. Cargo, Cereal, Multi-purpose	Cereal, Dry/Liquid-bulk, Fuels, Container, Gen. Cargo, RoRo	Container, Crude oil/Petroleum products, Dry/Liquid bulk, LPG(Liquefied Petroleum Gas)/LNG, Cereal, Passenger, Gen. cargo
	Method of Cargo Handling	Large quay cranes, Belt conveyors, Unloaders, Harbor cranes, Crane barges, QGCs(Quay Gantry Crane), RTGs (Rubber-Tired Gantry Cranes)	Large quay cranes, Belt conveyors, Unloaders, Harbor cranes, Crane barges, QGCs, RTGs	Large quay cranes, Belt conveyors, Pipelines, Harbor cranes, Crane barges, QGCs, RTGs	Mobile cranes, Simple gantry cranes, Forklifts, Simple hoppers/chutes	Quay cranes, Harbor cranes, Forklifts, Hoppers/Chutes	Large Jib cranes, Belt Conveyors, Pipelines, HBCs, Crane barges, QGCs, RTGs	Large Jib cranes, Belt Conveyors, Pipelines, HBCs, Crane barges, QGCs, RTGs
	Other Special Facilities	Large-scale silos, 2.5-3km breakwaters	Large-scale silos	Large-scale silos, Storage tanks	None	Indoor warehouses, Open yards	15km North&South breakwaters, Shipbuilding yard	Crude oil & Petroleum storage base
Operation Status	Major Cargo Commodity	Containers, Grains, Metal products, Construction materials, Gen. cargo	Containers, Grains, Metal products, Construction materials, Gen. cargo	Containers, Iron ore, Coal, Minerals, Grains, Chemicals, Liquid bulk	Cereal, Gen. cargo, Construction materials, Feed/Fertilizer (in small bulk quantities)	Cereal, Gen. Cargo, Construction materials, Lumber/Sawn timber	Cereal, Container, Gen. cargo, Ore, Crude oil, Petroleum products, Fertilizer	Crude oil, Petroleum, Gen. cargo, Container, Iron ore, LPG, Cereal, Steel materials
	Annual Cargo Handling Volume (actual)	51.20 mil. tons (2022) 62.00 mil. tons (2023) 97.20 mil. tons (2024)			0.79 mil. tons (2022) 1.68 mil. tons (2023) 0.51 mil. tons (2024)	0.30-0.50 mil. tons (2022) 0.50-0.80 mil. tons (2023) 0.20-0.40 mil. tons (2024)	75.54 mil. tons (2022) 92.69 mil. tons (2023) 77.54 mil. tons (2024)	68.20 mil. tons (2022) 81.00 mil. tons (2023) 77.40 mil. tons (2024)
	Annual Cargo Handling Capacity	50 mil. Tons	25-35 mil. Tons	60-70 mil. Tons	1.0 mil. Tons	2.0-3.0 mil. Tons	100 mil. Tons	115 mil. Tons
	Major Calling Vessel	Handymax、Supramax, -60,000DWT(Deadweight Tonnage) Bulk Carrier, 3000-8000TEU Container Ship, Panamax (Bulk)	Handymax, Supramax, Panamax、Post Panamax (restricted) etc.	Panamax、Post Panamax、Capesize	2000-3000t barge 5000-10000 DWT cargo ship	1000-2500t inland water vessel 2000-5000DWT river/sea vessel 3000-7000DWT small ocean-going vessel	2000-3000t barge/cargo ship～ 220,000DWT cargo ship/tanker	2000-3000t barge/cargo ship～ 300,000DWT cargo ship/tanker
	Operator Number	10	8	7	N/A	1	38	23
	Major Operator	Odesa Marine Trade Port、CTO(Container Terminal Odessa)、Brooklyn Kiev、DPKZO etc.	CSCP(Chornomorsk Sea Commercial Port)、Risoil、Transbulk terminal etc.	DP World、TIS Ore、TIS Coal、TIS Grain、Risoil、OPP(Odesa Port Plant)、TIS Oil etc.	State Enterprise "Sea Commercial Port of Ust-Dunaisk" →Elixir Ukraine	State Enterprise "Bilhorod Dnistrovskyi Sea Commercial Port"	ADM(Archer Daniels Midland)、UMEX、Chimpex、Comvex、Oil Terminal SA、DP World、APM、SOCEP etc.	Baltic Hub、Naftoport、Port Północny、PGCL、Gdansk Bulk Terminal etc.
	Major Trade Country	Import: TR/CN/RO/BG/US Export: CN/ES/IT/TR/EG etc.	Import: TR/CN/RO/BG Export: TR/IT/ES/EG/CN etc.	Import: TR/BG/RO/US Export: CN/ES/IT/TR/EG etc.	Import: RO Export: RO/BG	Import: MD/RO/BG Export: MD/RO/BG/TR	Import: UA/CN/GR/TR/IT Export: EG/TR/ES/IT/HU/RS	Import: NO/SA/US Export: CN/SG/GB/DE/BE/US
Hinterland Access	Railway	broad gauge, Siding available 1000-1500 cars/day	broad gauge, Siding available 900-1400 cars/day	broad gauge, Siding available 1200-1800 cars/day	Underdeveloped	broad gauge, Siding available, 5-10 trains/day	EU gauge, Siding available 300-330 wagons/day (Ore, Crude oil, Petroleum products), 150-330 wagons/day (Cereal)	EU gauge, Siding available 891 wagons/day in whole port
	Road	M-05/M-14/M-16 road connection	Direct connection to main road network via M-27/M-14	Direct connection to main road network via M-14	Local, regional, and state roads only	Local, regional, and state roads only	A2/E81 direct connection, No congestion	A1/S6/S7 road connection
Expandability		Horizontal expansion limited, High expandability through functional upgrades, efficiency improvement, and reorganization	Ample land and water depth allowing for phased expansion, Capacity enhancement of container terminal, Phased expansion of cereal terminal, and Enhancement of RoRo terminal	Few hinterland constraints, Ample water depth and infrastructure capacity, and New terminal expansion plan ongoing	Privatized to Elixir Ukraine from State Enterprise "Sea Commercial Port of Ust-Dunaisk" in 2023	Large-scale expansion limited, focusing on maintenance of function/efficiency improvement. Reported privatization sale to APM.	Enough expansion areas for quay, terminal in the port with some reclamation required, 20% cargo handling capacity able to increase after M/P achieved, Logistics corridor from EU to central Asia been planned	Increasing up to 4.5 million TEU(Twenty-foot Equivalent Unit) container handling by development of Baltic Hub Container Terminal T3, and New cereal terminal project ongoing
Issue & Challenge etc.		Horizontal expansion impossible, Conflicts with urban traffic, Aging infrastructure, and High war risks	War risks (insurance premium up, unstable decisions by shipping companies), Inadequate zoning within the port, and Aging infrastructure	High war risks, Fluctuations in bulk cargo market, and Environmental regulations (dust, chemicals)	Small-scale with limits to capacity expansion, maintaining water depth, and access constraints	Maintenance of water depth and navigation routes, aging facilities and equipment, access constraints, and fragile business viability.	No critical issues for maritime, IWT, railway and road connections, and Some port projects waiting longer for EU funds	Delay of cold ironing, capacity enhancement of external port and railway, mitigation of road congestion, and Response of collection and handling to next fossil fuel cargoes

Note: RO: Romania, TR: Turkey, EG: Egypt, TN: Tunisia, CY: Cyprus, GR: Greece, UA: Ukraine, CN: China, IT: Italy, ES: Spain, BG: Bulgaria, HU: Hungary, RS: Serbia, NO: Norway, SA: Saudi Arabia, US: USA, SG: Singapore, GB: England, DE: Germany, BE: Belgium

Source: Prepared by JICA Survey Team based on field surveys, field interviews, websites of port authorities, port management companies and port operators, and data and information of Danube Commission

Table 3-8 Comparative Overview of Target Ports (2/2)

Category		Danube River					
Country Name		Ukraine（UA）			Moldova（MD）		Romania（RO）
Major Port		Izmail Port	Kiliya Port	Reni Port	Giurgiulesti Port		Galati Port
					Giurgiulesti International Port	Giurgiulesti State-Owned Port	
							
Characteristics		A river port along Kiliya branch under management by USPA	A river port along Kiliya branch of Danube River under management by USPA, regional accumulation base	A river port at the south end of UA under management by USPA	Transshipment port Cross point of road, railway and waterway with UA and RO		Biggest Romanian river port, Shipbuilding/steel mills specialized
Infra Status	Location	90km from Danube River Mouth	40-45km from Danube River Mouth (Kiliya)	128km from Danube River Mouth	133km from Danube River Mouth		140km from Danube River Mouth
	Total Berth Length(km)	3.77	0.15	3.93	0.60 (0.85)	0.15	1.10 (New Basin Port) 1.57 (Docks Port)
	Berth Number (nr)	39	2	37	5 (7)	2	10+13
	Depth (m)	7	3~4	7	57	3~4	7
	Port Area (ha)	108	20-30	94	57	1.2	42+21
	Major Terminal	Cereal, Dry-bulk, Gen. Cargo, Liquid-bulk(LNG), Passenger	Cereal, Gen. Cargo	Cereal, Dry-bulk, Food Oil, Liquid-bulk, LNG, RoRo	Cereal, Dry/Liquid-bulk, Food Oil, Fuel, Gen. Cargo, Container, RoRo	Cereal, Dry-bulk, Gen. Cargo	Cereal, Dry/Liquid-bulk, Heavy cargoes, Petroleum products, Crude oil, Container, Gen. Cargo
	Method of Cargo Handling	Large Jib cranes, Belt Conveyors, Pipelines, HBCs, Crane barges	Quay cranes, Belt Conveyors, Hoppers	Large Jib cranes, Belt Conveyors, Pipeline, HBCs, Crane barges	Mobile cranes、Mobile loaders, Mobile belt conveyors、Pipelines	Mobile cranes、Mobile loaders, Mobile belt conveyors	Large Jib cranes, Belt Conveyors, Pipelines, HBCs, Crane barges
	Other Special Facilities	Ship repair yard, floating dock（PSC Danube Ship Repair）	Simple silos, Warehouses	Waste vessel	Grain silos, Fuel tanks, vegetable oil refinery	-	Shipbuilding yard (Damen/Navron)、Steel mill (Liberty)
Operation Status	Major Cargo Commodity	Cereal, Iron ore, Veg. oil, Steel materials, Petroleum products, LPG, Fertilizer, Coal	Cereal (Wheat, Corn)	Cereal, Fertilizer, Metals, Petroleum products, Container	Cereal/Sunflower seeds, diesel and gasoline, Veg. oil, Construction materials	Cereal, Livestock, Rocks/Stones	Iron ore, Steel products, Petroleum products, Scraps, Cereal
	Annual Cargo Handling Volume (actual)	8.89 mil. tons (2022) 20.26 mil. tons (2023) 13.40 mil. tons (2024)*	0.79 mil. tons (2022) 1.68 mil. tons (2023) 0.51 mil. tons (2024)	6.80 mil. tons (2022) 10.07 mil. tons (2023) 3.43 mil. tons (2024)	1.82 mil. tons (2022) 2.26 mil. tons (2023) 1.80 mil. tons (2024)	0.53 mil. tons (2022) 0.81 mil. tons (2023) 0.42 mil. tons (2024)	4.61 mil. tons (2022) 3.88 mil. tons (2023) 3.27 mil. tons (2024)
	Annual Cargo Handling Capacity	8.50 mil. Tons	1.0 mil. Tons	7.0 mil. Tons	3.5 mil. tons	1.0 mil. tons	10 mil. Tons
	Major Calling Vessel	2000-3000t barge 3000-7000 t River/Sea Va	2000-3000t barge	2000-3000t barge 3000-10000 t River/Sea Va/Vb	2000-3000t barge 3000-10000 t River/Sea Va/Vb	2000-3000t barge	2000-3000t barge 3000-15000 t River/Sea Va/Vb
	Operator Number	8	N/A	12	1 (over 50 tenants)	1	5
	Major Operator	Izmail Commercial Sea Port、EKO、New Energy、Dunaisudoservice etc.	State Enterprise "Sea Commercial Port of Ust-Dunaisk" →Elixir Ukraine	Reni Commercial Sea Port、Reni Line、Reni Elevator、Agro Reni、Reni Lis、Trans-Expo etc.	ICS Danube Logistics (owned by EBRD)	SoE "Ungheni River Port"	Romportment, Trans Europea Port, Docuri, Unicom Oil, Port Bazinul Nou
	Major Trade Country	Import: RO Export: RO/TR(via), EG/TR/TN	Import: RO Export: RO/BG	Import: RO/EG Export: RO/TR(via), EG/TR/TN	Import: RO/TR, Export: RO/CY/GR/TR		Import: TR/CN/IT/BG Export: BG/ES/TR/IT
Hinterland Access	Railway	Russian gauge, Siding available, Unload: 60-100 wagons/day, 280-300 wagons/day (Peak in 2023)	Undeveloped	Russian gauge, Siding available, Unload: 200wagons/day, Load:100wagons/day	Russian/EU (standard) gauge, Siding available 3000t/day (Cereal) 4000t/day (Oils & Fuels)		Russian/EU gauges, Siding available 15-33 wagons/day (Petroleum products) 20-40 wagons/day (Steels & Scrap) 25-50 wagons/day (Cereal/Fertilizer etc)
	Road	M15 road connection (Odesa/Reni)	M15 road connection via Izmail	M15 road connection (Odesa/Reni)	E584 road connection, Road congestion at UA/RO borders		E87 road connection, Close to MD border
Expandability		Larger vessel accommodative, Upgrading existing facilities, Focusing on integration of port function	Privatized to Elixir Ukraine from State Enterprise "Sea Commercial Port of Ust-Dunaisk" in 2023	Feeder barge operation w/ Istanbul port(Import 50/Export 400 TEUs), Phase development of Multi-modal Terminal	No new berth expansion available60 ha high-hinterland available Up to 4.5 mil. tons accommodative at existing port facilities	No new berth expansion available Expansion plan available at the Prut river upstream left bank	Limitation of port hinterland development, Multi-modal Platform Project ongoing under EUI(European Union Initiative) support (TEN-T)
Issue & Challenge etc.		Security risk (drone attacks), Insurance premium rate up in the Danube river routes, and BCP capacity restricted at RO&MD	Vulnerable hinterland access, less expansion areas for port	Deterioration of infrastructure, Security risk (drone attacks), and Insurance premium rate up in the Danube river routes	Limitation of expansion of river waterfront and hinterland, Re-arrangement of hinterland road connections needed, and Differentiation required for nearer ports such as Galati Port and Reni Port		Port modernization possible by redevelopment of existing port area, and railway maintenance required

Note: RO: Romania, TR: Turkey, EG: Egypt, TN: Tunisia, CY: Cyprus, GR: Greece, UA: Ukraine, CN: China, IT: Italy, ES: Spain, BG: Bulgaria, HU: Hungary, RS: Serbia, NO: Norway, SA: Saudi Arabia, US: USA, SG: Singapore, GB: England, DE: Germany, BE: Belgium

Source: Prepared by JICA Survey Team based on field surveys, field interviews, websites of port authorities, port management companies and port operators, and data and information of Danube Commission

The main cargoes are containers, grains, metal products, construction materials, and general cargo. Annual throughput is on an upward trend, with approximately 51.2 million tons in 2022, approximately 62 million tons in 2023, and approximately 97.2 million tons in 2024 (combined figures for the ports of Chornomorsk and Pivdennyi). The nominal handling capacity is approximately 50 million tons. The main vessels calling at the port are Handymax and Supramax bulk carriers, bulk carriers with a maximum deadweight tonnage (DWT) of approximately 60,000 tons, container ships with a capacity of 3,000 to 8,000 twenty-foot equivalent units (TEU), and Panamax bulk carriers. About 10 operators are active within the port.

A broad-gauge railway spur line provides access to the hinterland with a handling capacity of up to 1,000–1,500 cars per day, which also connects to Routes M-05, M-14, and M-16. On the other hand, horizontal expansion is difficult, and the main challenges include conflicts with urban traffic, aging infrastructure, and high war risks; however, there is room for improving efficiency through functional upgrades and reorganization.

b) Chornomorsk Port (Ukraine)

The Chornomorsk Port is a planned deep-water port on the Black Sea coast in southern Ukraine, serving as a complementary hub port to the Odesa Port, under the administration of the USPA. Benefiting from its relatively favorable water depth and land conditions, it functions as one of the major logistics hubs along the Black Sea coast.

Figure 3-49, The port infrastructure comprises approximately 6–7 km of total berth length and 30 berths, with a water depth of 14–16 m, making it one of the deepest ports in Ukraine. The port area spans approximately 300 ha, and the main terminals handle containers, grain, general cargo, and roll-on/roll-off (RoRo) cargo. In addition to large quay cranes, belt conveyors, pipelines, harbour cranes, and crane barges, the port is equipped with QGCs and RTGs, providing a facility system capable of handling both containers and bulk cargo. It features large-scale silos and serves as a major hub for grain exports.



Source: https://ukragroconsult.com/en/news/ukraine-plans-to-concession-the-Chornomorsk Port/

Figure 3-49 Panoramic View of the Chornomorsk Port

The main cargoes are containers, grain, metal products, construction materials, and general cargo. Annual throughput is on an upward trend, with approximately 51.2 million tons in 2022, 62.0 million tons in 2023, and 97.2 million tons in 2024 (combined figures for the Ports of Odesa and Pivdennyi). The nominal handling capacity is approximately 25–35 million tons, and the port can accommodate Handymax, Supramax, and Panamax-class vessels, as well as Post-Panamax-class vessels with certain restrictions. Eight operators are active within the port.

A broad-gauge railway spur with a handling capacity of 900–1,400 cars per day provides access to the hinterland, and Routes M-27 and M-14 connect the port to the main road network . While there is ample land and water depth, allowing for the phased expansion of container, grain, and Ro-Ro terminals, the main challenges include the risk of war, inadequate zoning within the port, and aging infrastructure.

c) Pivdennyi Port (Ukraine)

Pivdennyi Port, located on the Black Sea coast in southern Ukraine, is the country's largest and deepest commercial port and serves as a core hub for bulk exports under the USPA. Leveraging its deep-water conditions and vast hinterland, it excels in handling heavy and bulky cargo among Black Sea ports.

The port's infrastructure features a total berth length of approximately 3–3.5 km and 15–18 berths, with a water depth of 18–19 m, making it the deepest port in Ukraine. The port area spans approximately 500 ha and comprises terminals for containers, grain, dry bulk (iron ore and coal), liquid bulk, and general/multi-purpose cargo. In addition to large quay cranes, conveyor belts, pipelines, harbor cranes, and crane barges, the port is equipped with a sophisticated infrastructure system that includes QGCs and RTGs, as well as large-scale silos and storage tanks.



Source: https://ukragroconsult.com/en/news/ukraine-plans-to-concession-the-Chornomorsk Port/

Figure 3-50 Pivdennyi Port Container and Bulk Terminal (DP World)

The main cargoes are containers, iron ore, coal, minerals, grains, chemicals, and liquid bulk; annual throughput is on an upward trend, with approximately 51.2 million tons in 2022, approximately 62 million tons in 2023, and approximately 97.2 million tons in 2024 (combined figures for the Ports of Odesa and Chornomorsk). The nominal handling capacity is approximately 60–70 million tons, and the port can accommodate Panamax, Post-Panamax, and Capesize-class vessels. Seven major operators, including DP World and companies within the TIS Group, are active within the port.

A broad-gauge railway spur with a handling capacity of 1,200–1,800 railcars per day provides access to the hinterland. Highway M-14 connects the port to the main road network . While there are a few hinterland constraints and plans for new terminal expansion are underway, major challenges include high war risks, fluctuations in the bulk cargo market, and compliance with environmental regulations regarding dust and chemicals.

d) Ust-Dunaisk Port (Ukraine)

The Ust-Dunaisk Port is a small-scale port located at the mouth of the Kiliya River, a tributary of the Danube in southwestern Ukraine. Operating under the USPA, it has functioned as an estuary port in coordination with the Kiliya Port. It serves as a complementary hub connecting Danube waterway transport with the Black Sea coast and operates the terminal consolidation of regional logistics.

Figure 3-51, the port infrastructure consists of approximately 0.2 to 0.3 km of total berth length, 2 to 3 berths, and a water depth of 5 to 7 m, with a small port area of about 10 to 15 ha. The main terminals handle grain and general cargo, and the wharves are of simple construction. Cargo handling operations are low-intensity, utilizing mobile cranes, simple gantry cranes, forklifts, and simple hoppers and chutes; there are no dedicated terminals or specialized facilities.



Source: https://open4business.com.ua/en/state-property-fund-of-ukraine-sold-seaport-Ust-Dunaisk-for-201-million-uah/

Figure 3-51 Cargo Handling at the Ust-Dunaisk Port (Operated by Elixir Ukraine)

The main cargoes are grain, general cargo, construction materials, and fertilizer (in small bulk quantities). Annual cargo throughput has trended at approximately 790,000 tons in 2022, 1.68 million tons in 2023, and 510,000 tons in 2024 (combined figures with Kiliya Port). The nominal handling capacity is approximately 1 million tons, and the main vessels calling at the port are 2,000–3,000-ton barges and small cargo ships in the 5,000–10,000 DWT class. Port operations were privatized from the former state-owned entity, State Enterprise "Sea Commercial Ust-Dunaisk Port," and are currently managed by Elixir Ukraine.

Rail access to the hinterland is underdeveloped, and road access is limited to local, regional, and state roads. Due to its small scale, significant capacity expansion is limited, and maintaining water depth and access remains an ongoing challenge. Going forward, limited, efficient operations based on a division of functions at Kiliya Port will be required.

e) Bilhorod-Dnistrovskyi Port (Ukraine)

The Bilhorod-Dnistrovskyi Port is an inland regional logistics port located within a lagoon at the mouth of the Dniester River in the Odesa Oblast of southern Ukraine. It operates under the USPA and functions as a complementary port supporting inland waterway transport and regional logistics.

Figure 3-52, the port infrastructure consists of approximately 1.2 to 1.4 km of total berth length, 9 to 10 berths, and a water depth of 5 to 7 m, with a port area of approximately 60 to 70 ha. The main terminals handle general cargo, grain, and multipurpose cargo, employing a cargo handling system suited for small- to medium-scale operations, using quay cranes, harbour cranes, forklifts, hoppers, chutes, and other equipment. Ancillary facilities include indoor warehouses and open yards, but specialized terminals are limited.

The main cargoes are grain, general cargo, construction materials, and lumber/sawn timber, with an estimated annual throughput of approximately 300,000–500,000 tons in 2022, approximately 500,000–800,000 tons in 2023, and approximately 200,000–400,000 tons in 2024.



Source: https://open4business.com.ua/en/state-property-fund-of-ukraine-sold-seaport-Ust-Dunaisk-for-201-million-uah/

Figure 3-52 Panoramic View of the Bilhorod-Dnistrovskyi Port

Its nominal handling capacity is approximately 2 to 3 million tons, and the main vessels calling at the port are 1,000–2,500-ton inland waterway vessels, 2,000–5,000 DWT river-sea hybrid vessels, and 3,000–7,000 DWT small ocean-going vessels. A single operator, the SOE "State Enterprise 'Bilhorod-Dnistrovskyi Sea Commercial Port'" manages the operations.

It has a broad-gauge railway spur line providing hinterland access, with a handling capacity of 5 to 10 trains per day; however, road access is largely limited to local and regional roads. The potential for large-scale expansion is limited, and future efforts must focus on maintaining functionality and improving efficiency. The main challenges include maintaining water depth and navigation routes, aging facilities, access constraints, and fragile business viability.

f) Constanta Port (Romania)

The Constanta Port, located on the Black Sea coast in eastern Romania, is one of the largest international seaports in Eastern Europe and serves as a core logistics hub connecting Europe and Asia. It features highly integrated inland waterways, rail, road, and maritime transport networks and functions as a key node in a broader regional corridor.

Figure 3-53, has a total berth length of approximately 31 km and 156 berths, with water depths ranging from 7 to 19 meters to accommodate a variety of vessel types. The port area spans approximately 3,864 hectares and features a wide range of terminal functions, including grain, dry bulk, liquid bulk, fuel, general cargo, containers, and RoRo. In addition to large quay cranes, belt conveyors, pipelines, harbor cranes, and crane barges, the port is equipped with QGCs and RTGs and features a breakwater stretching approximately 15 km north-to-south, as well as a shipyard.

The main cargoes handled include grain, containers, general cargo, iron ore, crude oil, petroleum products, and fertilizers. Annual throughput has remained high, totaling approximately 75.54 million tons in 2022, 92.69 million tons in 2023, and 77.54 million tons in 2024. The port's nominal handling capacity is approximately 100 million tons, and it can accommodate vessels ranging from 2,000–3,000-ton barges to large cargo ships and tankers of up to 220,000 DWT. Thirty-eight operators are active within the port, forming a high concentration of activity in the grain, energy, and container sectors.

Access to the hinterland is facilitated by numerous EU-gauge railway sidings, providing a handling capacity of 300–330 railcars per day for ore, crude oil, and petroleum products, and 150–330 railcars per day for grain. The port is directly connected to the A2/E81 highway, and traffic congestion is minimal.



Source: https://www.portofconstantza.com/pn/ro/home

Figure 3-53 Constanta Port

In the future, a capacity increase of over 20% is expected following the completion of the MP through quay and terminal expansions, including land reclamation, and the EU-Central Asia Corridor initiative is currently underway. However, some projects remain pending EU funding.

2) Baltic Sea Coast

a) Gdansk Port (Poland)

The Gdansk Port, located on the Baltic Sea coast in northern Poland, serves as the gateway port for Central and Eastern Europe and functions as a major hub port in the Baltic Sea region. In addition to

intra-European logistics, it serves as an international logistics hub connecting Northern Europe, the Middle East, and the United States with Central Europe, Eastern Europe, and inland Europe.

The port infrastructure comprises 41 berths with a total length of approximately 24 km and a water depth of 10–15 m (scheduled to be deepened to 17.5 m in the future), providing the capacity to handle large vessels. The port area spans approximately 1,066 hectares and features diverse terminal functions, including container, crude oil and petroleum products, dry bulk, liquefied petroleum gas (LPG)/LNG, grain, liquid bulk, passenger, and general cargo. In addition to advanced cargo handling equipment such as large quay cranes, belt conveyors, pipelines, QGCs, and RTGs, the port features a large-scale storage facility for crude oil and petroleum products.

The main cargoes are crude oil and petroleum products, containers, general cargo, coal, ore, LPG, grain, and steel products, with annual throughput remaining at a high level: approximately 68.2 million tons in 2022, approximately 81 million tons in 2023, and approximately 77.4 million tons in 2024. The port's nominal handling capacity is approximately 115 million tons, and it can accommodate vessels ranging from 2,000–3,000-ton barges to large cargo ships and tankers of up to 300,000 DWT. Twenty-three operators are active within the port.



a. Inner Port　　b. Outer Port

Source: https://www.portGdansk.pl/en/

Figure 3-54 Gdansk Port

Access to the hinterland is facilitated by numerous EU-gauge railway facilities, providing the port with a total handling capacity of up to 891 railcars per day. Road connections link to the A1, S6, and S7 highways. In addition, container handling capacity is scheduled to expand to 4.5 million TEU with the development of the Baltic Hub Container Terminal T3, and a new grain terminal project is also underway. On the other hand, key challenges include delays in electrification, expanding rail capacity in the outer port area, addressing traffic congestion, and transitioning to non-fossil fuel-based freight.

3) Danube River Basin

a) Izmail Port (Ukraine)

The Izmail Port is a river port located on the Kiliya tributary of the Danube River in southwestern Ukraine, situated approximately 90 km upstream from the Danube estuary (Sulina). Operated under the management of the USPA, it serves as a vital logistics hub connecting the Black Sea and Mediterranean regions with the inland Danube region.

The port infrastructure comprises a total berth length of approximately 3.77 km, 39 berths, and a water depth of approximately 7 m, with a port area of approximately 108 ha.

The main terminals handle grain, dry bulk, general cargo, liquid bulk (LNG), and passengers. They can handle a variety of cargo handling methods, including large quay cranes, belt conveyors, pipelines, harbour cranes, and crane barges. A shipbuilding and repair yard and a floating dock (PSC Danube Ship Repair) are also on-site.

The main cargoes are grain, iron ore, vegetable oil, steel products, petroleum products, LPG, fertilizers, and coal. Annual throughput has trended at approximately 8.89 million tons in 2022, 20.26 million tons in 2023, and 13.40 million tons in 2024. The nominal handling capacity is approximately 8.50 million tons, and operations exceed capacity during peak periods. The main vessels calling at the port are 2,000–3,000-ton barges and 3,000–7,000-ton river/sea vessels, with eight operators active within the port.

Access to the hinterland is provided by a standard-gauge railway spur and Route M15. While future improvements in functionality are possible through maintenance dredging, enhanced surveillance and security, and the renewal of existing facilities, key challenges include security risks, rising war risk premiums on shipping routes, and constraints on BCP processing capacity on the Romanian side.



Source: https://www.lloydslist.com/LL1142135/Ukraine%E2%80%99s-Danube-ports-export-over-4m-tonnes-of-grain

Figure 3-55 Izmail Port

b) Kiliya Port (Ukraine)

The Kiliya Port is a small river port along the Kiliya tributary of the Danube River in southwestern Ukraine and has functioned as a regional hub under the USPA. Situated approximately 40 to 45 km upstream from the mouth of the Danube (Kiliya), the port's primary purpose is to handle grain shipments from the surrounding agricultural areas.

The port infrastructure has two berths with a total length of approximately 0.15 km and a water depth of 3 m to 4 m. The port area is limited to about 20 ha to 30 ha. The main terminals handle grain and general cargo using a simple cargo-handling system consisting of quay cranes, belt conveyors, and hoppers. Although simple silos and warehouses are available as ancillary facilities, the port lacks large-scale dedicated terminals and specialized facilities.

The primary cargo consists of grains such as wheat and corn, with annual throughput totaling approximately 790,000 tons in 2022, 1.68 million tons in 2023, and 510,000 tons in 2024 (combined figures with Ust-Dunaisk Port). The nominal handling capacity is approximately 1 million tons, and vessels calling at the port are limited to 2,000-ton to 3,000-ton barges. The former state-owned entity, State Enterprise "Sea Commercial Ust-Dunaisk Port," previously managed port operations in Ust-Dunaisk, While Elixir Ukraine currently handles them.



Source: Wikipedia

Figure 3-56 Kiliya Port

Rail access to the hinterland is undeveloped, and road access is limited to a connection to Highway M-15 via Izmail. Although privatization in 2023 has created opportunities for operational efficiency, the vulnerability of hinterland access and constraints on available land for port expansion remain major challenges for future functional expansion.

c) Reni Port (Ukraine)

The Reni Port is a river port located on the Danube River in the southernmost part of Ukraine, situated approximately 128 km upstream from the Danube estuary (Sulina). Operated under the management of the USPA, functioning as a logistics hub connecting the inland Danube region with the Black Sea and Mediterranean regions.

Figure 3-57, The port infrastructure comprises a total berth length of approximately 3.93 km, 37 berths, a water depth of approximately 7 m, and a port area of approximately 94 ha. The main terminals handle grain, dry bulk, liquid bulk, edible oil, LNG, and RoRo cargo. They feature a variety of cargo handling methods, including large quay cranes, belt conveyors, pipelines, harbor cranes, and crane barges. The port also features specialized facilities capable of handling waste ships.

The main cargoes are grains, fertilizers, metals, petroleum products, and containers; annual throughput was approximately 6.8 million tons in 2022, approximately 10.07 million tons in 2023, and approximately 3.43 million tons in 2024. The nominal handling capacity is approximately 7 million tons. The main vessels calling at the port are 2,000- to 3,000-ton barges and 3,000- to 10,000-ton river/sea vessels, and 12 operators are active within the port.



Source: Marine Traffic

Figure 3-57 Reni Port

The port has a broad-gauge railway spur line providing hinterland access, with a handling capacity of 200 railcars per day for unloading and 100 per day for loading, connected to Odesa and Izmail via Route M15. In the future, the port will expand its functions by operating feeder barge services to the ports of Constanta and Istanbul, as well as by phasing in the development of a multimodal terminal. On the other hand, the main challenges include aging infrastructure, security risks, and rising war risk premiums on shipping routes.

d) Giurgiulesti Port (Moldova)

Giurgiulesti Port, Moldova's only port, is a river port located at the confluence of the Danube and Prut rivers. It consists of the "GIFP," operated by Danube Logistics, and the "Giurgiulesti Public Port," operated by the SOE Ungheni River Port.

<Giurgiulesti International Free Port (GIFP)>

GIFP is a transshipment port located on Danube River in southern Moldova and serves as a strategic hub where cross-border road, rail, and water transport routes to Ukraine and Romania converge. Situated approximately 128 km upstream from the Danube estuary (Sulina), it functions as a key node in the regional logistics corridor.

Figure 3-58, the port infrastructure comprises a total berth length of approximately 0.60 km (planned to be expanded to 0.85 km in the future), 5 berths (planned to be 7), a water depth of 5–7 m, and a port area of approximately 57 ha. The main terminals handle a diverse range of cargo, including grain, dry bulk, liquid bulk, edible oil, fuel, general cargo containers, and Ro-Ro, and feature flexible cargo handling methods such as mobile cranes, belt conveyors, pipelines, and mobile loaders. The port has ancillary facilities such as grain silos, oil storage facilities, and an edible oil refinery.

The main cargoes are grains (sunflower seeds), diesel and gasoline, edible oils, and construction materials; annual throughput has fluctuated around 1.82 million tons in 2022, 2.26 million tons in 2023, and 1.80 million tons in 2024. The nominal handling capacity is approximately 3.5 million tons, and the main vessels calling at the port are 2,000–3,000-ton barges and 3,000–10,000-ton river/sea vessels. The operator is ICS Danube Logistics (wholly owned by the EBRD), and the facility houses over 50 tenants.



Source: https://gifp.md/en/

Figure 3-58 Giurgiulesti International Free Port (GIFP)

The hinterland is connected by a railway spur capable of handling both broad-gauge and EU-gauge trains, with a daily handling capacity of 3,000 tons of grain and 4,000 tons of oil and fuel. The port connects to Highway E584. However, traffic congestion occurs on the border.

New berth expansion is limited by waterfront and land constraints. However, capacity can expand to approximately 4.5 million tons by utilizing approximately 60 hectares of elevated land in the hinterland. The key challenges are reorganizing access and differentiating the port from the neighboring ports (Galati Port and Reni Port).

<Giurgiulesti Public Port>

The Giurgiulesti Municipal Port is a small transshipment port located on the banks of the Danube River in southern Moldova, situated at a hub where road, rail, and water transport connecting to Ukraine and Romania intersect. Located approximately 128 km upstream from the Danube estuary (Sulina), it complements regional logistics.

Figure 3-59, the port infrastructure consists of two berths with a total length of approximately 0.15 km and a water depth of 3–4 m, while the port area is extremely limited at approximately 1.2 ha. The main terminals handle grain, dry bulk, and general cargo. The cargo handling system consists of a simple setup using mobile cranes, mobile loaders, and mobile belt conveyors. No special facilities are present.

The main cargoes are grain, livestock, and stone, with annual cargo volumes trending at approximately 530,000 tons in 2022, 810,000 tons in 2023, and 420,000 tons in 2024. The nominal handling capacity is approximately 1 million tons, and the main vessels calling at the port are limited to 2,000–3,000-ton barges. Operations are managed by a single operator, Ungheni River Port (a SOE). The main importing partners are Romania and Turkey. Exporting partners are Romania, Cyprus, Greece, and Turkey.



Source: Google Earth

Figure 3-59 Giurgiulesti Public Port

For hinterland access, the port has a railway spur compatible with both standard gauge and EU gauge, as well as Route E584; however, chronic traffic congestion occurs in the border area. While new berth expansion is difficult due to constraints on the waterfront and hinterland land, expansion plans on the left bank of the upper Prut River are under consideration. Future challenges will be reorganizing hinterland access and differentiating the port from the neighboring ports such as Galati and Reni.

e) Galati Port (Romania)

The Galati Port is one of Romania's largest river ports and an industrial port specializing in shipbuilding, steel, and chemical fiber-related industries. Located approximately 140 km upstream from the Danube estuary (Sulina) along the Danube River, it serves as a vital hub connecting inland industrial zones with the Black Sea region.

Figure 3-60, the port infrastructure consists of two port areas: New Basin Port and Docks Port. The total berth length is approximately 1.10 km and 1.57 km, with 10 and 13 berths, and a water depth of approximately 7 m. The port area covers approximately 42 ha for New Basin Port and approximately 21 ha for Docks Port, featuring diverse terminal functions for grain, dry bulk, liquid bulk, heavy cargo, petroleum products, crude oil, containers, and general cargo. In addition to facilities such as large quay cranes, belt conveyors, pipelines, harbor cranes, and crane barges, large-scale industrial facilities, such as shipyards (Damen/Navrom) and steel mills (Liberty), are located here.

The main cargoes are iron ore, steel products, petroleum products, steel materials, scrap, and grain, with annual throughput of approximately 4.61 million tons in 2022, approximately 3.88 million tons in 2023, and approximately 3.27 million tons in 2024. The nominal handling capacity is approximately 10 million tons, and the main vessels calling at the port are 2,000–3,000-ton barges and 3,000–15,000-ton river/sea vessels. Five operators are active within the port.



Source: https://www.danube-ports.ro/bazinulnou_en.html

Figure 3-60 Galati Port

Access to the hinterland is through a broad-gauge railway siding compatible with EU gauge and National Road E87. Although port land is limited, there is potential for modernization through redevelopment, and a TEN-T multimodal platform project is underway at New Basin Port. Meanwhile, the maintenance and renewal of railway infrastructure remain major challenges.

(2) Overview of Water Transport

The water transport routes covered in this study are the route from the Giurgiulesti Port to the Sulina Canal to the Constanta Port, and the route from the Giurgiulesti Port to the Danube-Black Sea Canal to the Constanta Port.

The former route runs from the Giurgiulesti Port down the Danube River, through the Dornești Canal, then the Constanta Port; it is an international waterway corridor primarily consisting of natural waterways that connects directly to the Black Sea via the Danube estuary. Since it does not require passing through locks and the navigation distance is relatively short, it offers excellent transport efficiency and is well-suited for the bulk transport of grain and other bulk cargo. Following Russia's invasion of Ukraine, its importance as an alternative export route to Black Sea ports has rapidly increased, making it a major route comprising the EU's "Solidarity Lanes."

On the other hand, it faces operational constraints due to bottlenecks in transport capacity from insufficient water depth, traffic congestion at the river mouth, and dependence on weather conditions and navigation management. The latter route involves sailing upstream from Giurgiulesti along the main Danube River, proceeding via the Danube-Black Sea Canal, and arriving at the Port of Constanta. It is a planned inland waterway corridor with an artificial canal, functioning as an alternative route that avoids congestion and safety risks at the Black Sea estuary. Since navigation conditions are stable along the canal section, offering excellent punctuality and safety, it is suitable for intra-EU logistics and medium- to long-distance transit transport. On the other hand, waiting times at locks, canal width, vessel-size restrictions, and tolls affect transport efficiency, necessitating a division of functions, with the estuary route for high-volume transport. Figure 3-61 shows the locations and overviews of each route below.

1) Giurgiulesti Port–Sulina Canal–Constanta Port Route

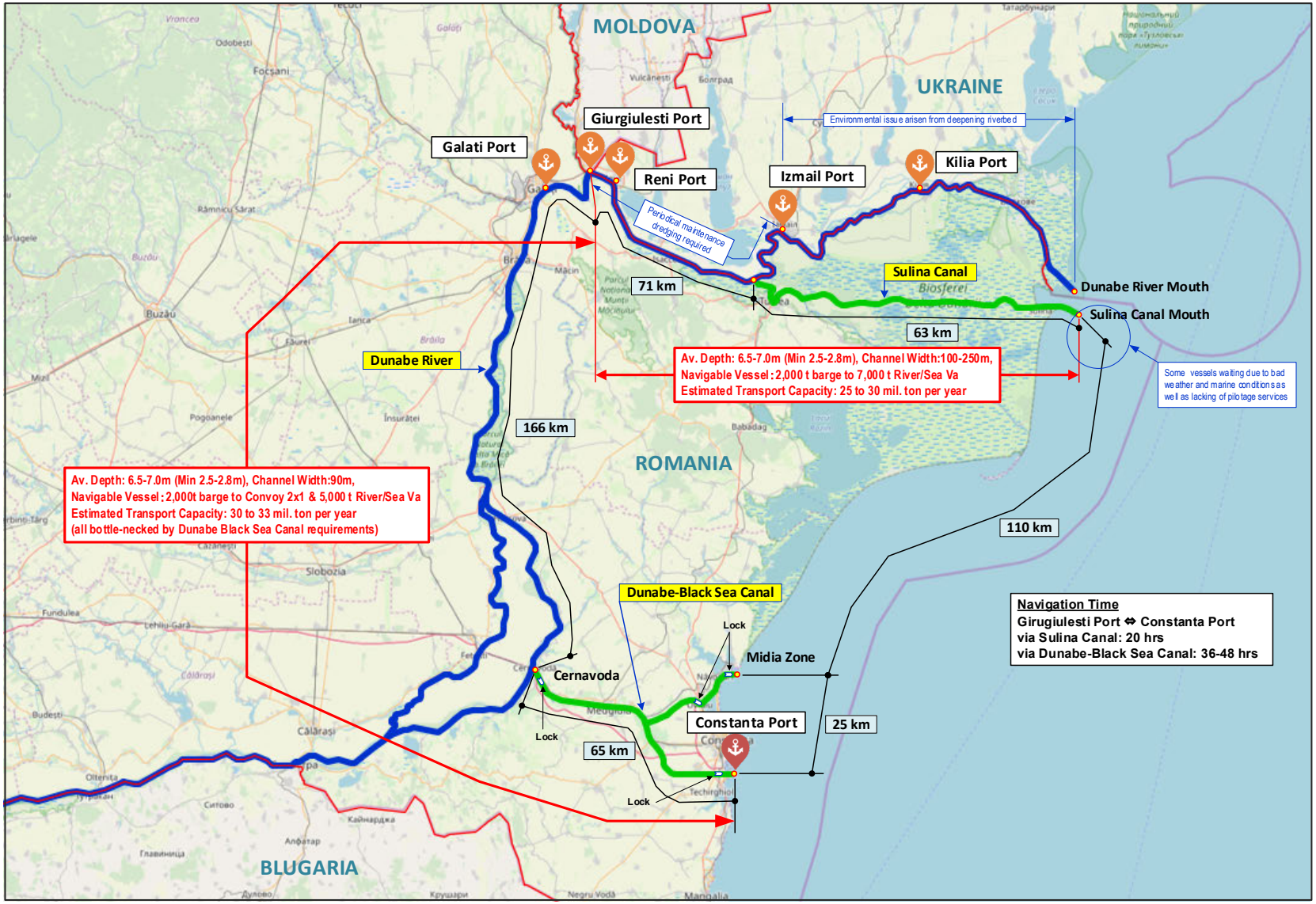
The Port of Giurgiulesti to Sulinaă Canal and Canal to Constanta Port route is an internationally significant combined inland waterway and maritime transport route that directly connects the Danube River basin with the Black Sea, serving as a strategic corridor for the bulk transport of grain, minerals, container cargo, and other goods. The waterway conditions along this route ensure a water depth of 6.5 to 7.0 meters and a minimum channel width of approximately 100 meters, allowing navigation of 7,000-ton-class river/sea vessels (Va class). The theoretical annual transport capacity is approximately 25 to 30 million tons. With a navigation distance of approximately 289 km and an average voyage time of about 20 hours, it offers relatively high transport efficiency for an inland waterway.

On the other hand, several technical and operational challenges prevent the stable and sustainable operation of this route. First, in the section from the Giurgiulesti Port to the Izmail Port, riverbed

fluctuations and sedimentation are significant, making regular dredging essential to maintain the required water depth. Consequently, rising maintenance costs and the disposal of dredged material have become critical issues.

Furthermore, in the Sulina Canal, navigation restrictions are likely to occur during adverse weather and sea conditions. In addition, reports of vessels waiting offshore or experiencing delays exist due to factors such as a shortage of pilots. These issues reduce the punctuality and reliability of transport, thereby affecting the overall efficiency of logistics. Furthermore, deepening the Kiliya tributary might change flow conditions, impacting wetlands and ecosystems; therefore, careful impact assessments and continuous monitoring are necessary from an environmental conservation perspective.

In light of the above, when enhancing the functionality of this route, it is essential to optimize dredging plans to maintain the waterway, improve canal systems, and formulate a phased development policy that accounts for environmental impacts. Also, comprehensive waterway management through international cooperation is necessary.



Source: Prepared by the survey team based on the Danube Commission Portal Map

Figure 3-61 Location and Overview of the Waterway in Question

2) Route from the Giurgiulesti Port to the Constanta Port via the Danube-Black Sea Canal

The route from the Giurgiulesti Port to the Constanta Port via the Danube-Black Sea Canal is one of the major inland waterway and maritime combined transport routes connecting the Danube River basin and the Black Sea coast. It is a vital logistics corridor responsible for the bulk transport of grain, minerals, and general cargo. The waterway conditions along this route ensure a water depth of 6.5 to 7.0 meters, and the minimum width of the locks in the Danube-Black Sea Canal section is approximately 90 meters.

Consequently, the size of vessels capable of navigating the route is limited to Convey 2×1 barge convoys and 5,000-ton-class river/sea vessels (Va class).

The annual transport capacity of this route is approximately 30–33 million tons, and the navigation distance is approximately 231 km. However, because passage through locks is necessary in the canal section, a voyage generally takes 36 to 48 hours, and compared to routes that use only natural river sections, the travel time tends to be relatively longer. In particular, during periods of high vessel traffic or when operational constraints arise in the canal, waiting times may occur in front of the locks, which could affect transport efficiency and punctuality.

The greatest challenge of this route lies in the presence of canal locks, which impose structural constraints on the waterway width, the size of vessels that can navigate it, and transport capacity. Since the width of the locks determines the maximum size of vessels, there are limits to the introduction of large vessels and the expansion of transport units; therefore, future increases in cargo demand require operational improvements and innovations in the transport system. Furthermore, since the operational efficiency and maintenance status of the locks can become a bottleneck for the entire route, it is crucial to establish appropriate operational plans and maintenance systems.

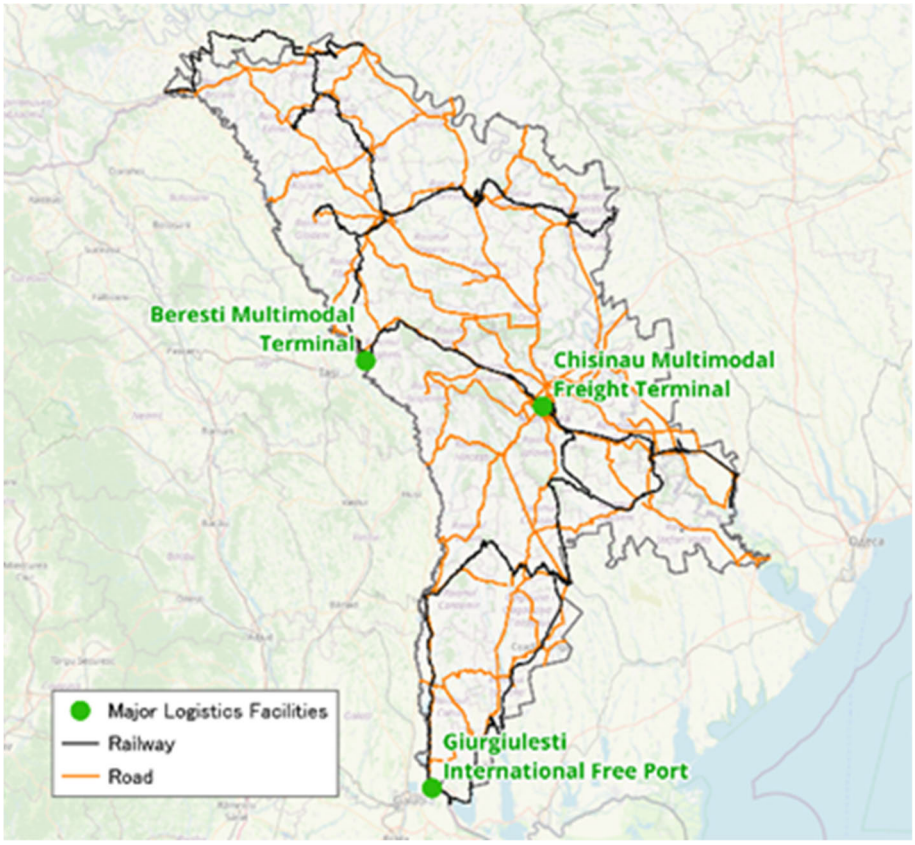
In summary, while this route provides a certain level of transport capacity, it also has physical and operational constraints stemming from the canal locks, necessitating a strategic positioning that accounts for the division of functions and complementary relationships with other routes.

3.3.4 Other Logistics-Related Infrastructure along Major Import and Export Routes

Moldova's logistics infrastructure currently operates primarily through the GIFP, the country's only international trade port. In addition, plans are underway to construct the Bereşti Multimodal Terminal and the Chişinău Multimodal Freight Terminal to streamline and diversify the logistics network.

In addition to developing these major transportation hubs, efforts are underway to build an industrial base. To attract investment and revitalize the regional economy, the Moldovan government has established three frameworks: Free Economic Zones (FEZ), Industrial Parks (IP), and Multifunctional Platforms (MIP). FEZs are designated areas separated from the customs territory, with a primary focus on export-oriented production and development. Their most significant feature is strong preferential tax and customs measures, including corporate tax reductions or exemptions and exemptions from import duties and VAT.

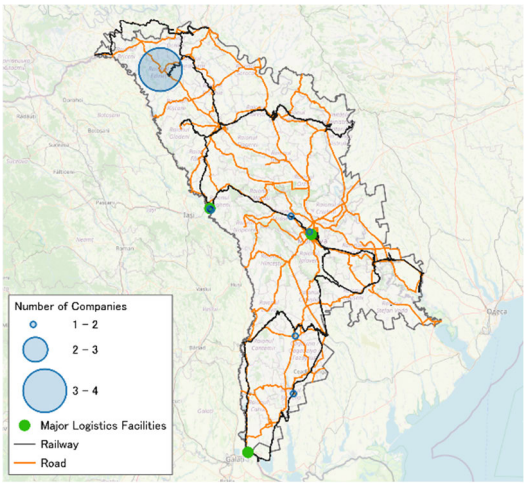
Meanwhile, IPs are zones that provide land with fully developed infrastructure, enabling companies to commence operations quickly. Investors can purchase land at a fixed price and receive administrative and legal support, such as assistance with obtaining permits, thereby reducing operational costs and risks. Finally, the MIP is a new project launched in 2020 to revitalize regions lagging in industrialization. By developing infrastructure primarily in undeveloped areas, it aims to enhance industrial potential and create jobs.



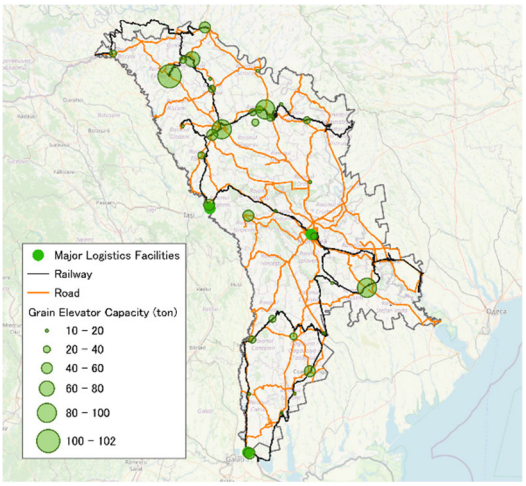
Source: Prepared by the research team based on interview results

Figure 3-62 Location of Logistics Hubs

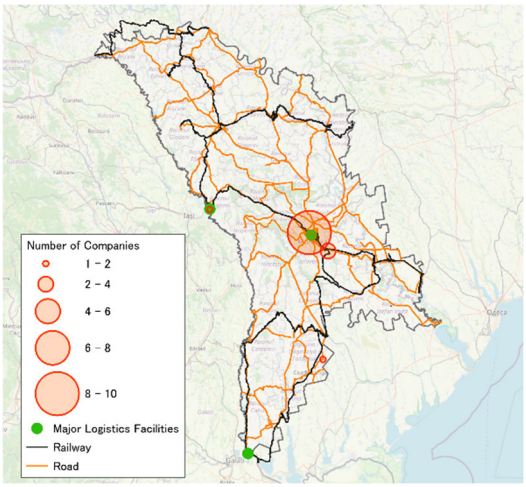
The figure below summarizes the sectoral distribution of tenant companies in FEZs and Ips. Two of three frameworks have corporate production activities underway. While there is a high concentration in the central area (around Chișinău), the layout and distribution of facilities reflect the characteristics of each sector. In particular, agriculture-related products are concentrated relatively in the north.



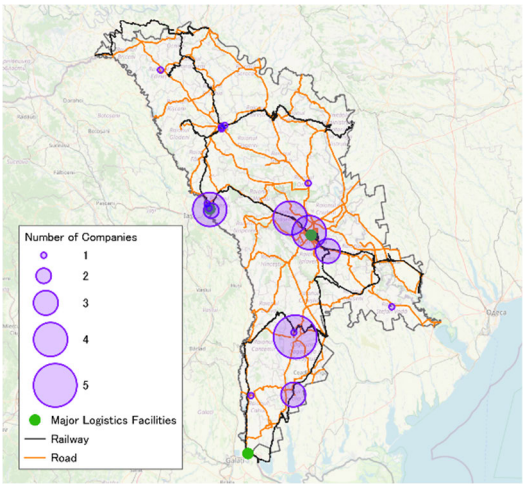
Agriculture industry



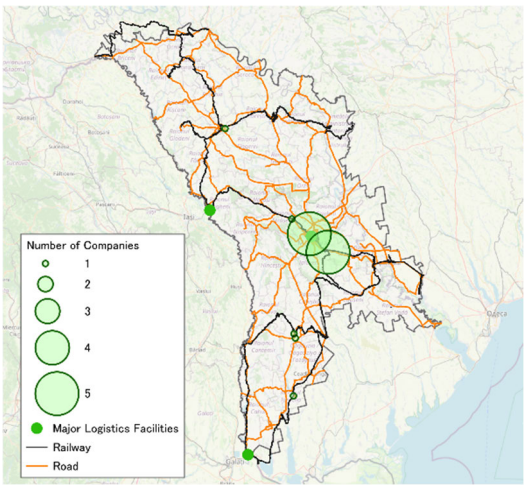
Capacity of grain elevators



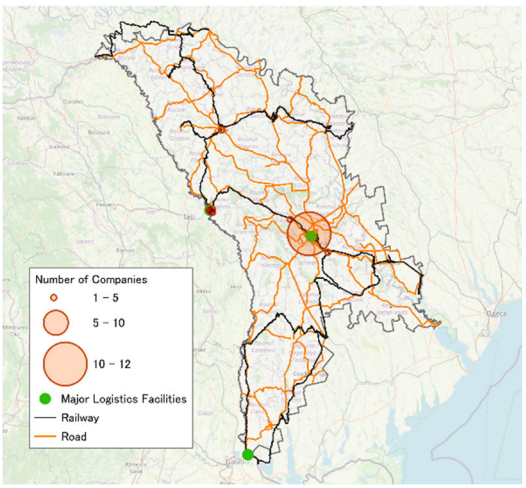
Chemical industry



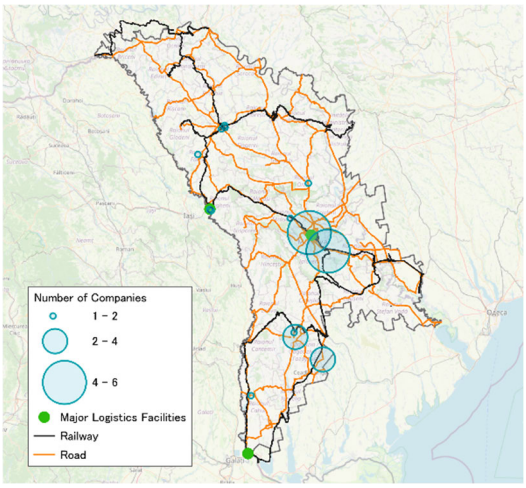
Construction industry



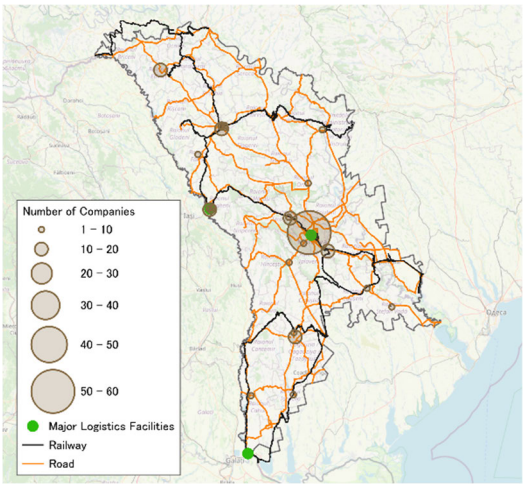
Construction materials industry



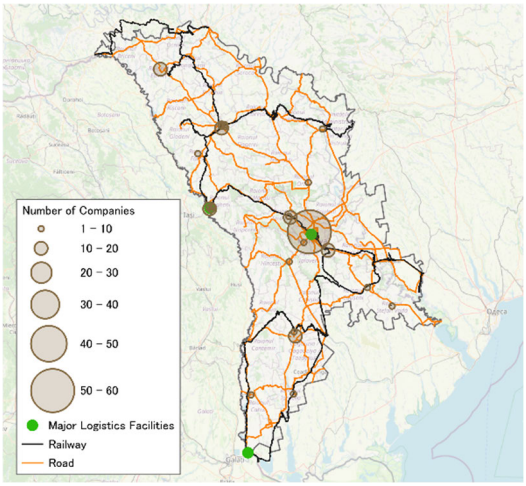
Light industry



Food industry



Manufacturing industry



(Reference) Location of Multifunctional Platforms

Source: Prepared by the research team based on interview results

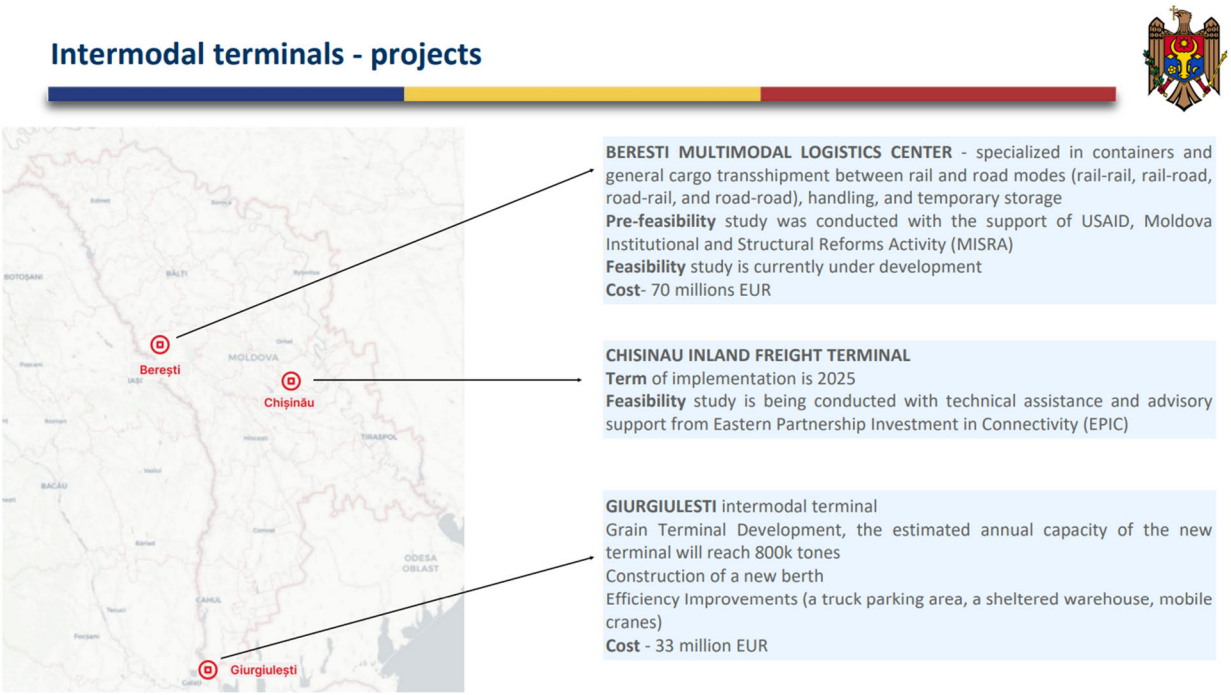
Figure 3-63 Number of Companies in FEZs and IPs and Grain Storage Capacity

3.4 Support Trends of the EU and Other Donor Agencies

3.4.1 Support Trends of Other Aid Agencies in Moldova and Ukraine

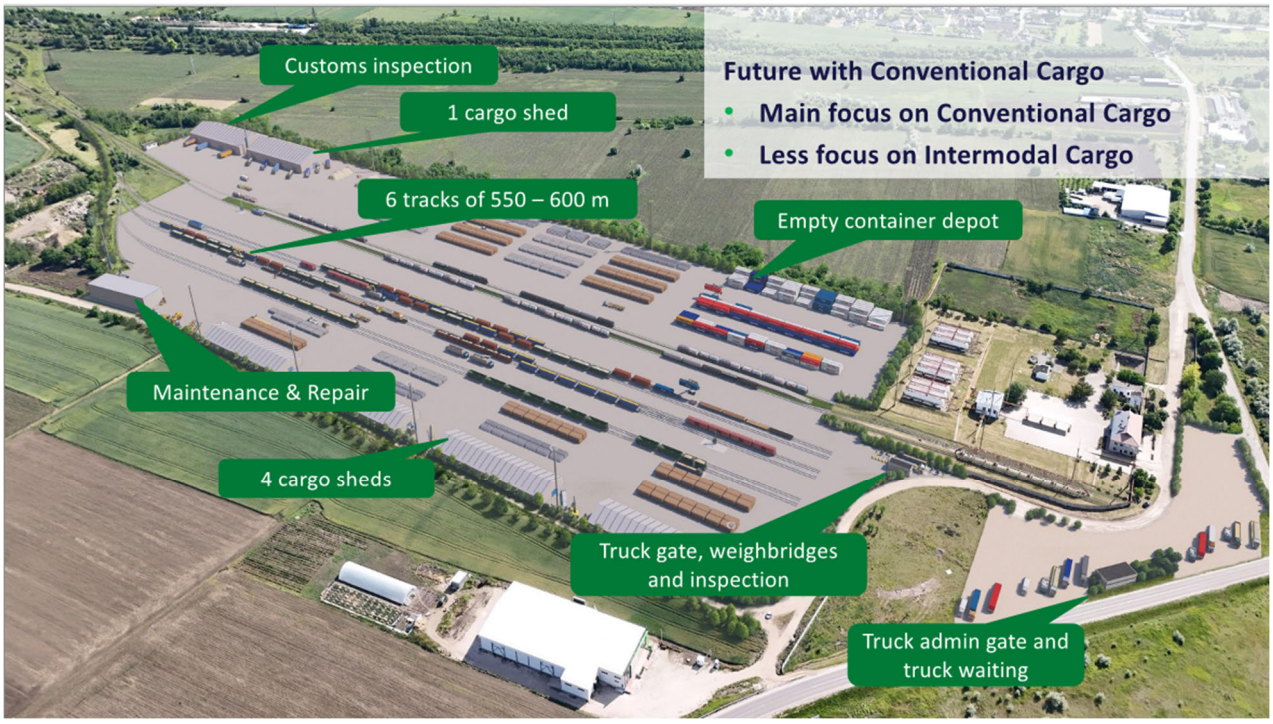
(1) Logistics in General

Under the EaP, the EU is providing a wide range of support, including roads, railways, and port renovation and development, to strengthen Moldova's logistics capabilities. In addition to this sector-specific support, the EU is also supporting the development of intermodal terminals to complement each sector. Specifically, there are terminal development plans in Berești (Ungheni), Chișinău, and a Pre-Feasibility Study (Pre-FS) is already complete for Berești (Ungheni).



Source: Growth Plan and Reform and Growth Facility for the Western Balkans, Mauro di Veroli
https://jaspers.eib.org/files/activities/2024/presentations-session-3.pdf

Figure 3-64 Intermodal Terminal Development Plan



Source: U.S. Agency for International Development (USAID)

Figure 3-65 Plan of the Bereşti Multimodal Terminal

(2) Railway Sector

1) Moldova

International support for Moldova's railway sector is proceeding in two phases: emergency rehabilitation to address the aging of the former Soviet-style broad-gauge (1,520 mm) network, and integration into the EU network through the medium- to long-term introduction of European standard gauge (1,435 mm).

a) Infrastructure and Rolling Stock Support Led by the EBRD and EIB

The EBRD and EIB are the largest donors supporting CFM restructuring and modernization. The two institutions are jointly financing the "CFM Restructuring Project," which has so far enabled the procurement of 12 new mainline diesel locomotives (TE33AC) and the renovation of locomotive depots. In addition, the two banks have provided approximately €113 million in financing for track rehabilitation on the Southern Corridor (between Tighina, Basarabeasca, and Giurgiulesti), which has gained strategic importance as an export route for Ukrainian grain (the "Solidarity Lanes"); construction is currently underway. Furthermore, expanded support includes emergency repairs on the Northern and Central Corridors (Valcinet–Oknytsia–Bălți–Ungheni–Chișinău–Cănari).



Source: JICA Survey Team

Figure 3-66 Track under Improvement as Part of the Southern Corridor Rehabilitation Project Currently Being Implemented with Support from the EBRD, EIB, and EU

b) EU Institutional Integration and Interoperability Enhancement (JASPERS)

As part of the "Solidarity Lanes" initiative, the EU formulated the "Strategy for the Integration of the Ukrainian CFM System into the EU" through JASPERS, the EIB's technical advisory body. This strategy proposes the construction of a European standard-gauge (1,435 mm) backbone line within Moldova, with the standardization of the section connecting the capital, Chișinău, to the Romanian border (Ungheni) identified as the top priority. In addition, EU "Connecting Europe Facility (CEF)" funds are being utilized for the electrification project on the connecting Romanian side (between Iași and Ungheni).

c) Trends in Bilateral Aid Agencies

- France (AFD): With financial support from the AFD, a "Roadmap for Railway Sector Reform and Modernization" was formulated, aiming to separate CFM's management and bring it into compliance with EU standards. Furthermore, the French government has signed a Letter of Intent (LOI) for approximately €50 million in support of the rehabilitation of the Central Corridor (Chișinău–Ungheni). (Note: Following the LOI, the project has not progressed, and in the meantime, the EBRD and EIB have decided to provide support for the renovation of the Central Corridor.)
- United States (USAID): USAID (now dissolved) supported an F/S to develop a multimodal logistics center at the Berești Station near Ungheni through the "Moldova Institutional and Structural Reforms Activity (MISRA)" program, thereby eliminating logistics bottlenecks at the border.
- U.S. Department of State (CFM Surveillance and Communications System Modernization Project under the U.S. EXBS Program): In response to increased freight traffic from Ukraine and geopolitical threats, a project to modernize surveillance and communications systems—aimed at ensuring the security of CFM's strategic routes—is currently underway with support from the U.S. Department of State (EXBS Program). State-of-the-art equipment, including thermal imaging cameras, GPS tracking, and access control systems, is being installed at 12 locations and on mainline locomotives along the "Southern Loop," a critical logistics route connecting Ukraine and Romania. The project is currently in its final implementation phase. At seven of the 12 target locations, including Chișinău, installing key equipment and wiring is complete. The project is now awaiting import approval for long-range cameras and the activation of communication lines for real-time monitoring. This project will establish a real-time freight transport monitoring system independent of existing aging infrastructure and lay the foundation for a secure railway security network for future nationwide expansion.
- Poland: To address the shortage of freight cars, discussions are underway for a Polish aid loan to procure more than 3,000 freight cars.
- Japan (METI): With a view to medium- to long-term EU integration, METI is supporting an F/S on the development of a European standard gauge (1,435 mm) railway line from Ungheni to Bălți and Oknytsia in the north.

2) Ukraine

Since Russia invaded Ukraine, support for the country's railway sector has focused on the emergency expansion of "westbound routes" to compensate for the blockade of Black Sea ports, as well as standard-gauge conversion for post-war reconstruction and EU integration.

a) EU, EIB, and EBRD "Solidarity Lanes" Support and Reconstruction Funding

- EU (European Commission): The EU has contributed €1 billion to the "Solidarity Lanes" initiative, which supports Ukraine's agricultural exports and other efforts. Furthermore, similar to Moldova, the EU, based on the JASPERS strategy, is promoting the phased introduction of a 1,435 mm standard-gauge network in Ukraine (extending from the Polish border toward Lviv and Kyiv).
- EIB: As part of its pre-war support, the EIB provided a €150 million loan for the procurement of grain hopper cars and established the "EU-Ukraine Gateway Trust Fund." Post-war, it has established a framework to provide financial support for larger-scale infrastructure reconstruction.
- EBRD: While it had previously provided loans for the electrification of the Southern Corridor (between Dorynska and Mykolaiv) and the procurement of new locomotives, following the invasion, it provided emergency liquidity support to maintain UZ's operations. Additionally, support for procuring Alstom electric locomotives using a French credit line is under consideration.

b) Strengthening Border Connections through the Connecting Europe Facility (CEF)

To eliminate the physical barrier of the gauge difference (break-of-gauge) between Ukraine and EU member states, projects to upgrade border facilities with CEF grants are underway. Specifically, projects include the construction of a new 1,435 mm track connecting Chop and Uzhhorod (22 km) on the Slovakia-Hungary border, as well as major repairs to the 1,435 mm track at Vadul Siret Station on the Romanian border.

c) Emergency Equipment Provision and Bottleneck Relief by the U.S. (USAID) and Others

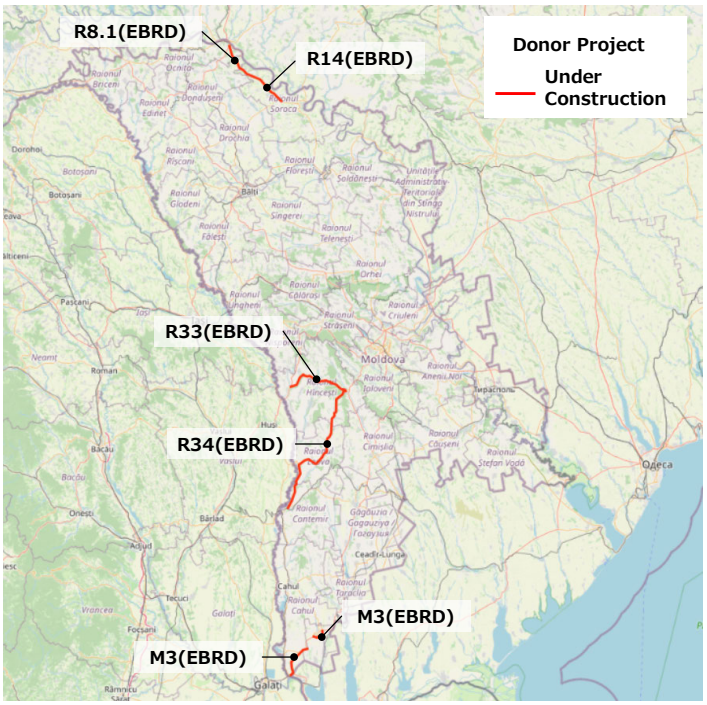
Bilateral donors such as USAID are providing immediate assistance without waiting for fundamental infrastructure upgrades. Specifically, they are supporting the procurement of freight cars for grain transport and providing modular grain transshipment equipment at BCPs with Poland and other countries, contributing to alleviating freight congestion at the border and boosting transport capacity.

(3) Road Sector

1) Moldova

The EBRD, EIB, EU, and World Bank are among the major donors in Moldova's road sector. The Moldovan government has finalized the "National Mobility Strategy 2023–2030," which envisions EU accession, and donors are implementing investments based on this strategic framework. This strategy was drafted with coordinated support from major donors as part of the Facility for Eastern Partnership Investment in Connectivity (EPIC), a joint initiative of the EBRD, EIB, EU, and WB.

In the road sector, the strategy outlines the integration of Moldova's road network into the TEN-T, ensuring quality and safety in line with EU standards, and expanding logistics capacity to strengthen "Solidarity Lanes. "Regarding the form of support, a strategic division of roles among donors is as follows: while the EBRD and EIB are responsible for developing trunk roads such as TEN-T, the World Bank supports the development of local roads and rural access roads through the "Local Roads Connectivity Project."





R14 under renovation (EBRD)



R33 under renovation (EBRD)

Source: Based on SRA data; edited and photographed by the research team

Figure 3-67 Road Sections Under Construction or Renovation with Donor Funding

There is also a large-scale road project to construct a strategic highway that crosses the Republic of Moldova from east to west, connecting Ungheni on the Romanian border through Chișinău to the major Ukrainian port city of Odesa. Under the leadership of the EIB, a Pre-FS and F/S are currently underway. Table 3-9 shows road projects currently being planned or for which tender preparations are underway with funding from major donors.

Table 3-9 Road Projects Currently in the Planning or Tender Preparation Stages, Funded by Major Donors

No.	Road Name	Type of Work	Donor (Financier)	Status
1	R34 Hînceşti-Leova-Cahul	Rehabilitation	EIB	Tender launched
2	M5 Ukraine Border - Criva - Bălți - Chișinău - Tiraspol - Ukraine Border	Rehabilitation	EIB	Preparation of tender documents
3	M3, Cimişlia Bypass	New construction	EIB	Preparation of tender documents
4	M1 Romania Border - Leușeni - Chișinău - Dubăsari - Ukraine Border	Rehabilitation	EBRD	Design
5	M1 Romania Border - Leușeni - Chișinău - Dubăsari - Ukraine Border	Rehabilitation	EBRD	Design
6	M1 Romania Border - Leușeni - Chișinău - Dubăsari - Ukraine Border	Rehabilitation	EBRD	Design
7	M1 Romania Border - Leușeni - Chișinău - Dubăsari - Ukraine Border	Rehabilitation	EBRD	Design
8	M1 (Chișinău Ring Road Lot 2)	Rehabilitation	EBRD	Design
9	M1 (Chișinău Ring Road Lot 3)	Rehabilitation	EIB	Design
10	M1 Romania Border - Leușeni - Chișinău - Dubăsari - Ukraine Border	Rehabilitation	WB	Preparation of tender documents
11	Access road to the bridge over the Prut River (Ungheni)	New construction	WB	Design
12	Corridor 5: R13-Ivanovca-Izvoare-Vantina-Ocolina-R14	Rehabilitation	WB	Preparation of tender documents
13	Corridor 8: G88 (Cornești-Boghenii Noi-Năpădeni-M5) & G86	Rehabilitation	WB	Preparation of tender documents
14	Corridor 24: G131, G132, G133 (various sections)	Rehabilitation	WB	Preparation of tender documents

Source: SRA



Construction funded by the CEF program (EU)



Construction status as of September 2025

Source: Photographed by the JICA survey team

Figure 3-68 Construction Status of the Ungheni Bridge (Ungheni-Chișinău-Odesa Expressway Project)

2) Ukraine

The "Ukraine Recovery Donor Coordination Platform" was established as a framework to address Ukraine's urgent funding needs and support its future economic recovery and reconstruction, based on

the December 2022 Group of Seven (G7) Leaders' Statement. The Platform's Steering Committee features the Government of Ukraine, the G7 countries, and the European Commission as permanent members. In addition, major international organizations and financial institutions, including the Council of Europe Development Bank (CEB), the EBRD, the EIB, the Organization for Economic Co-operation and Development (OECD), the World Bank (WB), the International Finance Corporation (IFC), and the IMF, participate in discussions as working-level participants, with each donor working closely together to advance recovery and reconstruction support. Currently, the platform is working to establish a pipeline of prioritized early recovery projects in accordance with the "Ukraine Plan" and the RDNA. In the road sector in particular, the following three points are key strategies:

- Integration into TEN-T
- Pursuit of "Build Back Better" and sustainability
- Securing strategic logistics routes

According to information from the Ukrainian Agency for Reconstruction and Development, the donor-funded road sector projects are as follows.

Table 3-10 Status of Road Infrastructure Restoration and Improvement Projects in Ukraine Supported by International Financial Institutions

Project Name	Financing Institution	Amount	Completion	Key Components
RELINC (Restoration of Critical Logistics Infrastructure and Network Connectivity)	WB	Grant: 30,055,000 USD	2027	Purchase of 18 modular bridges Design documentation for the M-06 highway overhaul Surveying of the main road network.
DRIVE (Creating Resilient Infrastructure in Vulnerable Environments)	WB	Loan: $422 million Grant: 10 million USD	Not Specified	Maintenance of national roads Installation of 15 temporary modular bridges Reconstruction of 350 km of export corridors.
Development of the TEN-T	EBRD	Loan: 450 million EUR	2028	Repair of the M-09 highway (62 km) Repair of M-06 highway sections (up to 394 km) in the Kyiv, Zhytomyr, and Rivne regions.
European Roads of Ukraine II	EIB	Loan: 450 million EUR	Ongoing	Major repairs to the M-06, M-07, M-05, and H-01 highways Construction of multi-level interchanges.
Transport Infrastructure in Ukraine – Phase I	EIB	Loan: 50 million EUR Grant: 50 million EUR	Dec. 31, 2029	Construction of overpasses and interchanges on the M-06 and M-05 highways
EU Solidarity Roads Initiative	EIB	Loan: 230 million EUR Grant: 9 million EUR	Dec 31, 2030	Reconstruction of bridges on the M-15 Major repairs to sections of the M-06 in the Lviv region

Source: State Agency for Restoration and Development of Infrastructure of Ukraine

(4) Port and Harbor Sector

1) Moldova

International assistance in Moldova's port sector is not limited to port development but also serves as a division-of-labor approach aimed at integration into European transport corridors. As Moldova is a landlocked country with no direct access to the Black Sea, and GIFP on the Danube is its only international port, port assistance is positioned as part of the regional logistics network rather than as national port development. Table 3-11 shows the status of donor assistance to Moldova.

Table 3-11 Status of Donor Assistance to Moldova (Port Sector)

Donor/Agency	Target of Assistance	Details of Support	Method of Support	Purpose	Primary Target Ports	Source
EBRD	GIFP	Investment in port operating companies, modernization of operations, and attraction of private investment	Equity investment and PPP	Integration into the EU logistics network, promotion of privatization	Giurgiulesti Port	EBRD (2021–2026) Giurgiulesti International Free Port Project
EU	Port Connectivity Corridor	EU Solidarity Lanes, Improvements to Roads, Railways, and Customs Clearance	Grant + Technical Assistance (TA)	Establishment of Alternative Transport Corridors for Ukraine	Giurgiulesti Port	European Commission (2023– 2025) EU-Ukraine Solidarity Lanes Reports
EIB	Port access roads	Upgrading of main roads, improvement of logistics connections	Sovereign Loan	TEN-T Eastern Extension, EU Market Integration	Giurgiulesti Hinterland	EIB (2022) Moldova Transport Connectivity Program
WB	Trade and Logistics Systems	Trade Facilitation, Border Clearance Improvements, Logistics Capacity Enhancement	Development Policy / TA	Strengthening Economic Resilience	National Logistics Network (including ports)	World Bank (2023) Moldova Economic Update / Transport Connectivity
U.S. Agency for International Development (USAID)	Logistics and Energy Supply	Strengthening Supply Chains, Support for Fuel Import Capacity	Grant / TA	Reducing Dependence on Russia	Giurgiulesti Port	USAID Moldova (2022–2024) Energy Security Programs
UNDP	Crisis Response Logistics	Logistics Resilience and Strengthening Crisis Response Capabilities	TA	Maintaining Logistics During Disasters and Wars	Port-Related Logistics	UNDP Moldova (2023) Resilience Program
Romanian Government / Constanta National Maritime Ports Administration Company (Compania Națională "Administrația Porturilor Maritime" SA Constanta: CNAPM)	Port Integration	Port Equity Acquisition and Operational Integration	Strategic Investment	Direct Connection to the EU Port Network	Giurgiulesti Port	Romanian Government / EBRD Announcement (2026)

Source: Compiled by JICA Survey Team

The EBRD plays a central role in this support, with an established private-sector-led management structure through equity investments in port operating companies. The EBRD prioritizes management improvement, investment attraction, and strengthening commercial operations over facility construction and is responsible for integrating Moldovan ports into the European port network, reflecting the characteristic approach of European donors, who treat ports as "regional market infrastructure" rather than "national assets."

The EU and the EIB prioritize developing CC over the ports themselves. In particular, through the EU Solidarity Lanes established following the invasion of Ukraine, Moldova has been positioned as a logistics hub complementing Ukrainian transport, leading to expanded support for improving road, rail, and customs clearance capacities. Port support functions as one element of the overall corridor, with the integration of transport networks being the primary policy objective.

The World Bank and the United Nations Development Program (UNDP) are responsible for institutional capacity building and resilience enhancement, supporting improvements in trade facilitation, border management, and crisis response logistics capabilities. With the addition of energy and supply chain support from the U.S. Agency for International Development (USAID), developing ports will become a foundation for economic security.

Thus, in Moldova, a clear division of labor among donors has been established, with the EBRD focusing on core port functions, the EU and EIB on corridor connectivity, and the World Bank and UN agencies on institutional capacity and resilience. As a result, the scope for new large-scale infrastructure investment in the port sector is limited, and future support is trending sharply toward complementary areas such as port operational optimization, disaster prevention, the adoption of Information and Communication Technology (ICT), and the strengthening of operational capabilities. Moldovan ports have moved beyond the stage of national port development and will serve as strategic nodes in the EU's Eastern Logistics Network.

2) Ukraine

In contrast to Moldova, international assistance for Ukraine's port sector is a multi-layered support structure aimed at sustaining the national economy during wartime. While pre-invasion assistance focused on port efficiency and privatization, current efforts must simultaneously maintain exports and logistical continuity while preparing for post-war reconstruction. Table 3-12 shows the status of donor assistance to Ukraine.

Table 3-12 Status of Donor Assistance to Ukraine (Port Sector)

Donor/Agency	Target of Assistance	Details of Support	Method of Support	Purpose	Primary Target Ports	Source
WB Group	Port / Logistics Recovery	Assessment of damage to port and transport infrastructure, Restoration of logistics connectivity, Preparation for reconstruction	Grant / Loan / TA	Maintenance of national economy / Recovery of exports	National ports	World Bank (2023–2024) Ukraine Rapid Damage and Needs Assessment (RDNA2/3)
EU	Transport Corridors	Solidarity Lanes, cross-border logistics, Customs improvements	Grant / Budget Support	EU integratio / Maintenance of exports	Danube ports / Land corridors	European Commission (2023–2025) EU-Ukraine Solidarity Lanes
EBRD	Port Operations/Logistics	Support for private logistics, Funding for port companies, War risk insurance	Loan / Guarantee	Continuation of trade / Maintenance of private economy	Great Odesa ports	EBRD (2024) War Risk Insurance Programme
EIB	Transport Infrastructure	Rehabilitation of port access roads and railways	Sovereign Loan	Integration into European corridors	National transport network	EIB (2024–2025) Ukraine Infrastructure Recovery Initiatives
UN	Grain Export	Operation of the Black Sea Grain Initiative (BSGI)	Multilateral Agreement	Global food security	Odesa / Chornomorsk / Pivdennyi	United Nations (2023) Black Sea Grain Initiative
IMO	Maritime Safety	Navigation safety, Ship safety guidelines	Technical Framework	Maintenance of international shipping lanes	Black Sea ports	IMO Resolution A.1183(33), 2023
USAID	Economic / Logistics Support	Support for port logistics and supply chains	Grant / TA	Economic stabilization	National ports	USAID Ukraine Economic Resilience Programs (2022–2024)
NATO Allies / Bilateral Donors	Port Protection	Support for port air defense and surveillance capabilities	Security Assistance	Ensuring maritime security	Black Sea coast	NATO Security Assistance Reports
IMF	Macroeconomy	Support for maintaining foreign currency and trade	Financial Programme	National fiscal stability	Indirect (port-dependent)	IMF Ukraine Country Report (2024)

Source: Compiled by the JICA Survey Team

The World Bank and the EU are the main pillars of this support. Through its RDNA, the World Bank assessed port damage and identified reconstruction needs, positioning the maintenance of transport connectivity as the top priority for national recovery. Meanwhile, the EU established “Solidarity Lanes,” redirecting Ukrainian exports to corridors within the EU amid restrictions on Black Sea shipping routes. As a result, port support became closely linked to European integration policies, rather than being limited to mere facility restoration.

The EBRD provided loans to port-related companies and offered war risk guarantees to sustain the private economy, thereby enabling the continuation of vessel operations and cargo transport. The EIB supported hinterland infrastructure, such as port access roads and railways, to ensure the redundancy of transport corridors. These financial institutions play a role not only in providing recovery funds but also in creating an environment where logistics do not come to a halt.

Furthermore, the UN provides an international operational framework for ports through the Black Sea Grain Initiative (BSGI), while the IMO institutionally supports port utilization by establishing navigation safety standards. In addition, countries providing security assistance are strengthening port defences and maritime surveillance capabilities, creating a situation where ports serve as a convergence point for military, diplomatic, and economic interests.

As a result, support for Ukrainian ports has formed a three-tiered structure: (1) maintenance of the national economy by the World Bank and the EU, (2) support for the continuation of trade by the EBRD and the EIB, and (3) securing shipping lanes through the UN and security frameworks. As future efforts transition from the emergency assistance phase to the reconstruction investment phase, the need for large-scale port infrastructure reconstruction will become apparent, and opportunities for new donors, including Japan, to participate are likely to expand.

(5) Customs and Clearance Sector

1) Moldovan Customs

a) Support from the EU

The European Union Border Assistance Mission to Moldova and Ukraine (EUBAM) was established on December 1, 2005, and supports the implementation of border management and customs systems compliant with EU standards in Moldova and Ukraine. While EUBAM serves as an advisory body, it does not possess executive authority. To date, support has been provided through international conferences, thematic meetings, expert working groups, joint operations, training, and analytical reports. Headquartered in Odesa, Ukraine (with country offices in Chișinău, Moldova, and Odesa), EUBAM maintains operational bases at key locations along the border. It currently consists of 83 staff members seconded by nine EU member states.

EUBAM's mandate has been extended seven times to date, and the current term expires on November 30, 2025; however, Moldovan customs authorities have indicated that the status of the extension is unclear (as of September 30, 2025). For example, the main objectives of the mandate covering the period from June 1, 2023, to March 31, 2025, are as follows:

- Support for confidence-building measures related to Transnistria, and harmonization of customs, trade, and transport legislation, as well as administrative line management procedures
- Supporting the implementation of Integrated Border Management (IBM) along the Moldova-Ukraine border, particularly in the Transnistria section
- Support for measures to combat cross-border crime, with a focus on the Transnistrian section
- Support for the provision of inspection equipment and IT equipment to customs and border authorities

Based on EUBAM's activities over the past 20 years, the Moldovan Customs Service has expressed a need to restructure the current mission's mandate. Specifically, it proposes transforming EUBAM into a support project focused on the following four strategic elements:

- Continued alignment with EU customs
- Introduction and implementation of EU customs IT systems
- Monitoring of the Transnistria region
- Countering cross-border crime amid the war in Ukraine

In addition, the EU is supporting the pilot operation of the Systematic Electronic Exchange of Data (SEED) through the e-Customs project under the European Union's digital support program (EU for Digital: EU4Digital). As part of this project, a pilot project has been underway since 2024 to automatically exchange customs information using SEED+, an enhanced version of SEED, among the customs authorities of Moldova, Romania, and Ukraine. This project will reduce customs clearance times

and administrative burdens, and improve the accuracy and transparency of data, which is essential for efficient risk management.

b) Support from USAID

Through the USAID MISRA project, USAID has been supporting the Moldovan Customs Service in digitizing customs procedures and implementing a Time Release Study (TRS)[19]. Currently, the MISRA project is suspended due to the interruption of direct USAID support, and there is no timeline for its resumption.

2) Ukrainian Customs

a) Support from the EU

In conjunction with the entry into force of the Common Transit Convention (CTC), the EU is supporting the development of IT infrastructure, such as Ukraine's customs clearance system. Additionally, to strengthen border management capabilities among Ukraine, Moldova, and Romania, the EU supports the European Union Advisory Mission (EUAM) Ukraine and EU4Digital. Furthermore, within Ukraine, legislative amendments are underway to implement the provisions of the EU's Union Customs Code (UCC) into domestic law, aligning risk management and post-clearance audit standards with those of the EU. Support from the EU is summarized in the table below.

Table 3-13 EU Support for Ukrainian Customs

Category	Name	Details
Border Management	EUAM	Promote trilateral cooperation among Ukraine, Romania, and Moldova, and support the establishment of a customs working group, the modernization of border infrastructure, and the coordination of emergency response efforts.
	EUBAM	Supporting the promotion of EU border management standards, capacity building for customs officials, and measures against smuggling at the Moldova-Ukraine border
	EU4Digital	Supporting the implementation of a pilot project for data exchange using the SEED system between the customs authorities of Ukraine and Romania
Electronic Customs Clearance	Public Finance Management Support Program for Ukraine (EU4PFM)	Supporting the development of the Automated Customs Clearance System (ASMO) and the Automated Risk Management System (ASUR), and their integration with the New Computerized Transit System (NCTS)
	Multi-Annual Strategic Plan for Customs (MASP-C)	Ukraine's customs digital development plan is based on the EU's MASP-C.
Legal Framework	UCC	Support for legislative amendments to align Ukraine's Customs Code with the provisions of the EU's UCC

Source: JICA Survey Team

b) Support from USAID

USAID is supporting the Ukrainian Customs Service in developing BCP infrastructure and introducing state-of-the-art equipment. Since 2023, as part of the USAID Economic Resilience Activity (ERA)

[19] A survey methodology developed and recommended by the World Customs Organization (WCO) to measure and analyze the time required from the arrival of imported goods at customs until they are released (cleared) for pickup.

project, a project to streamline railway border procedures to expedite grain exports to the EU has been implemented.

Table 3-14 USAID Support to the Ukrainian Customs Service

Project Name	Support Details	Target Area
USAID ERA	Provision of mobile X-ray inspection equipment; training support for O&M	12 road border checkpoints (Yahodyn, Porubne, Uzhhorod, Luzhanka, Krasnoilsk, Diakivtsi, etc.)
	Renovation of BCPs, construction of modular facilities Provision of railway equipment (20 bogie replacement lifts, 5 sets of hoists, 12 bogie replacement lifts, etc.)	42 railway BCPs (Volyn, Lviv, Zakarpattia, Chernivtsi, etc.)

Source: JICA Survey Team

(6) Special Economic Zone (SEZs), IPs, etc.

As part of the "EU4Environment Program," the EU is providing support in Moldova to assist IPs and FEZs to transition to Eco-Industrial Parks (EIPs). This support focuses on capacity building and TA to facilitate the transition from conventional "mere clusters" to sustainable models that incorporate the circular economy, resource efficiency, and clean production. Specifically, in collaboration with experts from the United Nations Industrial Development Organization (UNIDO), the program provides financial support for feasibility studies based on international EIP frameworks. This support is not a direct infrastructure investment, such as the construction of new roads or factories. It is a policy and TA to help IPs meet environmental standards and efficiency requirements, and to promote integration with the EU market and compliance with Environmental, Social, and Governance (ESG) requirements. The two target sites are the Tracom IP and the FEZ Vulcănești in Chișinău.

Meanwhile, in Ukraine, in addition to support for the EU4Environment Program similar to that provided to Moldova, the EBRD is making a partial investment in the development of the Lviv IP, given the unique wartime circumstances. The World Bank Group (Multilateral Investment Guarantee Agency: MIGA) is providing investment guarantees against war risks, among other forms of support.

Table 3-15 Status of EU and Other Support for Industrial Parks in Moldova and Ukraine

Country	IP/Zone	EU-Related Support Details	Implementing Entity/Mechanism	Purpose of Support
Moldova	IP Tracom (Chișinău)	Feasibility Assessment and Technical Support for EIP Implementation	EU-funded EU4Environment Action (supported by UNIDO)	Introduction of EIP methods, improvement of environmental and economic performance
	FEZ Vulcănești (Vulcănești)	Feasibility Assessment and Technical Support for EIP Implementation	EU-funded EU4Environment Action (supported by UNIDO)	Improving environmental and resource efficiency and sustainability in industrial zones
	Other industrial zones (e.g., Bioenergagro, Cimișlia, etc.)	Potential for indirect support (policy and standardization promotion)	Support for the development of EU EIP guidelines	Promotion of long-term EIP and green growth
Ukraine	M10 Industrial Park (Lviv)	Investment guarantees against war risks (up to USD 9.1 million)	Implemented with support from MIGA (a World Bank Group guarantee agency) and the EBRD	Attracting private investment and promoting the development of logistics and manufacturing space
	IPs in the Lviv region (e.g., M10 and others)	Approx. US$24.5M in EBRD investment and development support (warehouses and manufacturing facilities)	EBRD Investment (up to 35%)	Development of logistics and manufacturing infrastructure to meet international demand and strengthen supply capacity
	BVAK / AgroMash / Patriot IPs	Support for sustainability and energy efficiency (eco-IP conversion)	EU-funded EU4Environment Action (supported by UNIDO)	Improving energy efficiency and environmental performance; modernization to meet European standards

Source: Compiled by the JICA survey team from information on EU and other website.

Chapter 4 Freight Flows and Future Demand Forecasts for Moldova and the neighboring Countries

4.1 Overview of Major Import and Export Products in Moldova and Ukraine

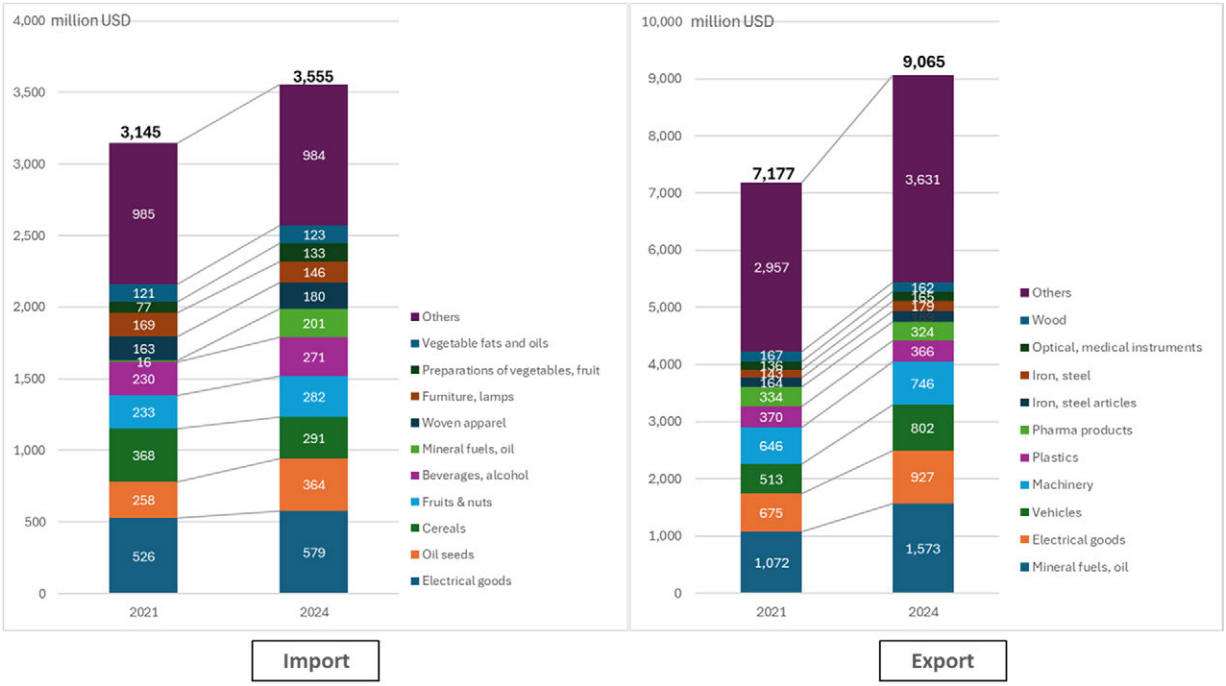
4.1.1 Trends in Moldova's Major Import and Export Items and Trade Values

The results of an analysis of Moldova's import and export values, organized by commodity using the Harmonized System (HS) codes defined by the World Customs Organization (WCO) for the years 2021 (prior to Russia's invasion of Ukraine) and 2024, are shown in Figure 4-1.

Comparing import and export values by HS category, Moldova's export value increased by 13% from 2021 to 2024, partly due to the re-export of fuel to Ukraine. Meanwhile, import value rose by 23%, driven by rising energy prices and a recovery in domestic demand. Although import and export values fluctuated, no significant changes were observed in the composition of goods.

Moldova's major export items are primarily agricultural products, like grains (including wheat and corn), oilseeds (such as sunflower and rapeseed), vegetable oils (seed oils), and fruits and nuts (such as apples and walnuts). In addition, mechanical and electrical components, including automotive wire harnesses, and refined petroleum products are also major export items.

On the import side, mineral fuels and petroleum products, like petroleum products and natural gas, account for approximately 17% of the total import value, making them the largest category. Following this, imports of electrical equipment and machinery, including manufacturing equipment for wire harnesses, as well as automobiles, account for a significant portion.



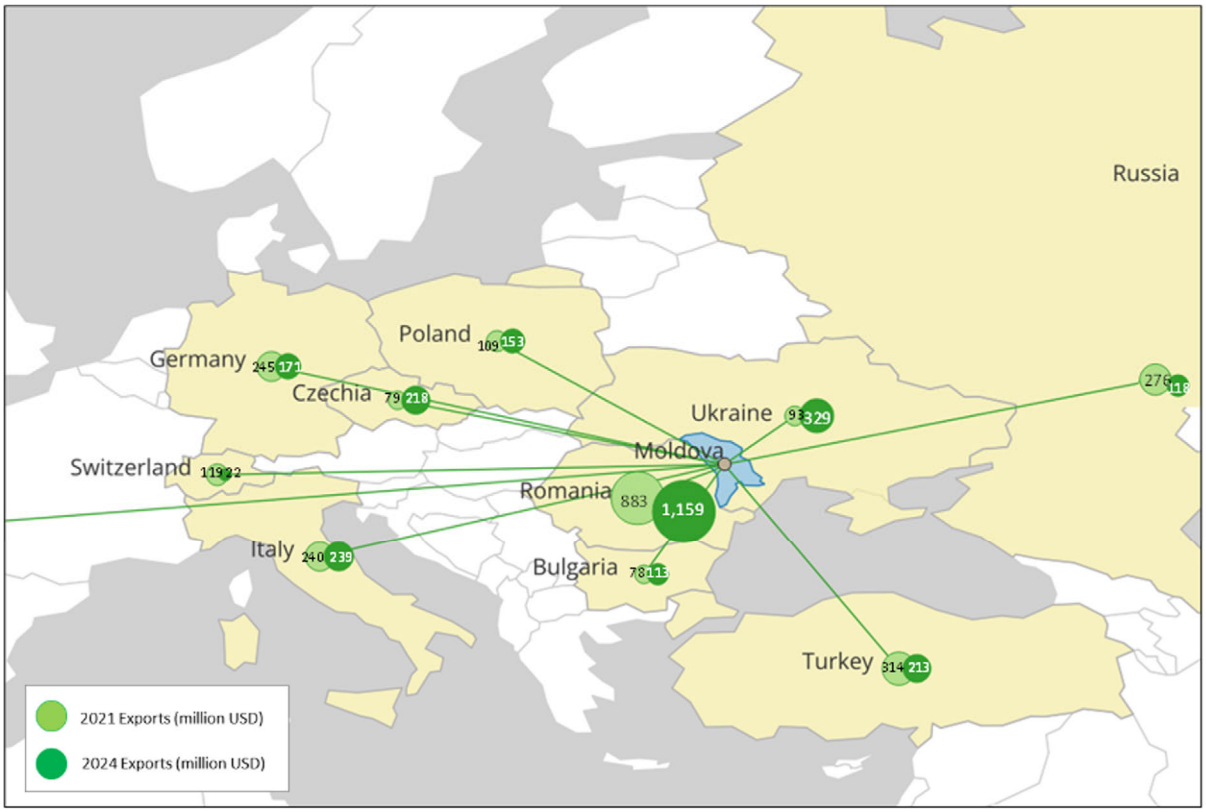
Note: Data compiled based on 2-digit HS codes. Items ranked 12th or lower in terms of export and import value are grouped together under "Other."

Source: UN Comtrade

Figure 4-1 Moldova's Export and Import Values by HS Category (2021 and 2024)

4.1.2 Changes over Time in Moldova's Major Export and Import Partners

The results of a comparison of export values by country for Moldova's top 10 export destinations in 2021 (before Russia invaded Ukraine) and 2024 are in Figure 4-2. Romania has been the largest export destination since before the invasion, accounting for approximately 30% of total exports. It remained the largest export destination in 2024, with export value increasing further. Following the invasion, exports to Russia fell sharply to less than half their previous level as exports to Ukraine expanded approximately 3.5-fold due to the re-export of petroleum products during the war. In addition, exports to EU member states in Central and Eastern Europe, such as the Czech Republic and Poland, have also increased.



Source: UN Comtrade

Figure 4-2 Moldova's Major Export Destinations and Export Value by Country (2021 and 2024)

Next, Figure 4-3 compares import values by country for Moldova's top 10 import sources in 2021 (before Russia invaded Ukraine) and 2024. While Russia was the largest import source in 2021, import values from Russia have decreased significantly by 2024, largely due to a sharp decline in imported energy-related goods.

On the other hand, Romania had been a major import partner even before the invasion and became the largest afterward. Furthermore, in addition to Ukraine, imports from EU member states such as Poland, Germany, Italy, and France have expanded, and imports from China have also increased.



Source: UN Comtrade

Figure 4-3 Moldova's Major Import Partners and Import Value by Country (2021 and 2024)

4.1.3 Major Import and Export Categories and Trends in Import and Export Values for Ukraine

Regarding Ukraine's import and export values, the results organized by commodity based on the HS codes from WCO for 2021, before Russia invaded Ukraine, and 2024 are in Figure 4-4.

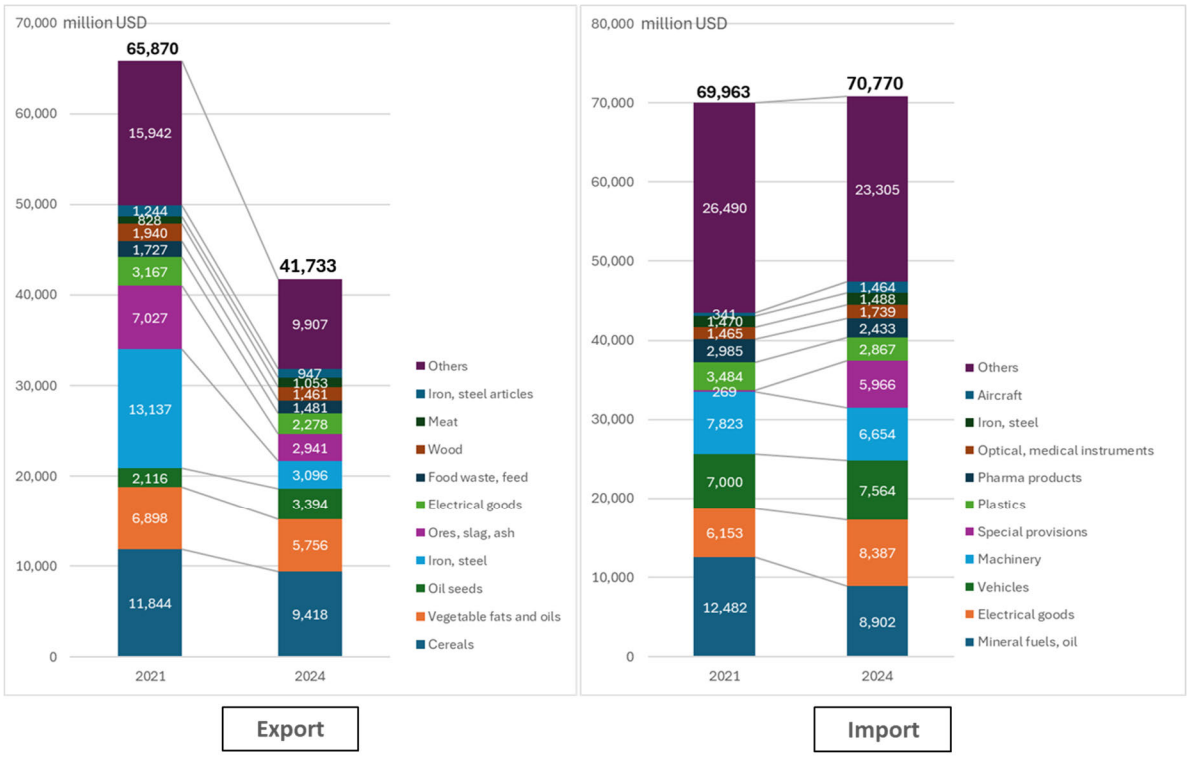
A comparison of import and export values by HS category shows that export values in 2024 have fallen to approximately 60% of the 2021 level. Meanwhile, import values have remained largely flat overall.

As of 2021, Ukraine's major export items included agricultural products such as grains (wheat and corn) and oilseeds and vegetable oils (primarily soybeans and rapeseed), as well as industrial products such as steel products, ores, and slag. However, since the invasion, agricultural exports have declined due to port operation constraints and disruptions to logistics networks. Furthermore, as major production hubs for steel, ore, and slag have been occupied or attacked, export values for these items have plummeted.

Regarding imports, there has been an increase in imports of items classified under "special classification items" in the HS code. Although details of these items are undisclosed, they are highly likely to be military goods, including weapons. The IMF report[20] also clearly points out that rising defence needs are a major factor in the change in Ukraine's import structure.

Furthermore, against the backdrop of progress in infrastructure restoration and rising demand to maintain logistics and transportation capacity, the value of imports of automobiles and electrical equipment has also increased.

[20] IMF Country Report No. 24/314, October 2024



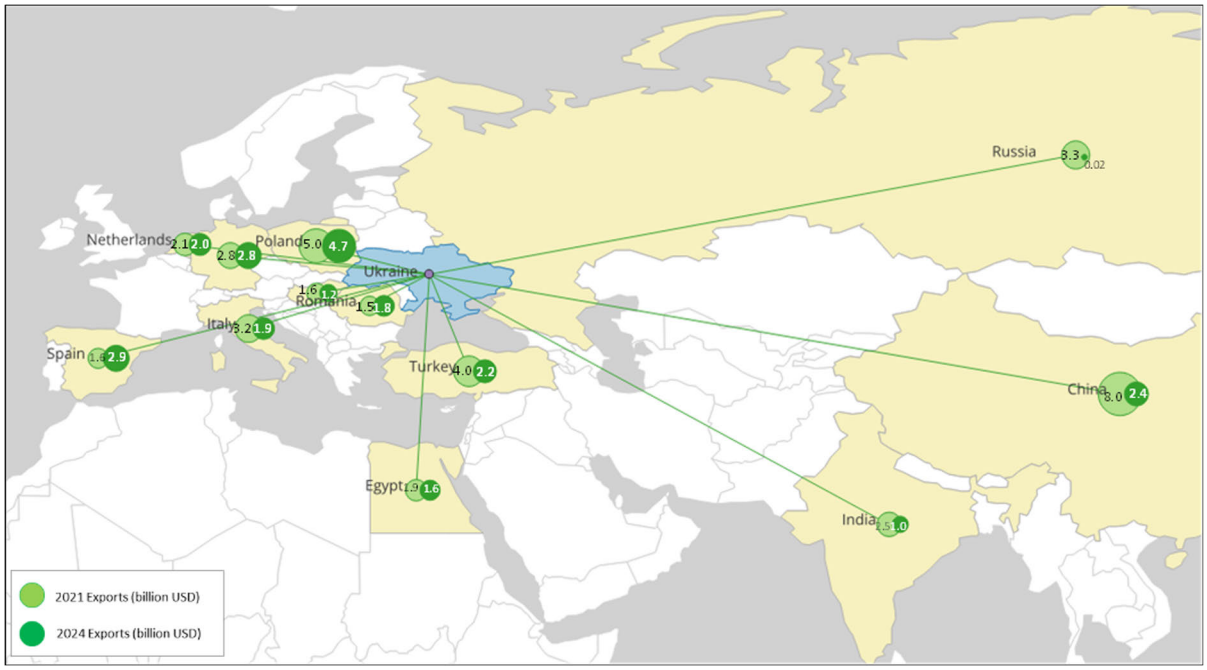
Note: Data aggregated at the HS 2-digit level. Items ranked 12th or lower in terms of export and import value are grouped together under "Other."

Source: UN Comtrade

Figure 4-4 Ukraine's Export and Import Values by HS Code (2021 and 2024)

4.1.4 Changes over Time in Ukraine's Major Export and Import Partners

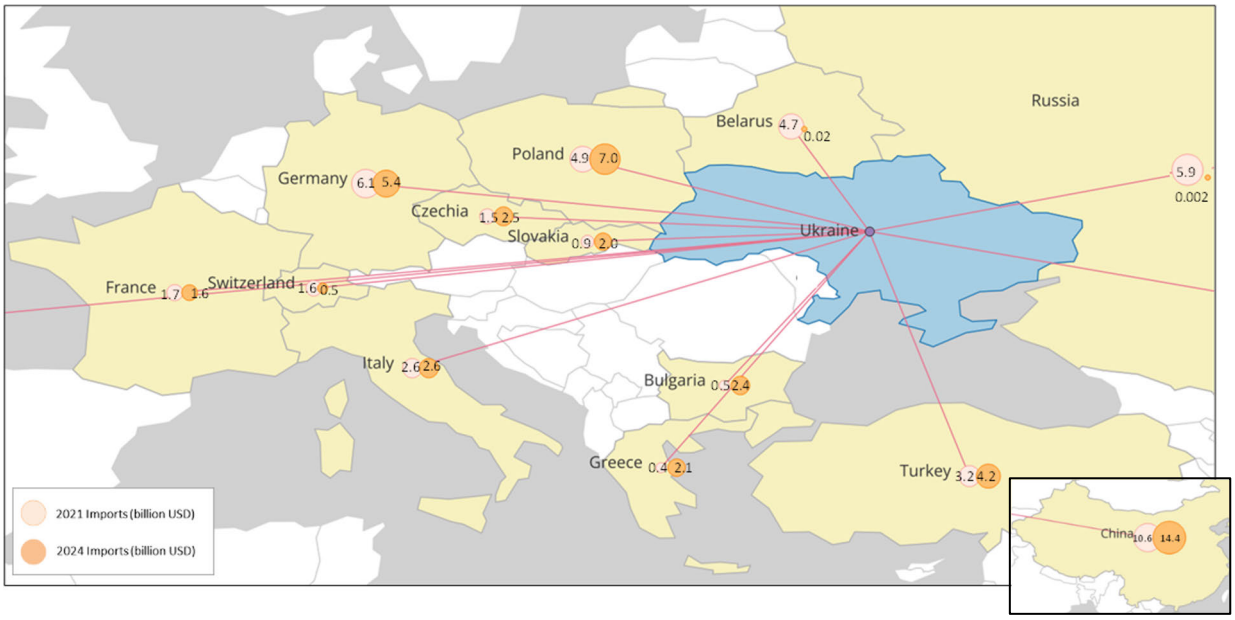
Figure 4-5 shows a comparison of export values by country for Ukraine's top 10 export destinations in 2021 (before Russia invaded Ukraine) and 2024. In 2024, exports to Russia have virtually disappeared. Furthermore, China was the largest export destination in 2021. Exports of grains, seed oils, and other products to China have decreased significantly due to constraints on export routes, and the export value has fallen to approximately 30% of the 2021 level. On the other hand, while the export value to Poland has declined only slightly, its relative export share has increased, making it the largest export destination in 2024.



Source: UN Comtrade

Figure 4-5 Ukraine's Major Export Destinations and Export Value by Country (2021 and 2024)

Next, Figure 4-6 shows a comparison of import values by country for Ukraine's top 10 import sources in 2021 (before Russia invaded Ukraine) and 2024. By 2024, imports from Russia and Belarus had virtually disappeared. Meanwhile, the value of imports from China increased by more than 30% compared to 2021, and imports from Poland also expanded. Furthermore, imports from neighboring EU countries such as Bulgaria, Greece, and Slovakia have emerged as new sources, confirming that the diversification of import sources is progressing.



Source: UN Comtrade

Figure 4-6 Ukraine's Major Import Partners and Import Value by Country (2021 and 2024)

4.1.5 Moldova's Major Import and Export Products

Moldova's major export items in 2023 are agricultural products (wheat, corn, sunflowers, rapeseed, and seed oils), industrial products (wire harnesses), and refined petroleum products (gasoline and diesel fuel).

For agricultural products, Romania is the primary export destination; exports to that country account for more than 50% of the total export value of wheat, corn, sunflowers, rapeseed, and seed oils. Wire harnesses are integrated into the European automotive supply chain and are exported to EU countries, including Romania. Regarding petroleum products, since Russia invaded Ukraine, fuel imported from Romania and other countries has been re-exported to Ukraine.



Source: https://oec.world/

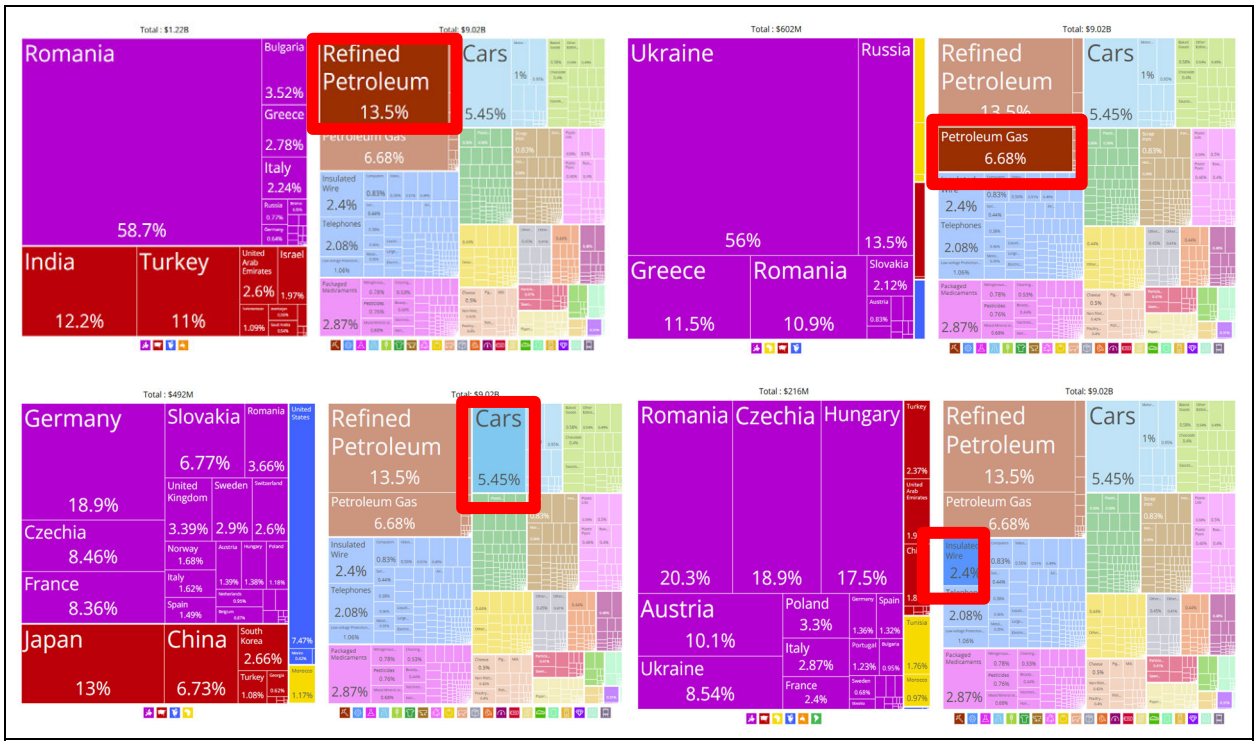
Figure 4-7 Moldova's Major Export Items in 2023

Moldova's major import items in 2023 were energy resources. The country relies on imports for nearly 100% of its energy resources, and energy-related items account for a very large share of total imports. The

value of imports of refined petroleum products from Romania has increased due to their re-export to Ukraine via Moldova.

Natural gas[21] is primarily for residential heating and power generation. In recent years, efforts to diversify supply sources have been underway to strengthen energy security. In addition to gas imports from storage facilities within Ukraine, the country procures LNG from Greece and other sources via the interconnection pipeline with Romania and the Trans-Balkan route (reverse flow). Meanwhile, Russian natural gas continues to be supplied to the Transnistria region[22].

Imports of automobiles also rank high. These consist primarily of used passenger cars, mainly imported from Germany and Japan. As for raw materials for wire harnesses, imports come from Romania and the Czech Republic.



Source: https://oec.world/

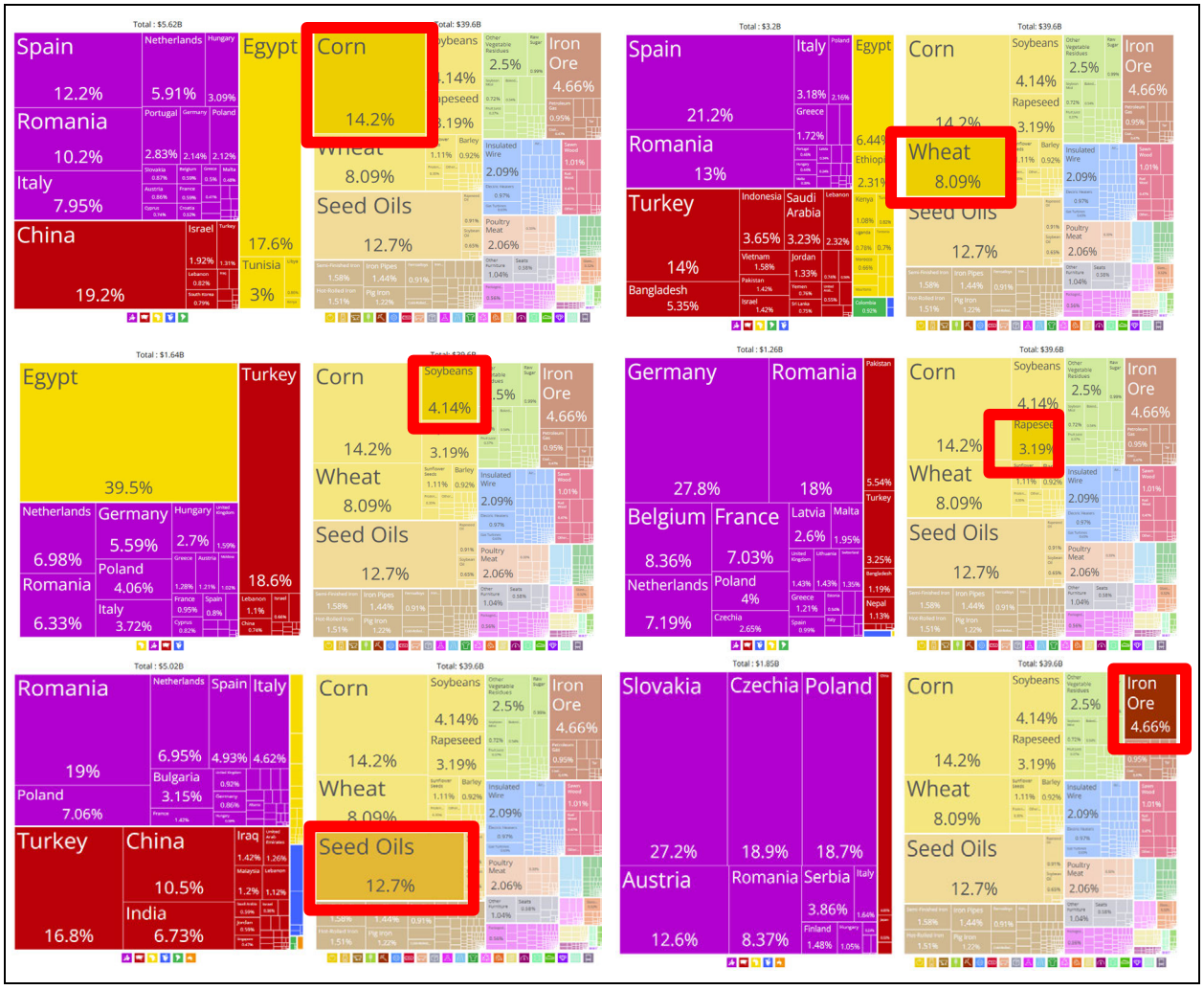
Figure 4-8 Moldova's Major Import Items in 2023

4.1.6 Ukraine's Major Import and Export Products

Ukraine's major export items in 2023 include agricultural products (wheat, corn, soybeans, rapeseed, and seed oils) and iron ore. Corn is the largest export item, with China accounting for a significant share of exports. Regarding wheat, Spain has become the largest export destination following Russia's invasion. The main export destinations for soybeans are Egypt and Turkey, which together account for approximately 60% of export value. Rapeseed is exported primarily to Germany for use as a raw material for biodiesel and as animal feed. Regarding seed oils, sunflower oil is the main product; Romania and Poland serve as

[21] Although the figure lists "Petroleum Gas," OEC.world's "Petroleum gas" includes natural gas in its calculations.
[22] IMF Country Report No. 24/355, 2024

transit points for supply to the EU market, while Turkey and China are important export destinations as major consumer countries. On the other hand, iron ore exports have declined significantly as they concentrate in neighboring Central European countries such as Slovakia, the Czech Republic, and Poland.



Source: https://oec.world/

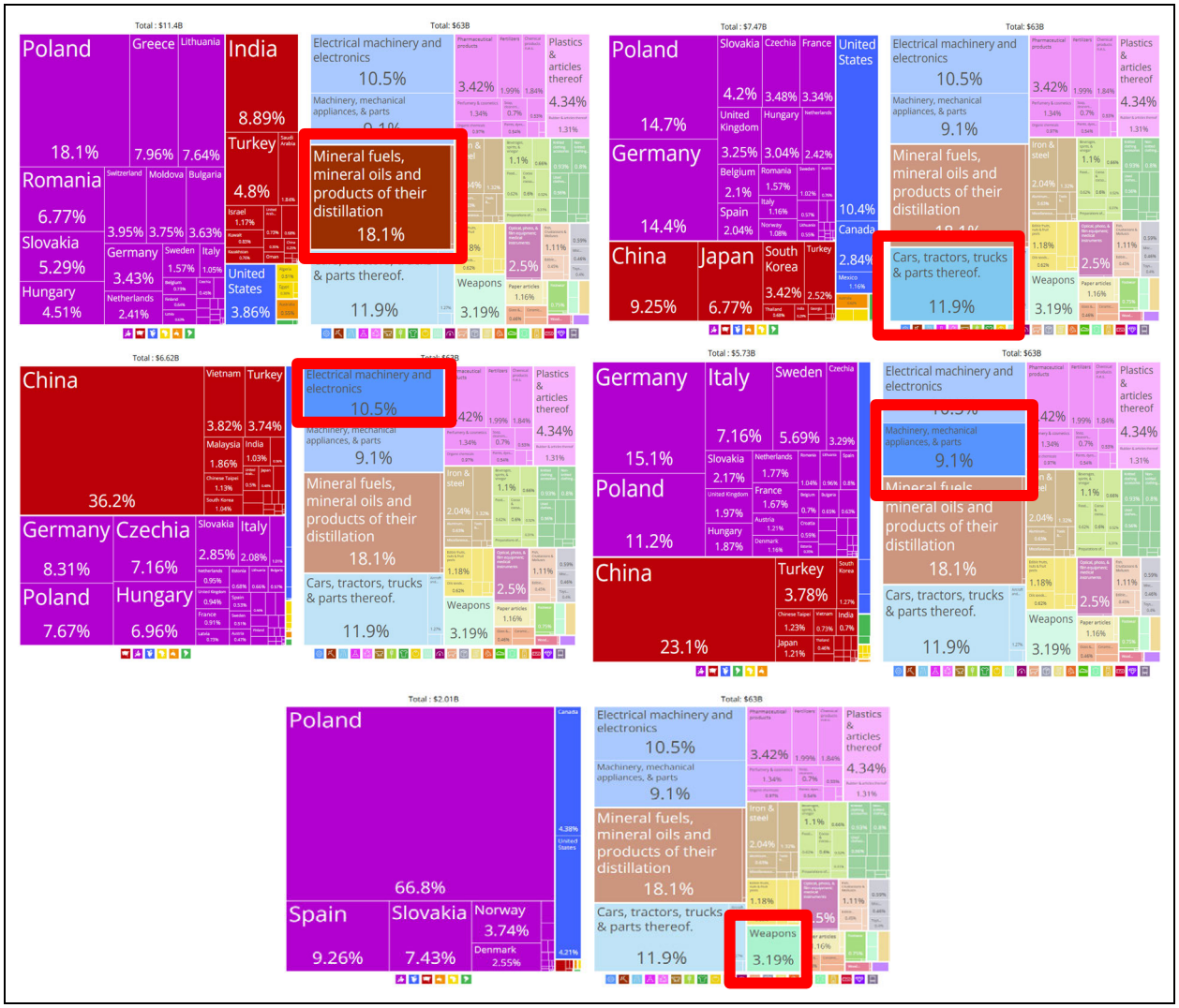
Figure 4-9 Ukraine's Major Export Items in 2023

Ukraine's main imports in 2023 are energy resources. Due to the destruction of domestic refineries, imports of refined petroleum products have become unavoidable, with supplies sourced from India, Greece, Poland, and Romania.

Regarding natural gas, imports from Russia and Belarus have virtually ceased, shifting to imports from neighboring EU countries such as Slovakia, Hungary, Poland, and Romania. In particular, Poland and Romania serve not only as suppliers of refined petroleum products but also as transit points for natural gas via pipelines, making them key trading partners for Ukraine's energy imports.

In the transportation equipment sector, in addition to passenger car imports from Germany and Japan, truck imports from the United States and Poland are also observed. Regarding electrical equipment and machinery, while imports from China previously accounted for the bulk of the market, the value of imports

of automobiles and electrical equipment has increased since the invasion, driven by rising demand for infrastructure restoration and the maintenance of logistics and transportation capacity. Furthermore, since the invasion, imports of weapons from Poland have also been newly confirmed.



Source: https://oec.world/

Figure 4-10 Ukraine's Major Import Categories in 2023

4.2 Major Import and Export Routes of Moldova and the neighboring Countries

4.2.1 Overview of Transport Routes, Modes, Goods, and Final Destinations

(1) Ukraine's Grain Export Routes

Tracking the evolution of export routes since the start of Russia's invasion, it is evident that as long as the Odesa Port and surrounding ports remain operational, the route via Moldova—which is inferior in terms of cost and efficiency—is highly unlikely to be chosen. The following summarizes these trends and their background.

February 2022: Russia began the full-scale invasion of Ukraine by blockading the Black Sea, temporarily limiting exports to ports on the Danube River (such as Izmail and Reni) and land routes (rail and truck).

July 2022: The "BSGI" brokered by the UN and Turkey was agreed upon, and exports resumed from the three major ports (Odesa, Chornomorsk, and Pivdennyi).

July 2023: Russia unilaterally declared its withdrawal from the BSGI, forcing the framework to come to an end.

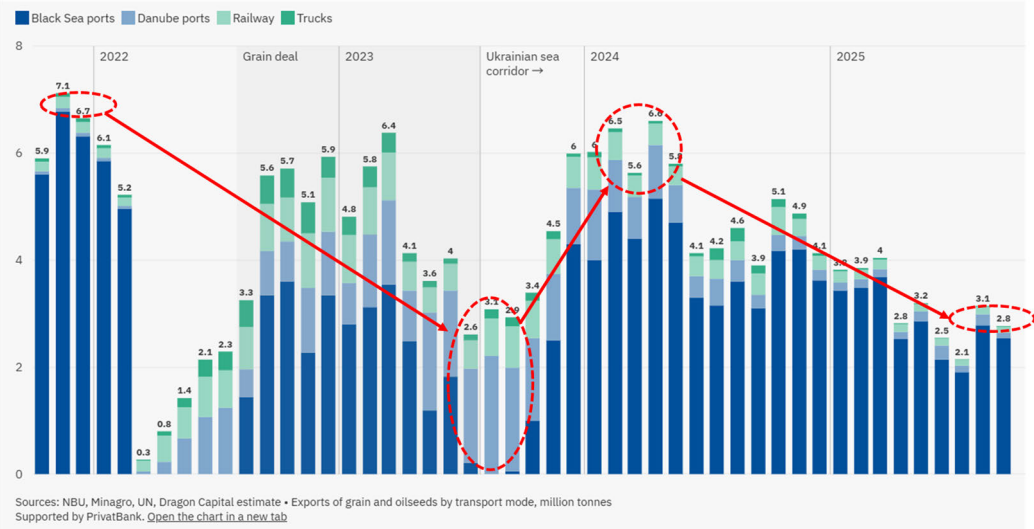
August 2023: Following the end of the BSGI, Ukraine launched its own Ukrainian Sea Corridor, independent of any agreement with Russia. This route involves the Ukrainian Navy ensuring the safety of the shipping lanes, with vessels sailing from Ukrainian territorial waters in the west to the coasts of NATO member states (Romania, Bulgaria, and Turkey). The key difference from the BSGI is the elimination of Russian vessel inspections by the Joint Coordination Center, which eliminated intentional inspection delays (sabotage) by Russia, dramatically improving transport throughput and predictability. The Ukrainian military's successful counterattacks and deterrence against the Russian Black Sea Fleet with maritime drones and missiles provide the military foundation for maintaining this independent corridor.

Looking at the chart, it is noteworthy that grain transport volumes in 2023 have recovered from the levels seen in 2022, when the Black Sea was under blockade. This recovery was made possible not only by the development of ports along the Danube River following concentrated investment after the invasion but also by the establishment of the "Solidarity Lanes" in cooperation with the EU, which simplified border inspections and expanded railway infrastructure, leading to a dramatic improvement in land transport capacity.

In summary, what can be gleaned from the evolution of export routes since the onset of the Russian invasion is that, as long as the ports around Odesa remain accessible under the BSGI or the "Ukrainian Sea Corridor," the likelihood of a large-scale shift in Ukrainian grain exports via Moldova is extremely low.

Maritime transport benefits from "economies of scale," allowing for the transport of large volumes of cargo at once compared to land or river transport. Given this overwhelming cost advantage and transport

efficiency, the route via Moldova, which suffers from logistical bottlenecks and high transport costs, remains an emergency backup for when maritime routes are physically blocked.



Source: National Bank of Ukraine (NBU), Minagro, United Nations (UN), Dragon Capital estimate • Exports of grain and oilseeds by transport mode, million tones
Supported by PrivatBank. Open the chart in a new tab

Figure 4-11 Ukraine's Grain Exports and Transport Modes

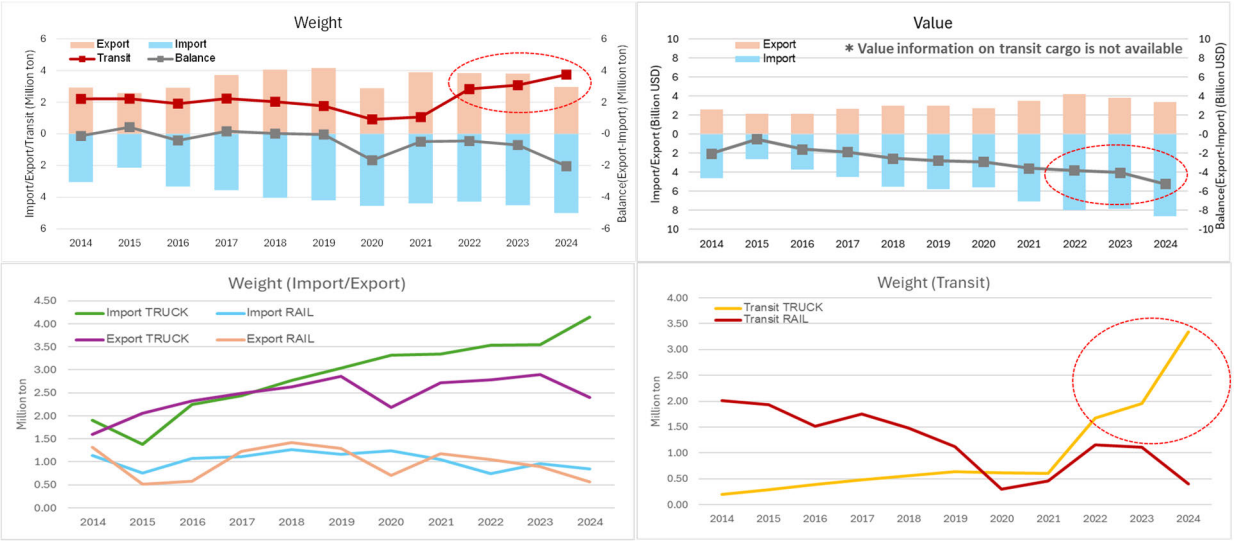
(2) Overview of Moldova's Trade Trends

An analysis of Moldova's trade statistics and data by transport mode from 2014 to 2024 revealed the following key trends.

Worsening Trade Deficit and Structural Changes: An examination of trade volume trends reveals a widening trade deficit. Since 2021, export volumes have stagnated relative to growth in import volumes, and by 2024, the deficit had reached its largest level on record. A similar trend exists on a weight basis, with import weights consistently and significantly exceeding export weights.

Surge in Transit Cargo Following Russia's Invasion of Ukraine: The dramatic increase in transit cargo began with Russia's invasion of Ukraine in 2022. Since 2022, transit cargo volumes have surged, eventually exceeding export volumes by weight, suggesting that Moldova, as a neighboring country, is playing a crucial role as an alternative transport route (Solidarity Lanes) due to disrupted logistics networks in Ukraine during the war.

Reliance on Truck Transport: An analysis by mode of transport reveals a dramatic shift from rail to road. While rail transport has stagnated or declined, truck transport has increased significantly. The growth in truck transport is particularly notable for imports. This trend also holds for transit cargo. While rail transport, which had been the dominant mode until 2021, has plummeted through 2024, the volume of cargo handled by truck transport has surged.

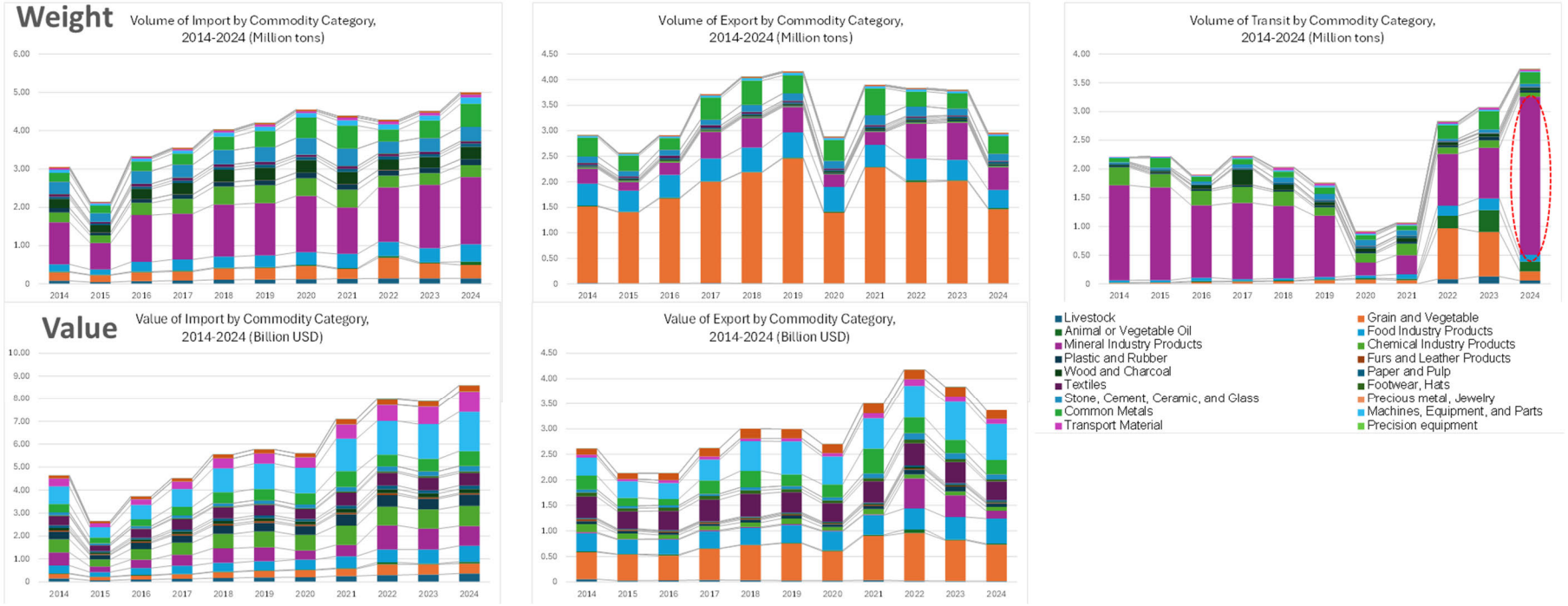


Source: Customs Service of the Republic of Moldova

Figure 4-12 Changes in Moldova's Trade Trends over Time (Import, Export, and Transit Volumes)

Structural Characteristics of Imports and Exports: Mineral products consistently account for a large share of import weight. On the other hand, most exports consist of grains and vegetables, indicating that Moldova is a typical agricultural export-oriented economy. Although not prominent in terms of weight, machinery and equipment account for a large share of import and export value, showcasing the importance of Moldova's machinery exports as intermediate goods and consumer goods for the manufacturing sectors of importing countries.

Dramatic changes in transit cargo: From 2021 to 2022, grain transit surged, which might be the result of the "Solidarity Lanes" operating via Moldova when Ukraine's Black Sea ports were blocked or restricted. Looking ahead to 2024, while grain transit appears to be stabilizing, fuel transit is expanding at an overwhelming volume, thought to reflect either the growing importance of Moldova as a route for energy supplies to Ukraine or that improvements in logistics infrastructure have enabled more efficient energy transportation.



Source: Customs Service of the Republic of Moldova

Figure 4-13 Changes in Moldova's Trade Trends over Time (by Commodity)

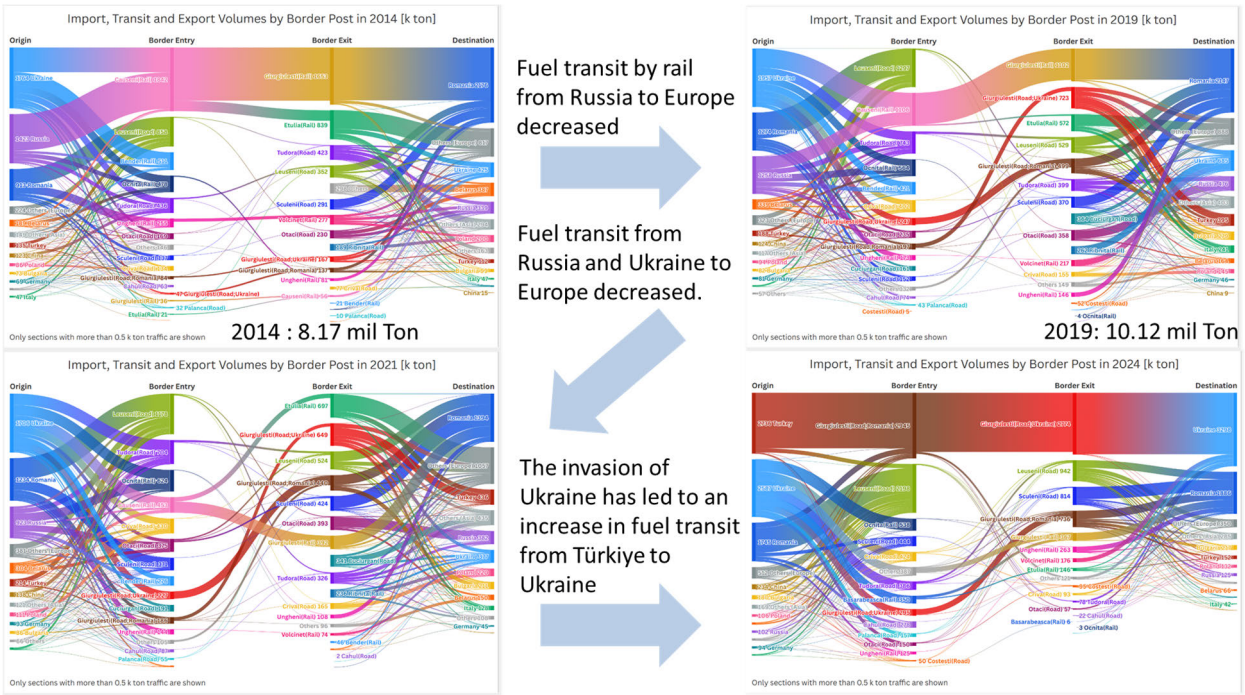
(3) Changes over Time in Cargo Transiting Through Moldova

Over the past decade, the volume and composition of cargo transiting through Moldova reflected geopolitical conditions. It experienced dramatic changes in many categories, particularly fuels. The major trends for each period are summarized below.

2014–2019 (Decline in Rail Transit from Russia to Europe): The volume of fuel transiting through Moldova's rail network from Russia to European countries showed a marked downward trend. While rail transport once served as the backbone of logistics and functioned as a vital corridor for transporting Russian energy to the West, the diversification of energy sources and efforts to improve transport efficiency during this period led to a gradual decline in traditional rail-based transport volumes (trade).

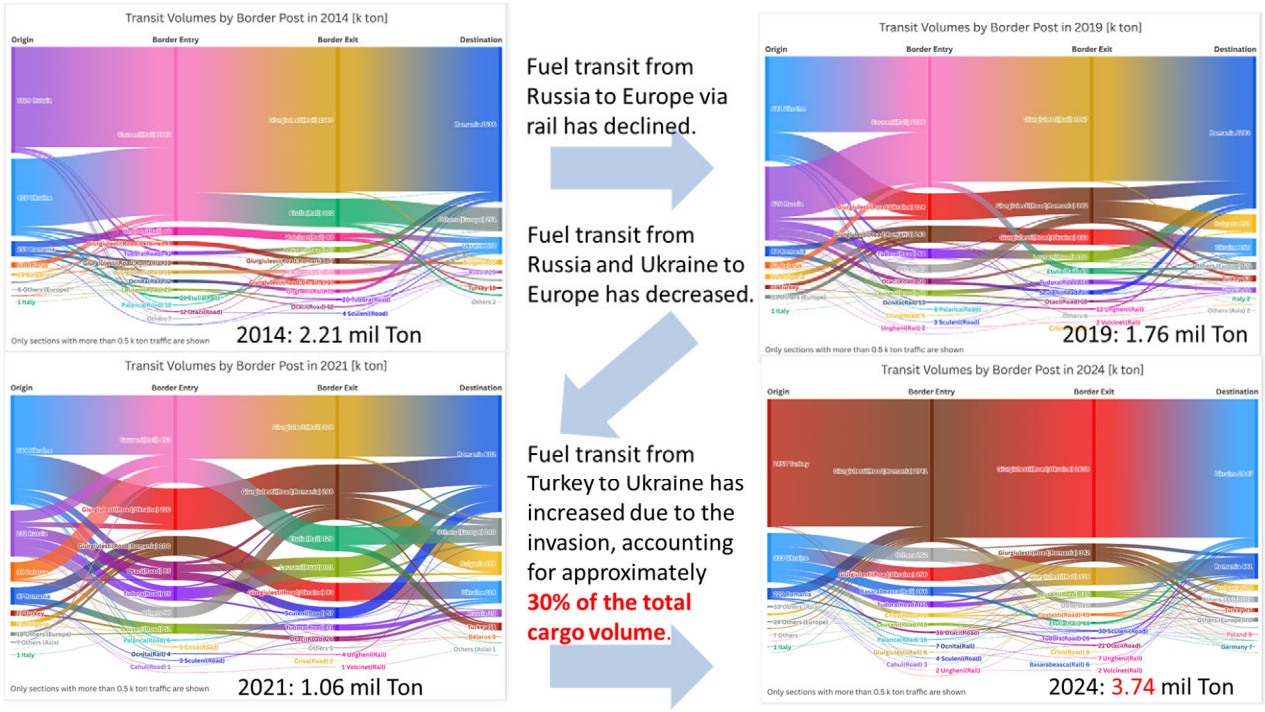
2019–2021 (Further Decline in Fuel Transit from Russia and Ukraine to Europe): Fuel transit to Europe originating from Russia and Ukraine saw a further decline. Compounded by regional instability and a shift in the EU's energy policy, the role of the "East-to-West" energy corridor—supplying fuel to Europe via Moldova—entered a decisive period of decline during this time.

2021–2024 (Reverse Flow from Turkey to Ukraine Following Russia's Invasion of Ukraine): Reversal of the logistics structure by the 2022 invasion of Ukraine. 2024 data indicate that Turkey rapidly emerged as a major supply hub. A reverse flow was established, with one-third of all transit cargo—primarily fuel—heading to Ukraine via the Giurgiulesti road checkpoint, suggesting that Moldova's geopolitical role shifted to a "south-to-north" strategic supply route to support Ukraine's wartime demand.



Source: Customs Service of the Republic of Moldova

Figure 4-14 Changes in Moldova's Trade Flows over Time

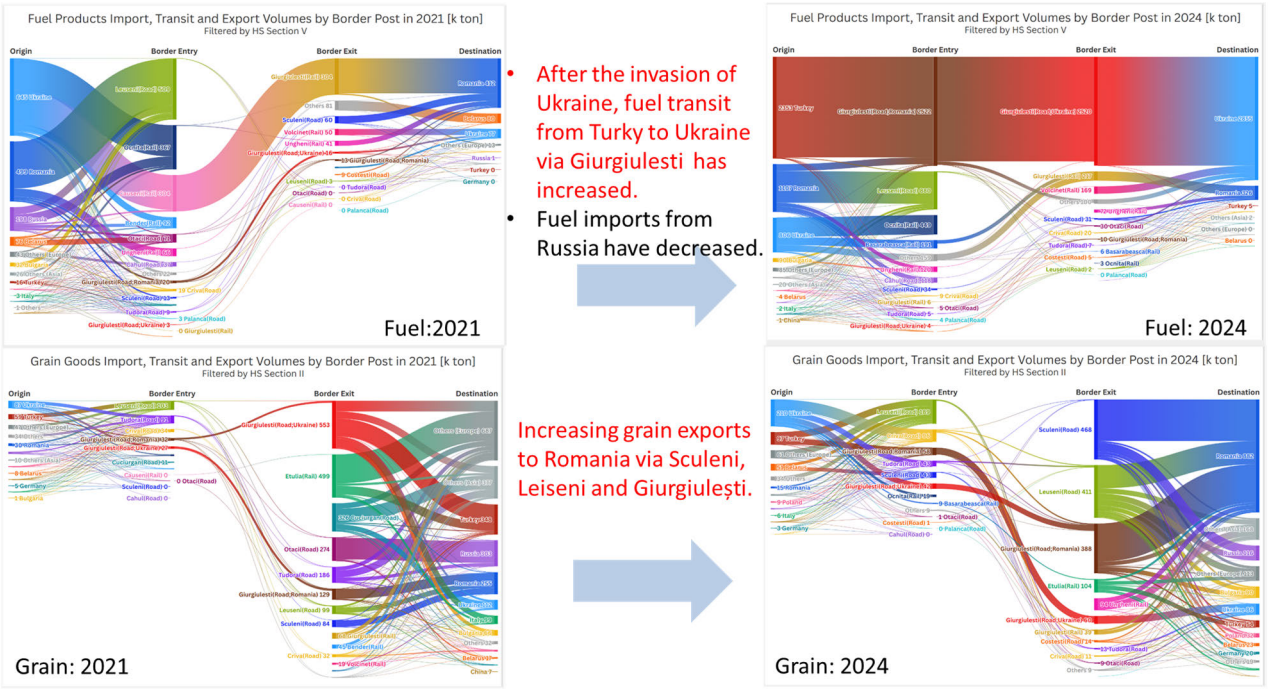


Source: Customs Service of the Republic of Moldova

Figure 4-15 Changes in Moldova's Trade Flows over Time (Transit only)

Trends in trade flows for fuel and grain, the main transport commodities, are focused on in this analysis. As mentioned above, regarding fuel trade, while direct fuel imports from Russia have plummeted, a new supply route originating in Turkey has emerged. According to 2024 data, fuel transit through Giurgiulesti to Ukraine has increased, indicating that Moldova has become a strategic energy corridor transporting fuel "from south to north" to support Ukraine's energy needs.

Meanwhile, looking at grain transportation, exports to Romania expanded significantly between 2021 and 2024. While there were once diverse destinations, the reorganization of logistics networks has led to grain being concentrated and shipped to neighboring Romania through major border checkpoints such as Sculeni, Leușeni, and Giurgiulesti, thought to reflect Romania's growing importance as a stable transit point to European markets, as traditional transport routes have been restricted due to the situation in Ukraine.



Source: Customs Service of the Republic of Moldova

Figure 4-16 Changes in Moldova's Trade Flows over Time (Fuel and Grain)

4.2.2 Travel Time and Costs for Each Export Route

(1) Transportation Costs and Transit Times for Cargo to and from Moldova

Figure 4-17 shows a summary of grain transport routes and modes originating from the vicinity of Floreşti, a major grain-producing region, based on interviews with local shippers. Currently, inside Moldova, a shift from rail to road transport has become established. Road transport costs are approximately half those of rail, and road transport speeds are two to three times faster than rail. However, it is possible to keep transport costs low on the rail route to Odesa, where nearly the entire journey takes place within Ukraine.

In terms of transit time, road transport to Giurgiulesti and Constanta holds a significant advantage. Particularly for medium-distance transport, a key feature of current logistics services is that road transport can be operated more quickly and at lower costs than rail transport, or at comparable costs.

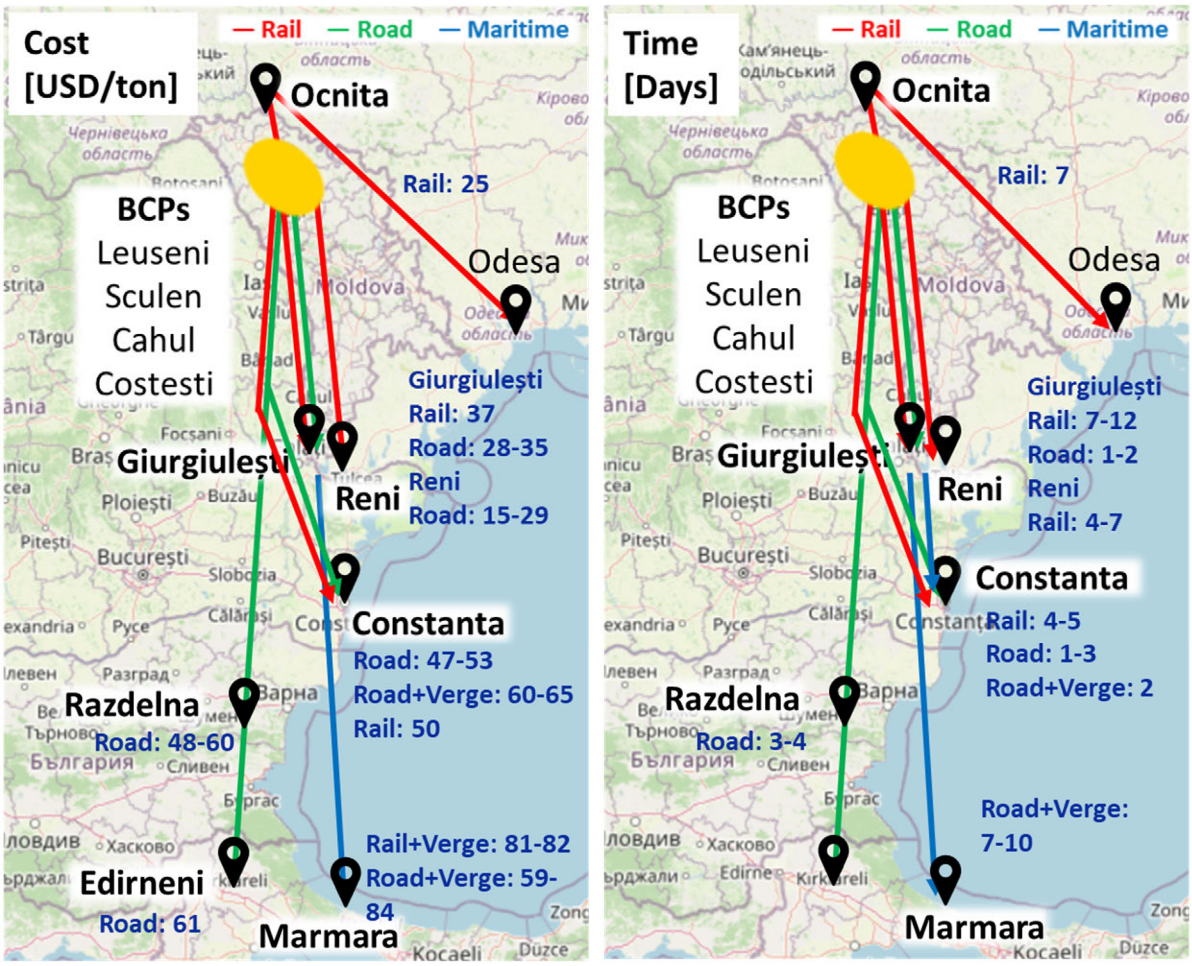
1) Transportation Costs and Transit Times for Cargo to and from Moldova

- **To Ukraine (Shortest Route Focused on Cost):** Transport to Reni and Odesa is the lowest-cost option due to geographical proximity. Rail transport to Odesa costs 25 USD/ton and takes 7 days.
- **Southern Moldova and Romania (Speed-Priority Route):** Giurgiulesti and Constanta are extremely important as export hubs. For shipments to Giurgiulesti, road transport (28–35 USD/ton, 1–2 days) offers a decisive advantage over rail transport (37 USD/ton, 7–12 days) in terms of both cost and time. Similarly, for shipments to Constanta, road transport (47–53 USD/ton, 1–3 days) is faster than rail transport (50 USD/ton, 4–5 days) and comparable in cost. A combined rail-and-sea transport route (60–65 USD/ton, 2 days) is also a viable option for speed.

- **Bulgaria and Turkey (Long-Distance, High-Cost Routes):** For destinations such as Razdelna, Edirne, and Marmara, costs and transit times increase proportionally to distance. Road transport to Razdelna costs 48–60 USD/ton (3–4 days). For the route to Marmara, the farthest destination, the Road + Sea combination costs 59–84 USD/ton. It has a transit time of 7 to 10 days. If the combined rail-and-sea transport route is selected, the cost is approximately 81–82 USD/ton.

2) Comparative Analysis by Transport Mode

- **Advantages of Road Transport:** According to the data in this study, road transport is more time-efficient than rail transport on many routes. In particular, for destinations such as Giurgiulesti and Constanta, delivery is possible within 1–3 days, making it the first choice for maximizing logistics service turnover.
- **Limited Benefits of Rail Transport**: Rail transport offers overwhelming cost advantages only on routes where specific infrastructure is in place, such as for shipments to Reni. However, in cases like shipments to Giurgiulesti, where transit times are longer (up to 12 days) and costs are higher than for road transport, careful consideration based on the destination is required.
- **The Role of Intermodal Transport (**Including Sea Freight**)**: Sea freight transport via the Black Sea is an indispensable means for long-distance exports to the Marmara region. However, costs tend to rise by $60–$80 per ton, and transit times typically exceed one week; therefore, it is practical to consider this option for large-volume shipments or when evaluating the total cost to the destination.



Source: Based on interviews with carriers and shippers

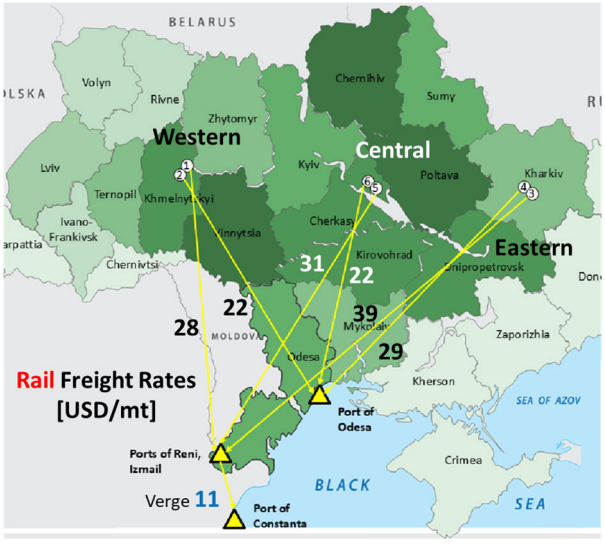
Figure 4-17 Comparison of Shipping Costs and Transit Times from Northern Moldova

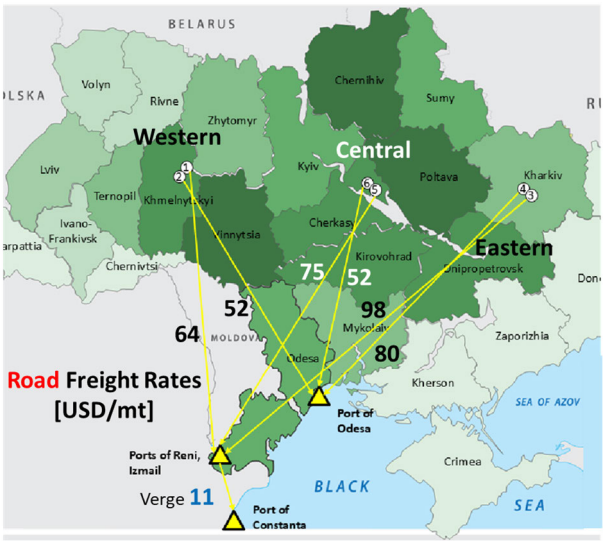
(2) Transportation Costs for Cargo to and from Moldova

This analysis compares and evaluates Ukraine's grain export costs for 2024 from USDA data presented in Figure 4-18, examining factors such as mode of transport, destination ports, and points of origin.

- **Comparison by Mode of Transport:** Rail transport offers a significant cost advantage over other modes. According to the data, rail freight rates are approximately 40% of road transport. For example, when transporting from the west to the Odesa Port, rail (22 USD/ton) costs less than half as much as road transport (52 USD/ton). This trend is consistent across all routes. For transport from the east to the Constanta Port (via Reni and Izmail), the difference is 59 USD/ton, with rail costing 39 USD/ton. Road transport costs 98 USD/ton.
- **Comparison by Route (Port):** By destination port, the Odesa Port (Black Sea route) is consistently lower in cost than the Constanta Port (Danube River/Romania route). When using the Constanta Port, a flat-rate barge fee of "11 USD/ton" is added to the overland transport cost to Reni and Izmail. As a result, even for the same rail transport, while the cost from the central region to Odesa is only 22 USD/ton, the total cost to Constanta is 44 USD/ton (33 + 11), which doubles the cost.

- **Comparison by Origin:** When comparing origins (Western, Central, and Eastern), the structure shows that costs for shipments originating in the East skyrocket with distance to the port. Freight rates from the Western and Central regions to the Odesa Port are at the same level (rail: 22 USD/ton, road: 52 USD/ton). In contrast, the cost burden is heaviest for shipments from the eastern region. For road transport to the Constanta Port, the combined cost of land transport (98 USD/ton) and barge fees totals 109 USD/ton, representing an approximately 45% increase compared to shipments from the western region (75 USD/ton).





Freight Cost Comparison:
Road Transport < Rail Transport (Approx. 0.4x)

Geographical Advantage:
Lower transport costs in Western regions due to proximity to ports.

Costs included in rail transport:
Delivery costs to the railway station and rental fees for grain hopper cars.

Costs included in road transport:
Inland transport costs to the port, loading charges (stevedoring), customs clearance fees, documentation fees, and demurrage.

Assumptions for Transport Rates (Western and Eastern Ukraine):
As specific data regarding transport fares from Western and Eastern Ukraine was unavailable, the calculations contain the following assumptions:

The truck transport cost to the railway station for all routes is fixed at **6.37 USD/mt** (based on the figure for Central Ukraine).

Rail transport rates for other routes were calculated by applying a **long-distance tapering effect** to the unit distance price from Central Ukraine.

The transport distances for rail and road are assumed to be **identical** for each respective route.

Source: Calculated by the research team based on USDA (2025) "Ukraine Grain Transportation"

Figure 4-18 Information on Ukraine's Grain Exports by Route (2024)

4.2.3 Challenges and Issues in Facilitating Import and Export Freight Transport Through Moldova

(1) Exporters' Perspectives

Interviews were conducted with 13 local transport operators and shipper companies. The results are in the table below, and the current logistics situation is under the following three categories.

1) Overview of Transport Routes and the Shift to Road Transport

Currently, export logistics primarily follow routes heading southwest from the northern grain-producing regions to Romania, Turkey, and Southern Europe. Regarding modes of transport, the shift from rail to road transport has become firmly established because trucks offer an overwhelming cost advantage—at roughly half the price of rail—and achieve transport speeds two to three times faster than rail. Furthermore, the efficient operation of truck transport carrying grain on the outbound leg and loading textiles or fertilizers on the return leg further reduces overall transport costs, which is a decisive factor in shippers' choices.

2) CFM's Dysfunction and the Reality of Rail Transport

CFM, which should serve as the backbone of logistics, has lost public trust due to multiple issues, including aging infrastructure and rolling stock, a bureaucratic management system, lagging digitalization, and opaque freight rate setting. In addition to the increased burden on users caused by the September 2025 freight rate hike and rising transshipment costs, physical risks such as landslides on the Western Line and cargo theft have also become apparent.

Regarding transport procedures, although shippers are required to submit requests to CFM a full month in advance, as the shipment date approaches, they are forced to adjust cargo volumes due to a shortage of freight wagons, making the process unreliable, cumbersome, and inconvenient. Meanwhile, since the second half of 2025, some companies have resumed rail exports from the Odesa Port, and there are signs of efforts to explore new transport routes under these difficult conditions by transferring cargo to Ukrainian State Railways' rolling stock at Oknytsia.

3) Structural and Geopolitical Bottlenecks and External Pressures

The current logistics network faces structural challenges, including route reorganization following the Russian invasion and transshipment costs due to differences in track gauges. In particular, at the Giurgiulesti Port, transport restrictions due to insufficient water depth in the Danube River are hindering stable operations. In addition, soaring material costs are directly squeezing corporate profit margins, and economic difficulties persist. Furthermore, chronic congestion at border checkpoints and deficiencies in customs systems have made delivery delays the norm. A deteriorating external environment is reducing overall logistics efficiency.

Table 4-1 Challenges and Issues in Facilitating Import and Export Cargo Transportation Through Moldova

Respondent Company	Transit	UA trade	RO trade	Comments on Import and Export Cargo Transiting Through Moldova
Company A (Forwarder)	×	exports – imports ○	exports ○ imports ○	• Production sites for coal and iron ore from Ukraine (UA) are located in Eastern UA, which is currently under Russian occupation, resulting in a suspension of supply. → The Galati steel plant in Romania (RO) has closed due to a lack of demand. • Moldovan (MD) rail wagons are not permitted to enter UA due to the risk of shelling within Ukraine. • Passing through Transnistria is difficult, so routes into UA are limited. • Rail freight rates for container transport from the Port of Constanta to Moldova are twice those of truck transport. • In Giurgiulesti (GI), the proximity of the UA and RO borders causes trucks to accumulate in a narrow section within MD.
Company B (Shipping Company -Container)	×	×	exports ○ imports ○	• Since Odesa Port reopened in June 2024 and most bulk cargo returned to Odesa, there is almost no transit cargo passing through MD. • Odesa Port carries high security risks, and its utilization for container transport is very low. • Some UA customers use the Port of Constanta for safety reasons, but they do not need to pass through MD (direct transport to RO).
Company C (Oil wholesaler)	○	×	exports × imports ○	• Diesel and gasoline are exported to UA from RO refineries and storage facilities. • The majority of exports to UA are conducted directly by rail via the RO-UA border. → Most of the transport to UA is destined for storage facilities in the northwestern part of Ukraine, where the situation is stable. → Rail freight rates per km in RO are 40% cheaper than CFM (Moldovan Railways) rates. (Rail rates between Giurgiulesti and Chisinau are double those between Constanta and Chisinau.) • UA exports via MD are transported by barge or rail to the RO-MD (GI) border, and then by truck for the MD-UA leg (100,000–150,000 tons/year). → Due to safety concerns regarding storage facilities around Odesa, customers transport diesel and gasoline directly to their destinations by truck. → Barge loading capacity is limited by the falling water levels of the Danube River, while rail capacity in RO is limited by track availability.
Company D (Oil wholesaler)	×	×	exports × imports ○	• MD's railway infrastructure, intended for mass transport, is aging, and freight rates are higher than trucks. Cargo transloading between wagons is required at the RO-MD border. • CFM procedures are not digitized; to use wagons, documents must be prepared manually and submitted directly to CFM.
Company E (Cement manufacturer)	×	exports ○ imports ×	exports ○ imports ○	• Regarding cement exports to UA, exports are impossible because UA has imposed a 95% anti-dumping duty on MD-produced cement since 2020 (even though the raw material, slag, is imported from UA).
Company F (Grain Shipper)	○	-	-	• The railway operates at a fatally slow average speed of 10 km/h. • Demurrage risks for 3,000-ton class vessels reach approximately $4,000 per day. • For 300km truck transport, securing backhaul cargo in bags is a requirement for profitability.
Company G (Grain Shipper)	×	-	-	• The company owns a 20,000-ton warehouse at Giurgiulesti Port, but loading restrictions due to the falling water level of the Prut River act as a bottleneck. • Due to CFM freight rate hikes, the price advantage of rail has completely disappeared.
Company H (Grain Shipper)	○	-	-	• Lack of rail unloading infrastructure at Giurgiulesti Port. • The lack of repairs on the southern line (between Tigheci and Giurgiulesti) forces long detours and drives up costs.
Company I (Grain Shipper)	○	-	-	• The bureaucratic operation of CFM and the rigidity of its "Monthly Planning." • Delays in responding to the landslide (infrastructure accident) that occurred near Opalsen in 2021. • Risk of cargo theft and "shrinkage" (contents being extracted even if seals remain intact).
Company J (Grain Shipper)	×	-	-	• The facility has a storage capacity of 87,000 tons, but chronic congestion at the border pressures lead times. • Risk of quality degradation due to leaks in aging rail wagons. Worsening profitability due to skyrocketing production costs and price stagnation at 2018 levels.
Company K (Rail Forwarder)	× (past: ○)	○	○	• Railways should be regarded as essential public infrastructure supporting the national economy, similar to roads, and investments should be made by allocating fuel excise taxes toward maintenance. • Hubs like Ungheni, which possess both European standard gauge and broad gauge, have high potential; a track record should be established starting with low-cost renovations and restarts.

Source: Interviews with transport companies and shippers

(2) Views of Japanese Companies Engaged in Import/Export with Ukraine

The JICA survey team conducted interviews with Japanese companies importing and exporting to and from Ukraine (shippers, logistics companies, major trading firms, etc.) regarding the current status and future outlook of the logistics routes they use, revealing the following facts and perspectives.

- **The Mainstreaming of the Poland Route and the Current Status of the Moldova Route:** Currently, the mainstream route for Japanese companies transporting cargo to Ukraine involves transiting through Baltic Sea ports in Poland (such as the Ports of Gdansk and Gdynia) and then using

trucks or rail to transport goods into and out of Ukraine. On the other hand, using logistics routes transiting through the Republic of Moldova are extremely limited at this time.

- **Factors Behind the Choice of the Polish Route:** Common factors driving Japanese companies to prioritize the Polish route include the "stability" of transportation schedules and infrastructure, as well as the overall "cost" advantage, including insurance premiums. These factors suggest that, in the current highly uncertain business environment, companies place the highest priority on the predictability and economic rationality of their supply chains.
- **Potential for Future Route Diversification:** On the other hand, while companies currently prioritize the proven and reliable Poland route, they also recognize the need to prepare for potential changes in local conditions, logistics bottlenecks, and fluctuating cost structures. Therefore, from the perspective of future risk hedging, diversifying logistics routes, including developing alternative routes such as those via Moldova, is being suggested.

Table 4-2 Views of Japanese Companies Engaged in Import/Export with Ukraine

Item	Shippers	Logistics companies	Major trading companies
Logistics Route Usage and Selection Criteria	**By rail from the Port of Gdańsk, Poland, to Ukraine (cargo: rails)**. This route was chosen because it is closest to the destination (Mostyska Station) and because we were able to secure facilities for the handling and storage of large quantities of 25-meter rails. The route via Constanța was not selected due to a lack of yard space and other factors.	**Container transport by truck via the Port of Gdańsk, Poland**. The route via Romania is complicated and time-consuming, whereas Poland offers high operational capabilities due to the presence of Japanese expatriate staff.	**Typically, container transport by truck from the Port of Gdańsk, Poland (food products)**. This is the most cost-effective option in terms of insurance premiums. However, **for exceptionally heavy cargo (transformers) exceeding the weight limit at the Port of Gdańsk, we have, on rare occasions, utilized the Port of Constanța**.
Transportation Environment (Infrastructure, Costs, Time, Customs Clearance, etc.)	**Sea transport:** We choose the route around the Cape of Good Hope due to the situation in the Red Sea. **Rail:** Mostyska 2 Station is served by standard gauge tracks, eliminating the need for transshipment. **Customs Clearance:** We encountered difficulties due to jurisdictional disputes and document coordination specific to relief supplies. **Insurance:** Standard rates apply up to the border.	**Lead Time and Cost:** Transshipping at major Northern European ports (such as Hamburg) and shipping to Poland is faster and cheaper than shipping via the Mediterranean or Black Sea. **Infrastructure:** Truck transport is more efficient within Poland.	**Lead time:** The journey from Ukraine to Poland takes about one day, but **queues at border checkpoints** due to stricter EU regulations **are a source of uncertainty**. <**Customs clearance:** Procedures are smooth as customs clearance is completed on the Ukrainian side. **Heavy cargo:** When transiting via the Port of Constanța, cargo is transported by land without passing through Moldova.
Improvements, Requests, and Future Plans	Shared information on the route from Constanța to the Port of Leni in Ukraine via barges on the Danube River. The possibility of a rail route through southern Moldova is also being considered for the future.	We are exploring **the possibility of extending rail transport toward Moldova**, starting from Romania, which owns its own assets (railway companies, port terminals).	**Interest among Japanese companies in the route via Moldova is currently low**. However, if costs such as insurance premiums in the Black Sea region improve, there is room to consider switching to routes via Constanta and other ports.

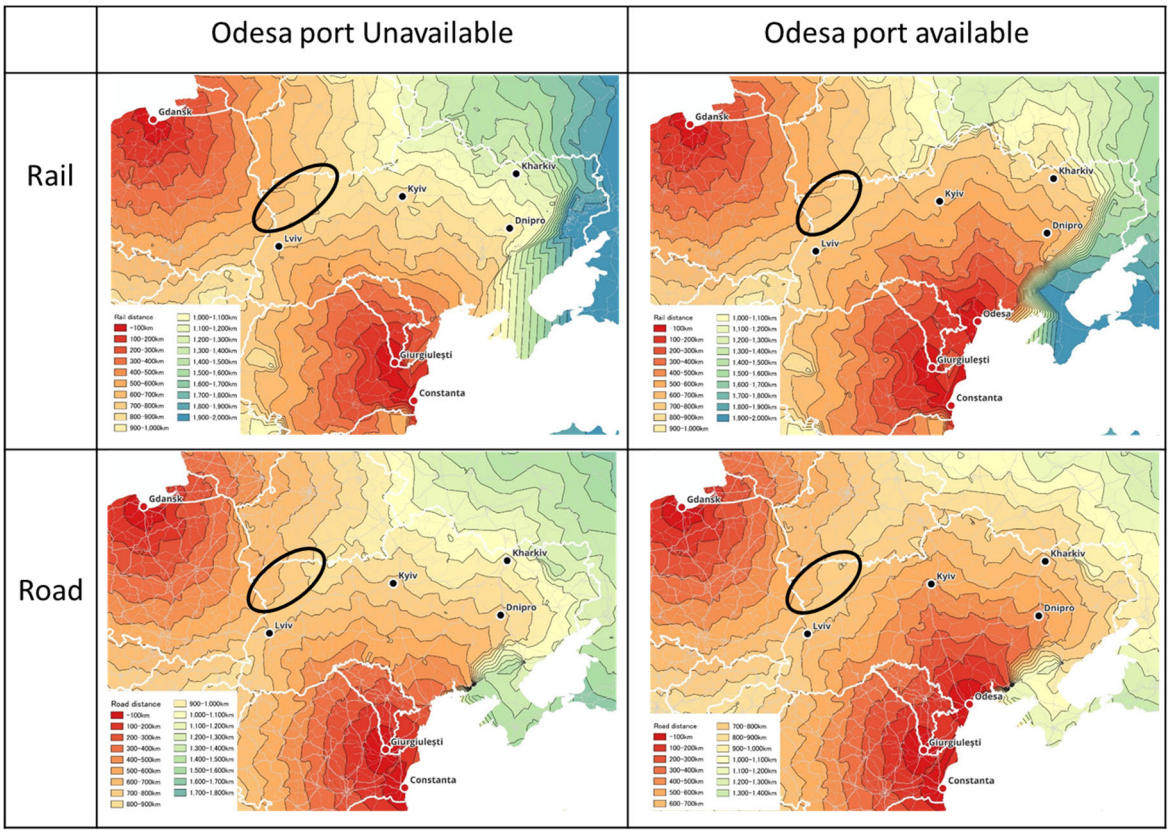
Source: Interviews with Japanese companies

(3) Catchment Area Analysis Using Isoclines

In this study, to evaluate the physical access advantages of major ports, a catchment area analysis using isochrones was conducted, as shown in Figure 4-19. The analysis confirmed the following geographical characteristics regarding import and export routes from within Ukraine.

- **Comparison of catchment areas for Baltic Sea ports and Black Sea/Danube River ports:** An evaluation based on isochrones revealed that the regions possessing a distance advantage (i.e., being closer) relative to Polish Baltic Sea ports (such as the Gdansk Port) are limited to a specific area in western Ukraine, primarily around Lviv. On the other hand, for most regions within Ukraine (central, eastern, and southern regions, etc.), access to the deep-water Black Sea port near Odesa or the Danube River ports in the southwest (such as Izmail and Reni) is shorter, demonstrating an overwhelming geographical advantage as catchment areas.
- **Geographical Assessment of Alternative Routes in Times of Emergency or Port Function Restrictions:** Based on the above results, if the Odesa Port—the primary gateway—becomes

unavailable due to an emergency or blockade, the most reasonable alternative routes from a distance perspective for most regions of Ukraine would be the Danube river ports in the southwest and the Constanta Port in Romania.



Source: JICA Survey Tea

Figure 4-19 Catchment Area Analysis Using Isodistance Curves

4.3 Demand Forecast

Logistics demand forecasts are essential basic information when considering Japan's short- and medium-term (through 2035) financial and TA to the logistics sectors of Moldova and Ukraine. This study focuses on the outlook for Moldovan and Ukrainian trade relations and shared structures with other countries, as well as the impact of Russia's ongoing invasion of Ukraine. Regarding the former, we will establish medium- to long-term outlooks based on economic growth forecasts for the trading partners of both countries and their trade relationships (trade dependency). Regarding the latter, we will consider two scenarios of the impact of Russia's invasion of Ukraine.

4.3.1 Trade in Moldova and Ukraine

(1) Estimates of Import and Export Values for Major Commodities

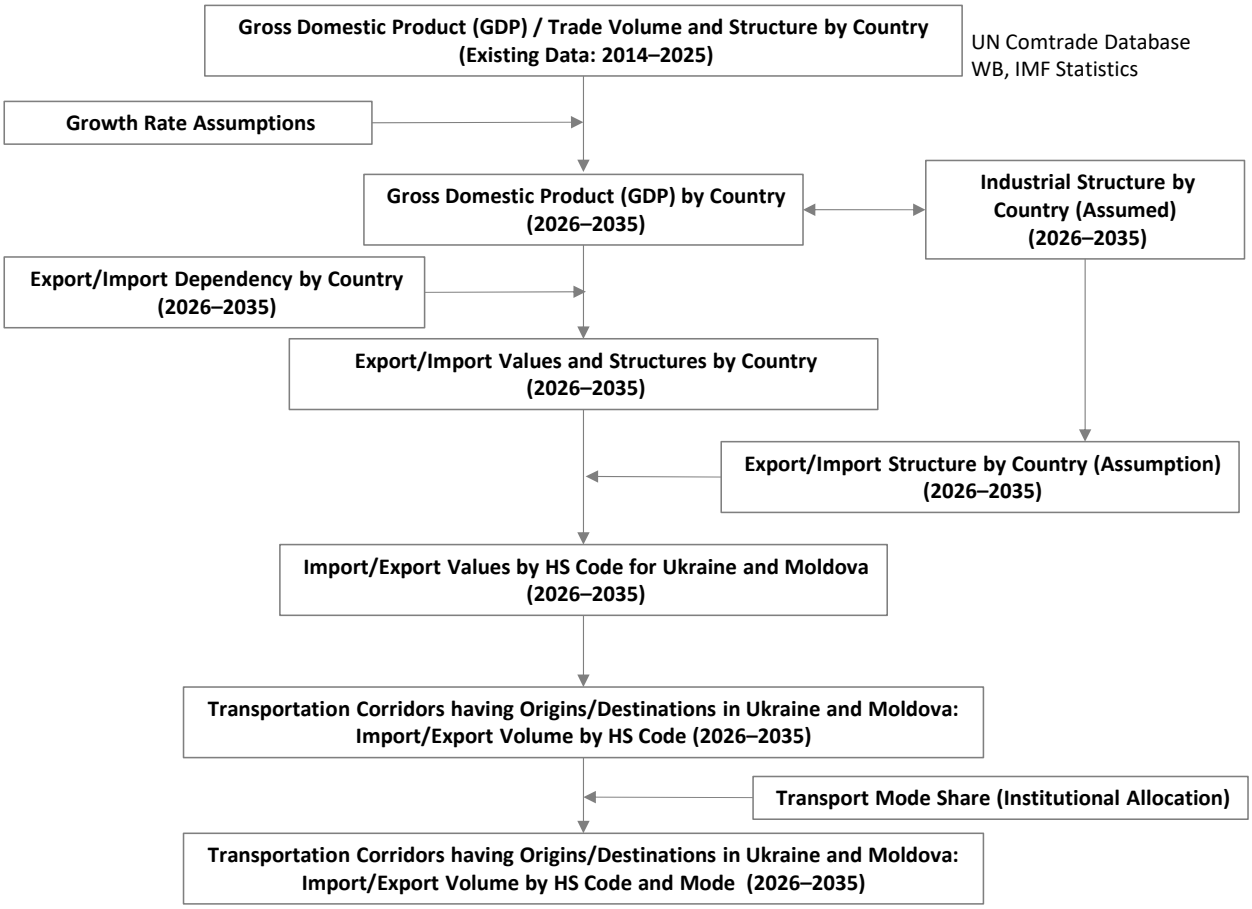
Based on economic growth forecasts for the trading partners of Moldova and Ukraine, future estimates of import and export values for their major items have been calculated. These estimated trade values serve as a guideline for estimating cargo volumes passing through BCPs, including international ports.

To estimate import and export values, the UN Comtrade database was used, specifically the trade data for Moldova, Ukraine, and their major trading partners by two-digit HS codes defined by the WCO. First, under a "Business as Usual" (BAU) scenario with stable trade relations, we analyzed the trade structure and commodity trends from 2014 to 2021 before Russia invaded Ukraine.

Furthermore, using the IMF database, we calculated the degree of dependence of Moldovan and Ukrainian exports and imports on the GDPs of each trading partner based on actual nominal GDP figures (2014–2021) and their breakdowns.

The IMF database (GDP) provides future projections (through 2030) that do not account for the impact of the Russian invasion. By applying the trade relationships (trade dependence) of Moldova and Ukraine and their trade partners to these projections, we estimate the future annual total import and export volumes for Moldova and Ukraine. For the period after 2031, we estimated the 2035 figures based on the trends observed in the projections through 2030.

Furthermore, assuming that the impact of the Russian invasion on trade between Russia and Belarus will be limited to the short- to medium-term, such trade has been excluded from the estimates.



Source: JICA Survey Team

Figure 4-20 Flowchart of Demand Estimates by Transport Corridor and Mode for Moldova and Ukraine

Following Figure 4-20, we explain the procedure for estimating the major import and export values of Moldova and Ukraine from 2025 onward.

1. Collection of Basic Data

   Using UN Comtrade, organize the actual import and export data between Moldova and Ukraine and their major trading partners (by export destination and import source) into HS code categories (based on 2-digit HS codes). The analysis period is set from 2014 to 2021, before the Russian invasion, identifying trade structures and commodity trends.

2. Identification of Major Commodities

   Based on data from the above period, identify major commodities with significant import and export values by HS code, and organize the composition ratio for each commodity and trade relationships by country.

3. Establishment of Macroeconomic Indicators

   Using IMF data, we obtained actual and projected nominal GDP figures for Moldova, Ukraine, and major trading partners to establish future economic scale (total GDP). Since the IMF's projections

extend only through 2030, figures for 2031 and beyond were derived by extrapolating the trend from the 2030 data.

4. Analysis of the Relationship Between Imports, Exports, and GDP

   The import dependency ratio was calculated using export and import values relative to each country's nominal GDP during the relevant period. This allows us to quantify and assess the medium-term trade structure of every country.

5. Estimation of Future Import and Export Values

   Using the average import dependency ratio obtained above, we will calculate future import and export values for each country based on their projected GDP from 2025 onward and estimate these figures by product category. Note that for Ukraine, trade with Russia and Belarus will be excluded from the analysis.

(2) Estimated Export Values for Moldova's Major Export Categories

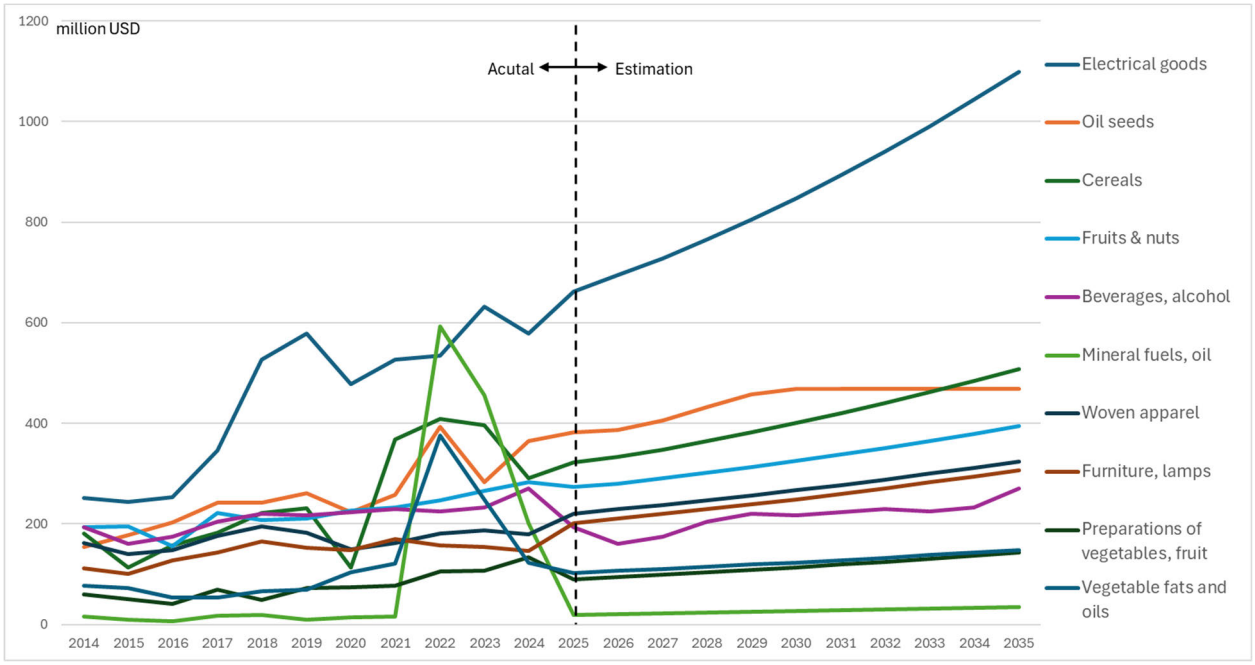
Export value estimates were calculated for the top 10 major export items by HS code[23]. Figure 4-21 shows that, according to the estimated results, electrical equipment is expected to grow over the next 10 years and become the most important item for overall exports. The next most important categories are agricultural products such as oilseeds, grains, fruits, and nuts; beverages and alcohol, represented by wine; and textiles and clothing.

Regarding grains and oilseeds, as described in "2.1.3 Moldova's Natural and Social Environment," the decline in agricultural sustainability from soil degradation is a challenge. Furthermore, interviews with agricultural cooperatives indicate a limited scope for farmland expansion beyond current levels. Based on these factors, estimates were made using FAO statistical data, with upper limit on export value based on the harvested area as of 2023[24].

As a result, the upper limit for grain exports was estimated at approximately 681 million U.S. dollars; this limit is not expected to be reached over the next 10 years, and export value is projected to continue increasing. On the other hand, the upper limit for oilseeds was estimated at approximately 468 million U.S. dollars; this limit is expected to be reached in 2030, after which exports are projected to remain flat from 2031 onward. For vegetable oils (seed oils), a gradual increase is projected to continue beyond 2025.

[23] Based on actual data from 2014 to 2021, the top 10 items accounted for approximately 80% of the total export value. Since this was deemed sufficient to grasp the bulk of the export structure, this analysis focused on the top 10 items.

[24] Based on the latest harvested area (ha) as of 2023, we calculated the harvest volume by applying the maximum yield (kg/ha) from the 2014–2021 period, before Russia invaded Ukraine. Furthermore, we estimated the export weight using the export ratio for bumper crop years and calculated the export value by multiplying this by the highest export unit price (USD/kg). The calculation formula is as follows:
Export Value = Harvest Volume (2023 Harvest Area × 2014–21 Maximum Yield) × Export Ratio in Bumper Years × 2014–21 Highest Export Unit Price



Source: JICA Survey Team

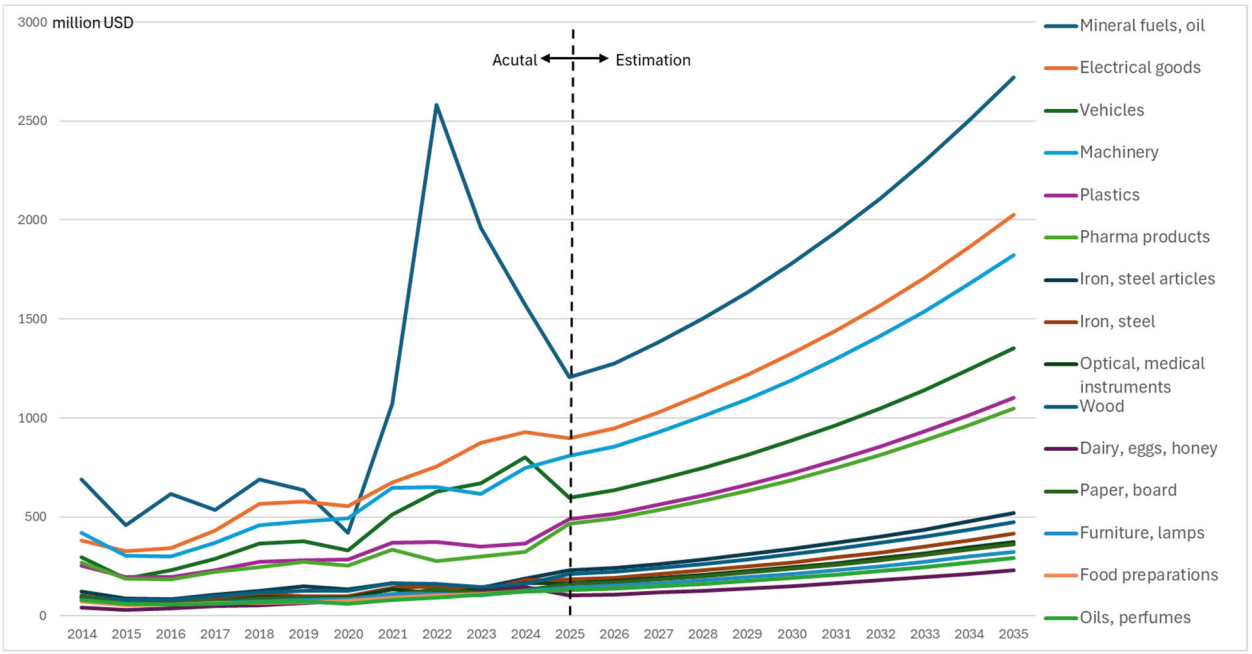
Figure 4-21 Estimated Export Value by HS Category for Moldova

(3) Estimated Import Values for Moldova's Major Import Categories

Import value estimates were calculated for the top 15 major import items by HS code[25]. Looking at the 2025 estimates, Moldova relies almost entirely on imports for mineral fuels such as refined petroleum products and natural gas, and a steady increase in energy demand is expected over the next 10 years as the economy expands (Figure 4-22).

Following these, electrical equipment, machinery, and automobiles and parts are classified as major import items. In the wire harness industry, which is expected to continue driving economic growth, imports of raw materials and industrial machinery associated with capital investment are projected to continue increasing.

[25] Based on actual data from 2014 to 2021, the top 15 items accounted for approximately 80% of the total import value. Since this allowed us to grasp the major components of the import structure, this analysis focused on the top 15 items.



Source: JICA Survey Team

Figure 4-22 Estimated Import Value by HS Category for Moldova

(4) Estimated Export Values of Ukraine's Major Export Items

Of the top 10 major export items by HS code[26], three items—steel, ores, slag, and ash, and steel products—were excluded from the analysis. However, their export values were still estimated.

Regarding the excluded items, the World Bank report confirms the destruction of the Azovstal and Ilyich Steel plants, resulting in a significant loss of production capacity. Furthermore, regarding ore supply, many of the affected facilities are located in Russian-occupied territories (as of the end of 2025), making it difficult to quantify production and supply conditions. For this reason, estimates exclude these items.

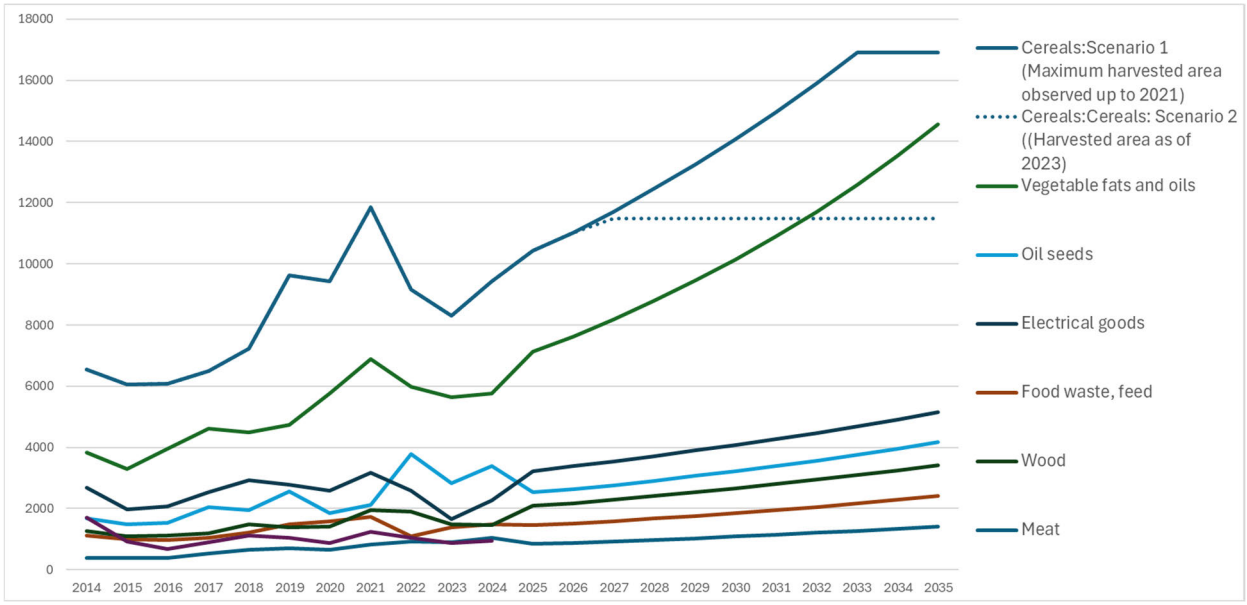
On the other hand, regarding grains and oilseeds, the IMF has identified the five regions in eastern and southern Ukraine—the primary production areas—as the region's most severely affected by the invasion. Based on this, this estimate establishes the following two scenarios regarding harvested area:

- Scenario 1: A case based on the maximum harvested area from 2014 to 2021 (before the Russian invasion)
- Scenario 2: A case based on the harvested area as of 2023 (following the Russian invasion)

As a result, the upper limits for grain and oilseed export values were estimated at 16,910 million USD and 5,271 million USD, respectively, under Scenario 1, and at 11,475 million USD and 5,069 million USD, respectively, under Scenario 2. For grains, the upper limit is projected to be reached in 2033 under Scenario 1 and in 2027 under Scenario 2. On the other hand, for oilseeds, the upper limit is not expected to be reached

[26] Based on actual data from 2014 to 2021, the top 10 items accounted for approximately 80% of total export value. Since we determined that this would allow us to grasp the bulk of the export structure, this analysis focused on the top 10 items.

in either scenario over the next 10 years, and export values are projected to continue trending upward. Consequently, an increase in export values is also anticipated for vegetable oils and fats.



Source: JICA Survey Team

Figure 4-23 Estimated Export Value by HS Category for Ukraine

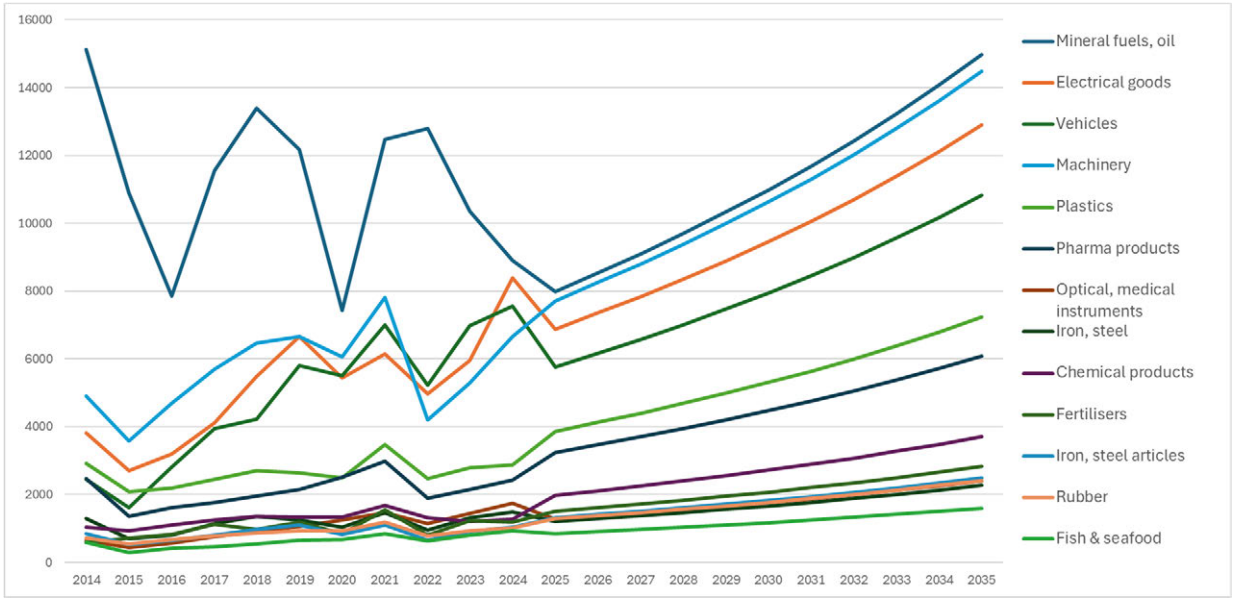
(5) Estimated Import Values for Ukraine's Major Import Categories

Top 15 Major Import Items by HS Code[27]: two categories were excluded—special classification items and aircraft—from the analysis and estimated import values. Import values for these items surged following the Russian invasion[28], and since aircraft are likely to include defence-related equipment such as unmanned aerial vehicles (UAVs), it is difficult to predict future demand. For this reason, estimates exclude them.

According to estimates, demand for mineral fuels will continue growing over the next 10 years, and import values for machinery, electrical equipment, and automobiles and parts will increase as major import categories.

[27] Based on data from 2014 to 2021, the top 15 items accounted for approximately 80% of total import value, and we determined that this would allow us to grasp the major components of the import structure; therefore, this analysis focused on the top 15 items.

[28] These items account for approximately 90% of total aircraft imports in 2023 and 2024.



Source: JICA Survey Team

Figure 4-24 Estimated Import Value by HS Category for Ukraine

4.3.2 Scenario Based on Russia's Invasion of Ukraine

Estimates of future import and export volumes (trade value) for Moldova and Ukraine were based on the economic growth of trading partners (IMF forecasts) and trade structures. Given this, predicting which transport corridors will be used for trade is crucial when considering support for transport and transportation infrastructure; in this context, the impact of Russia's invasion of Ukraine is a key factor influencing the choice of transport routes. The selection of transport routes for Ukrainian imports and exports, including those via Moldova, is fundamentally based on economic considerations—namely, transport costs, transit time, and transport quality. The external factor of Russia's invasion exists; therefore, we have prepared scenarios that focus on this aspect.

(1) Current Status and Outlook for International Logistics in Ukraine

The characteristics of Ukraine's international logistics as of the time of this survey (2025) can be summarized as follows.

- From 2022 to 2023 (immediately following the Russian invasion), Ukraine's grain exports travelled via land and water routes through the neighboring countries, including Moldova. However, by 2025, exports largely returned to the Odesa Port at pre-invasion levels. In other words, if the Odesa Port is operational, it is highly unlikely that Ukraine's grain exports will route through Moldova.
- The EU, EBRD, and EIB have designated the Ukraine–Moldova–Romania route (one of the "Solidarity Lanes") as an emergency route (a contingency route in response to the Russian invasion). They also recognize that there is no economic rationale for selecting this route under normal circumstances.

- Under normal circumstances, the primary trading partner for potential imports and exports via Moldova would be Romania; in such cases, the bulk cargoes likely to be transported by rail would be grain, oil, and iron.

(2) Current Status and Outlook of International Logistics in Moldova

The characteristics of Moldova's international logistics as of 2025 can be summarized as follows.

- The bulk cargoes in Moldova's imports and exports are grain and oil, and the majority of these are transported by truck.
- The transport of iron ore from eastern Ukraine (which accounted for 30% of CFM's freight volume) is no longer expected to generate future demand following the closure of the Galati steelworks.
- Transit cargo through Moldova fluctuates from year to year. However, in 2024, there has been an increase in fuel transported by truck from Turkey to Ukraine via the border transit zone near Giurgiulesti (accounting for approximately 30% of total cargo volume). The route through Moldova is considered to be a significant fuel supply route for southwestern Ukraine.
- Following Moldova's national elections, the pro-EU Party of Action and Solidarity (Partidul Acțiune și Solidaritate: PAS) secured a majority. Therefore, the likelihood of Moldova becoming a political obstacle to the use of the "Solidarity Lanes" for Ukraine's logistics and import-export trade via the Moldovan route remains low.
- There is a possibility that Moldova's domestic transport networks and services could become a freight transport hub for Ukraine's reconstruction efforts (in addition to land routes from Poland via Odesa, as an import route via Romania), and transit freight volumes could increase in line with demand for Ukraine's reconstruction.

(3) Scenario Setting

Considering EU accession, the separation of railway operations into infrastructure and operations is underway in Moldova. Given that, as of February 2026, the policy to split CFM into an infrastructure management company and a railway operations company has been finalized, the scenarios for examining international logistics routes to, from, or via Moldova (demand forecasts) are as follows.

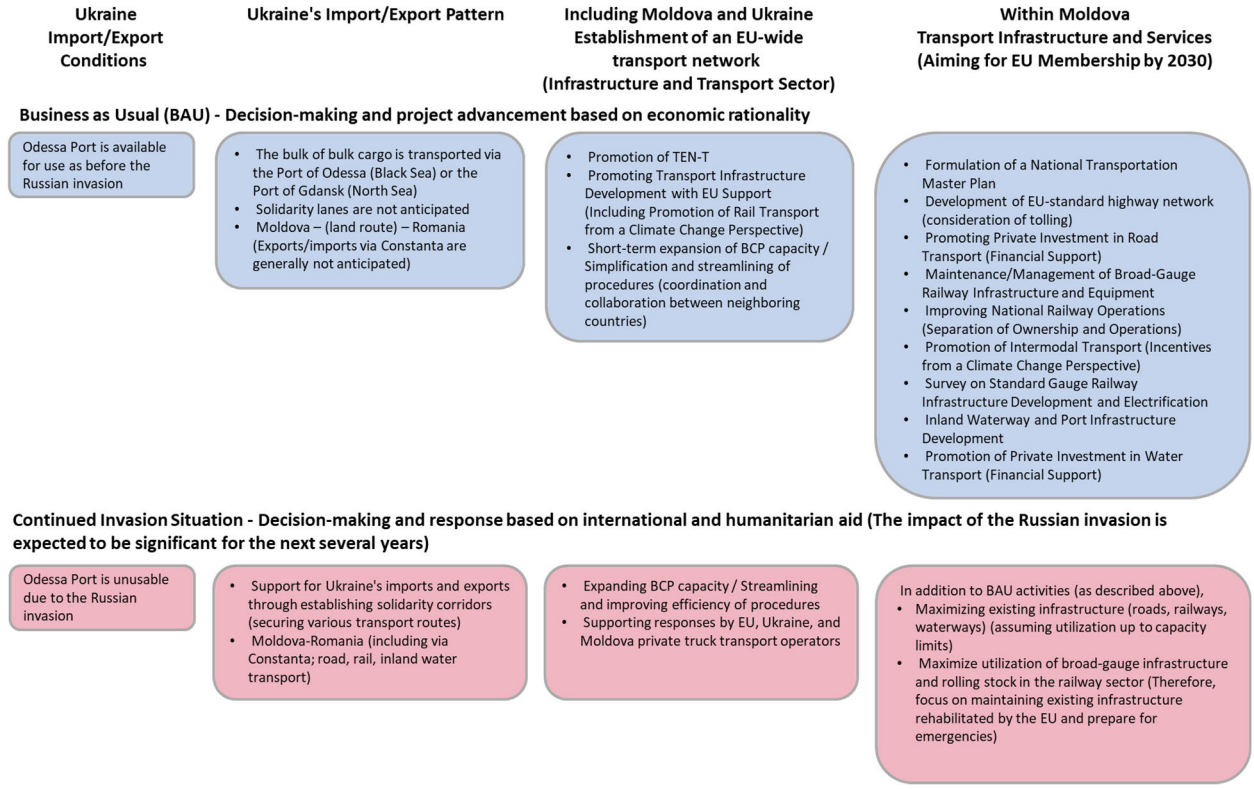
- After the separation of infrastructure and operations, if the entity conducting international freight transport adopts "intermodal transport" as a strategy to promote the freight transport business, it will initially focus on bulk cargo (grains and vegetable oils) originating from or destined for Moldova, rather than cargo originating from or destined for Ukraine.
- To ensure that this multimodal transport service secures a certain market share in the grain and grain oil transport market, improvements to transport services (such as increased speed) and a review of the pricing structure will be implemented (to be examined using a demand forecast model).
- Moldova (the transit section in Giurgiulesti) plays a crucial role as a route for Ukraine to procure fuel from Turkey, and will be continuously maintained.

- Support for Ukraine's grain exports (in times of emergency) will be provided as part of the Solidarity Lanes initiative (a measure in response to a Russian invasion). However, no large-scale investments will be made solely for this purpose (as the economic rationale is weak in peacetime); instead, the response will rely on maximizing the use of existing infrastructure and service capacity, including non-public-sector capabilities.

Based on the above assumptions, and taking into account the situation regarding Russia's invasion of Ukraine as well as Moldova's expectations and state of readiness with a view toward EU accession, the development scenarios for the international logistics sector in both countries are as follows:

First, the overarching goal is to maintain trade relations with countries other than Russia and Belarus at the same level as before the Russian invasion, and to maintain supply chain ties with Western nations, including Japan, thereby continuing to fulfil its role in the global economy. Furthermore, at the time of writing this paper, we assume that there are no economic activities, such as Ukraine's steel industry, for which recovery is considered extremely difficult.

Based on this overarching goal (the estimates of import and export values are based on this premise), and using the scenarios shown in Figure 4-25. A demand forecast was conducted for each transport corridor under a "BAU" scenario, in which the Odesa Port remains as accessible as before Russia invaded Ukraine. Based on this, we will examine potential support measures expected from Japan, the EU, and other parties.



Source: JICA Survey Team

Figure 4-25 Assumed Scenarios and Directions for Support

4.3.3 Demand Estimates

Using 2021 as the base year and 2035 as the target year, freight flows are visualized, which are the traffic distribution across the network, along major logistics routes within Moldova. The network distribution diagram, referred to as a flow map in this report, presented in this chapter, utilizes customs records and rail freight transport data to organize freight inflows, outflows, and transit through the country.

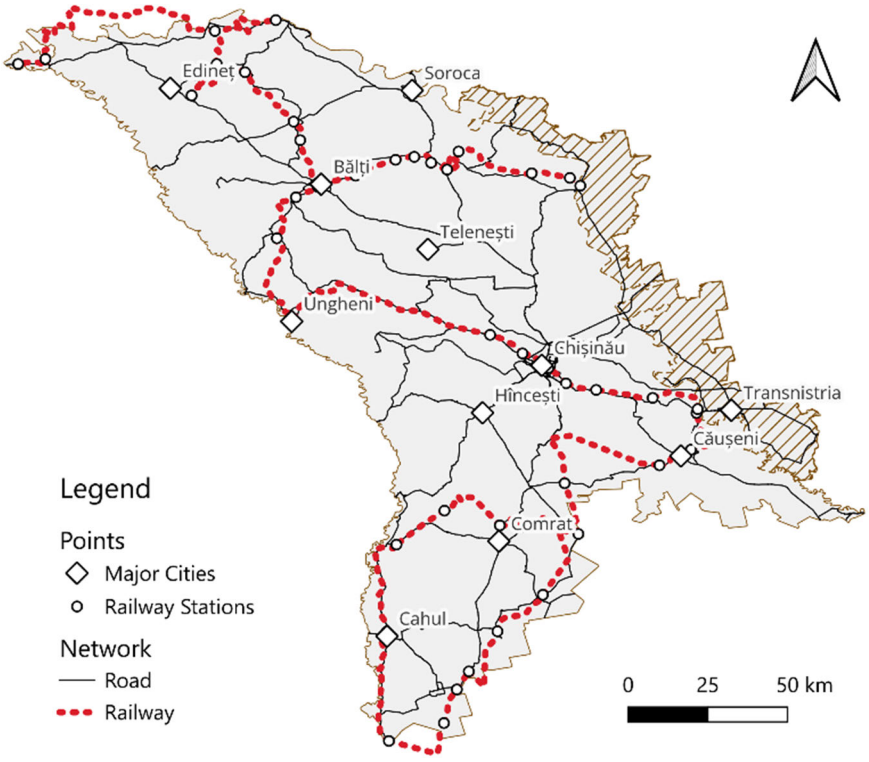
(1) Overview of Analytical Methods

1) Flow Map 1: Base Year Flow Map (2021)

In creating the 2021 flow map, we simultaneously constructed the transport network and estimated freight volumes based on official statistics.

a) Road and Rail Networks

From OpenStreetMap, trunk and primary roads are extracted to form the backbone of logistics, constructing a road transport network covering the entire territory of Moldova. For the railway network, each railway station listed in the CFM's railway origin-destination (OD) data indicating the origin and destination stations, commodity types, and transported volumes is modeled as a node, and stations are connected by links based on actual track layouts, thereby constructing a railway transport network model that accurately reflects reality.



Source: JICA Survey Team

Figure 4-26 Map of Moldova's Road and Rail Network

b) Logic for Estimating Road and Rail Freight Volumes

In constructing the road freight transport model, we used the volume of goods passing through each land BCP, following customs data, as a starting point.

First, for imported goods, we allocated the total inflow from each border to various destinations based on the population ratios of major cities within the 10 domestic regions, serving as a proxy for consumer demand. The major cities are those listed in the figure above.

Next, for export cargo, the ratio of companies by sector located within FEZs and IPs—as shown in the aforementioned Figure 3-63−was used as the weight for cargo origins and flows from each region to specific export destination borders, and was used to calculate flows.

For transit cargo, pairs of entry and exit borders contained in the customs data were linked, and cargo was allocated by selecting the shortest domestic route.

For rail freight, CFM's rail origin-destination (OD) data was the primary source. Since the original data did not specify transit borders for import and export cargo, transit borders were identified by calculating backward from the domestic travel distances recorded in the rail OD data, and routes were assigned accordingly.

For transit cargo, we referred to customs data. However, multiple transport distances between several border crossings were similar, making route identification difficult. It was challenging to set routes using the method described above. Therefore, we created a more accurate flow map based on customs data for shipments passing through customs facilities at each railway border crossing.

2) Flow Map 2: Projected Flow Map Considering Future Increases in Cargo Volume (2035)

Using actual 2021 figures as the baseline, we created a 2035 freight flow map that considers only changes in import and export volumes by commodity. Regarding road and rail infrastructure, we generally assumed that conditions would remain as they were before Russia invaded Ukraine in 2021, focusing primarily on analysing demand fluctuations within the existing network.

Specifically, for the major trade items of Moldova and Ukraine (15 import items and 10 export items) discussed in Chapter 4.3.1, we calculated the growth rates by item and origin-destination (OD) paired with 2021 (the base year) through 2035.

Future demand was calculated by applying these growth rates to the actual 2021 figures, while for items not included in the analysis, it was assumed that there would be no change from the 2021 levels. Regarding route allocation, the route selection and allocation logic of the 2021 model was applied to future states to construct the final flow map.

3) Flow Map 3: Projected Flow Map Accounting for Modal Shift (2035)

A modal shift from road to rail was also accounted for, which was not considered in the analysis in (2). In assuming future modal shifts, we adopted the criteria from the Roadmap for a Single European

Transport Area, a transport white paper formulated by the EU in 2011. The goals in this White Paper—to shift 30% (by weight) of road freight transport over 300 km to other modes (rail or water transport) by 2030, and at least 50% by 2050—are reaffirmed in the context of the European Green Deal within the Sustainable and Smart Mobility Strategy published in 2020. Moldova's Mobility Strategy 2030 was based on these European standards. In this analysis, we assumed that international transport generally involves distances of 300 km or more and therefore focused solely on international freight transport as the target for modal shift (road-to-rail). Regarding specific shift rates, future demand was derived by setting the 2035 target—the midpoint between the 2030 target of 30% and the 2050 target of over 50%—at 35% (shifting 35% of road freight to rail). As a result, the rail modal share reached 54% (by weight).

Additionally, assuming the Fălciu–Prut 2 section opens, and the Romania–Western Line (Moldova)–Ukraine route becomes available, a scenario in which transit freight routed via Giurgiulesti would instead be transported via Fălciu was created.

4) Flow Map 4: Forecast Flow Map Considering Suitability for Rail Transport (2035)

In the analysis in 3), a uniform 35% shift to rail (by weight) was applied to all categories of international freight transported by truck; however, goods well-suited for rail transport will be prioritized for this shift. Therefore, in this analysis, we set a target modal share of 54% for rail—which would be achieved if 35% of all road freight (all items) shifted to rail—and assumed a modal shift limited to specific target items highly suitable for rail transport. As a result, we derived a scenario in which the overall rail modal share could reach the target of 54% by shifting 45% (by weight) of road freight for these target items to rail.

(2) Comparison of Freight Transport Volumes by Mode

In this section, using 2021 as the base year (Flow Map 1) and 2035 as the target year, we compare changes in the transport structure resulting from increases in freight volume and the presence or absence of a modal shift in transport volume (tons and ton-kilometers).

1) Impact of Natural Growth in Freight Volume (Flow Map 2)

Based on growth projections for major commodity categories through 2035, road freight volume is expected to increase significantly from 65 million tons in 2021 to 90 million tons. Consequently, the load on major arterial roads is expected to become extremely high.

2) Effects of Modal Shift (Flow Maps 3 and 4)

The EU's "Sustainable and Smart Mobility Strategy" made efforts to shift international transport to rail. These actions resulted in the rail share of transport volume rising to approximately 54–55%, shifting the logistics system toward the modal mix targeted by the EU, alleviating the risk of congestion and saturation on the road network.

3) Differences Between Theoretical (Uniform) Shift and Effective (Item-Specific) Shift

Comparing Flow Map 3 (uniform 35% shift) and Flow Map 4 (prioritized shift of rail-suitable goods), while the total transport tonnage is equivalent, the ton-kilometers (distance × weight) in Flow Map 4 are approximately 1.02 times greater, suggesting that strategically selecting goods suitable for rail transport increases the average transport distance within the rail network, thereby enabling more efficient utilization of infrastructure capacity.

Table 4-3 Freight Transport Volume by Mode

Flow Map	Year	Road Transport Freight Volume [million tons]	Rail Transport Freight Volume [million tons]	Rail Share	Flow Map 2 Compared to Road transport Change [million tons]	Flow Map 2 Compared to Rail transport Change [thousand tons]
Flow Map 1	2021	6.5	2.8	30%	-	-
Flow Map 2 (Increase in cargo volume)	2035	9.0	3.9	30%	-	-
Flow map 3 (Flat rate of 35% Modal Shift)	2035	6.0	6.9	54%	-3.0	3.0
Flow Map 4 (Modal shift of cargo)	2035	6.0	6.9	54%	-3.0	3.0

Flow map	Year	Road Transport Freight Volume [Billion ton-km]	Rail Transport Freight Volume [Billion ton-km]	Rail Share	Flow Map 2 Compared to Road transport Change [million ton-km]	Flow Map 2 Compared to Rail transport Change [million ton-km]
Flow Map 1	2021	1.2	0.5	30%	-	-
Flow Map 2 (Increased Cargo Volume)	2035	1.8	0.6	26%	-	-
Flow Map 3 (Flat rate of 35% Modal Shift)	2035	1.2	1.4	54%	-635	842
Flow Map 4 (Modal shift of cargo)	2035	1.2	1.4	55%	-660	779

Source: JICA Survey Team

(3) Analysis of the Moldova Freight Flow Map (2021)

1) Overall Trends in Transport Modes

The Moldova Freight Flow Map (2021) is available at Figure 4-27. Logistics throughout Moldova revolves around road transport. In particular, the east-west axis—which runs from the Romanian border through the capital, Chișinău, to Ukraine—serves as the country's primary logistics artery, with freight concentrated on major highways. In contrast, rail transport functions as a complement to road transport along specific international corridors. It is essential for long-distance and high-volume shipments.

2) Trends in Imported Goods

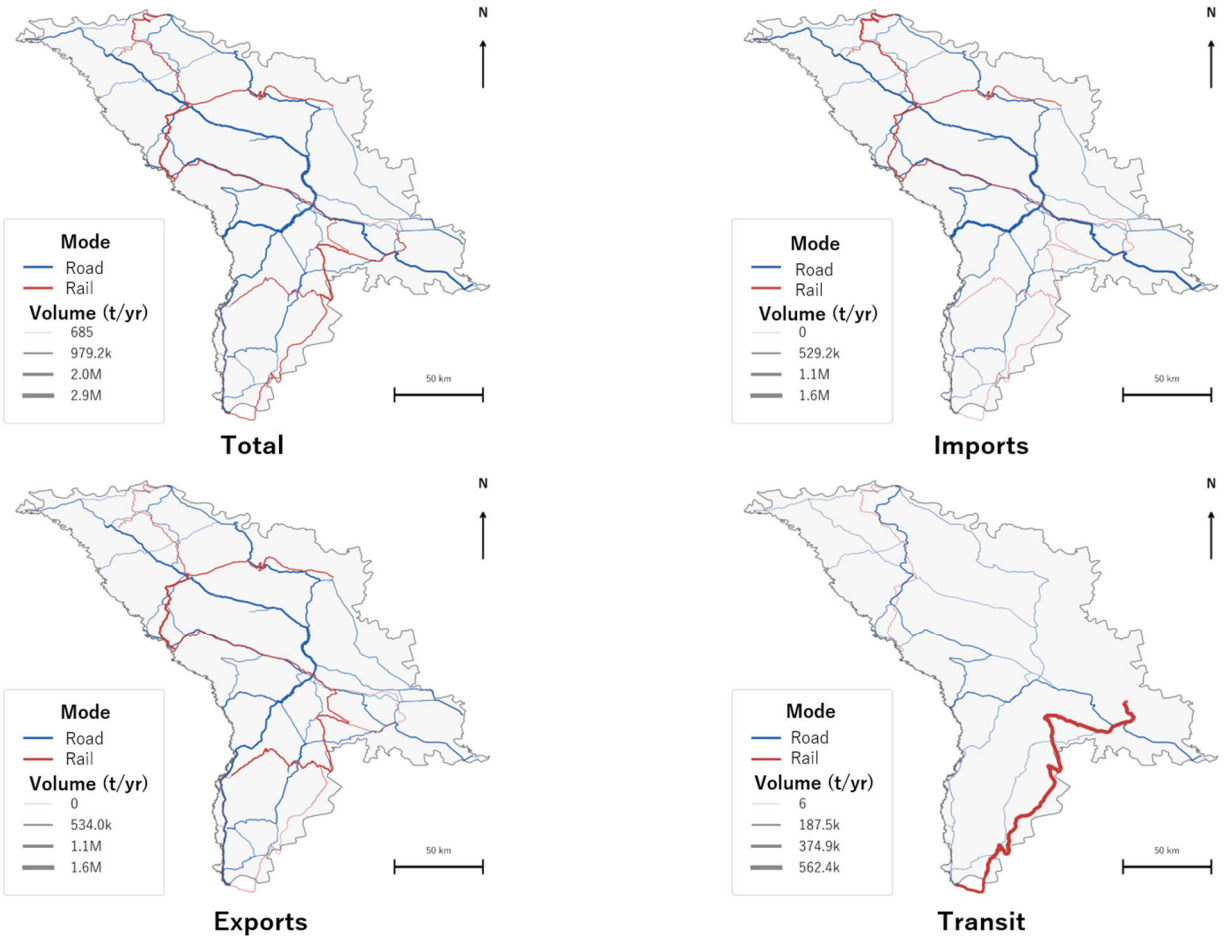
Road transport accounts for the overwhelming majority of imports. When import destinations were allocated based on population ratios and consumer demand, Chișinău accounted for a significant influx of goods as it is the largest population center. On the other hand, certain routes in the north and west have limited rail imports.

3) Trends in Export Cargo

The origins of export cargo are dispersed across various regions of the country for road and rail transport. Based on the locations of tenant companies in FEZs and IPs by industry, a flow is formed from regional production hubs toward the border. While road transport moves from local hubs to the nearest BCP, rail transport transports cargo to the border via fixed routes, starting from stations connected to specific industrial hubs.

4) Characteristics of Transit Cargo

Transit freight transport is the sector where rail transport demonstrates the greatest strategic advantage. In particular, a route connecting the area around Giurgiulesti in the south with Ukraine has been identified. While road-based transit also exists, rail plays an indispensable role as a land bridge across Moldova, transiting heavy loads or large-volume bulk shipments.



Source: JICA Survey Team

Figure 4-27 Moldova Freight Flow Map (2021)

(4) Analysis of the Comparison Between the 2035 Freight Flow Map Projections and 2021 Data

1) Overall Trends in Transport Volume

An overview of the 2035 network distribution (Figure 4-28) shows that while the distribution pattern of 2021 is maintained, flows (distribution volumes) have increased significantly in major corridors along key roads around Chișinău and toward the Romanian border, clearly indicating a rise in transport demand based on growth forecasts for target commodities. In particular, the maximum transport volume range in the total flow chart increased from approximately 1.99 million tons in 2021 to approximately 2.70 million tons in 2035. Rail transport has also seen an overall expansion in flow; while there is no decisive shift in the balance between modes, overall transport density is evidently increasing.

2) Changes in Import Cargo: Deepening Concentration in Chișinău

Regarding imports, the most significant change is the shift in traffic allocation from the western border toward Chișinău via road. In other words, there is an increased risk that the road network around Chișinău—a major population center—will become congested and approach saturation. While rail

imports are also increasing slightly, they remain low compared to road freight volumes. Promoting a modal shift to rail to alleviate the anticipated road congestion will become a major challenge.

3) Changes in Export Cargo: Growth and Diversification of Production Bases

Regarding exports, flows originating from FEZs and IPs across the country are increasing for both modes. As regional production hubs grow, road transport congestion near border checkpoints will become severe. Rail transport will likely gain importance as a more stable means of bulk transport along specific export routes. To support the revitalization of regional economies, it is necessary to eliminate road bottlenecks while simultaneously improving the service level of rail exports.

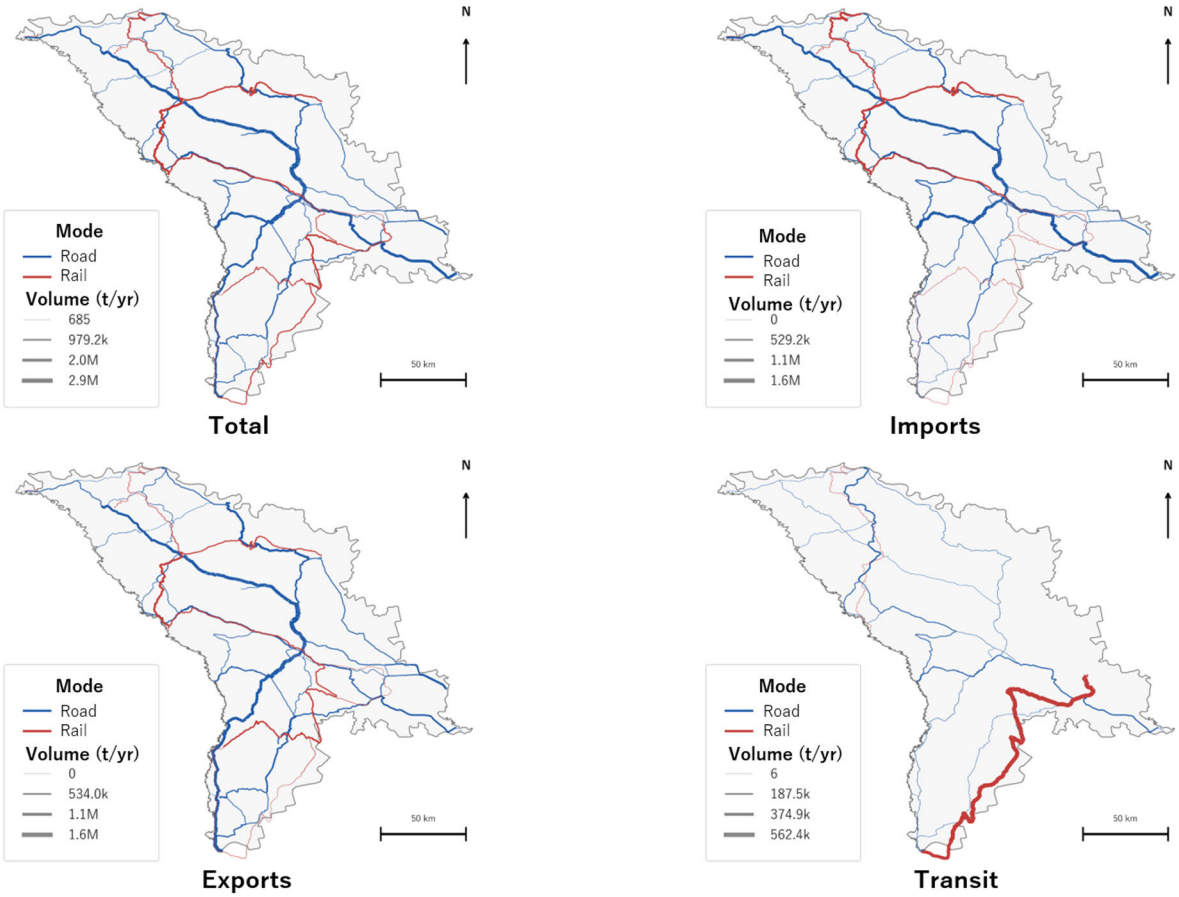
4) Changes in Transit Freight: The Importance of Strategic Railway Corridors

The competitive advantage of rail in transit will further increase toward 2035. Transport density in the Southern Railway Corridor will rise significantly, and its importance as an international logistics corridor will grow. While road-based transport will also increase, maintaining and strengthening a structure in which rail continues to handle most transit cargo—from the perspectives of environmental impact and road maintenance costs—will help establish a sustainable logistics system.

Future Challenges and Recommendations Based on Comparative Analysis

A comparison of 2021 and 2035 highlighted the following infrastructure challenges.

- **Bottlenecks on Major Road Corridors:** The main highway connecting Chișinău to the Romanian border is expected to face heavy traffic. Given that current infrastructure capacity increases the risk of traffic congestion and accidents, measures such as road widening (adding lanes), constructing bypasses, and promoting a modal shift to rail transport must receive priority.
- **Effective Utilization of the Rail Network:** The key to alleviating road congestion lies in the efficiency of rail transport services, which excel in transit operations, and will be leveraged to handle the growing volume of domestic import and export cargo, particularly for specific target commodities.
- **Border Crossing Point (BCP) Capacity:** The tendency for both imports, exports, and transit traffic to concentrate at specific border crossings is expected to intensify through 2035. There are concerns that the digitization of customs clearance and facility expansion will not keep pace with increasing physical transport volumes, necessitating targeted investments.



Source: JICA Survey Team

Figure 4-28 Moldova Freight Flow Map (2035, No Modal Shift)

(5) Analysis of the 2035 Freight Flow Map Following the Introduction of Modal Shift

1) Transformation of the Transport Structure through Modal Shift

In the 2035 flow map following the introduction of modal shift (Figure 4-29, Figure 4-30), it can be confirmed that, compared to the "no modal shift" case (Figure 4-28), road traffic on major trunk routes is curbed, with the share allocated to the railway network increasing significantly. This scenario is the result of shifting international road freight transport to rail to meet EU targets, bringing the rail modal share to 54% by weight. As a result, Moldova's freight transport has achieved a balanced and environmentally friendly modal mix.

Furthermore, if the Fălciu–Prut 2 section opens and the Romania–Western Route–Ukraine route becomes available, freight volume on the Western Route will increase, and freight volume on the Southern Corridor will decrease, as shown in Figure 4-31.

2) Differences in Estimation Logic: Theoretical Scenario (Figure 4-29) and Practical Scenario (Figure 4-30)

Figure 4-29 (uniform conversion of all items) and Figure 4-30 (conversion of priority items suitable for rail transport) both aim for a "rail share of 54% (by weight)," but the logistics volume for each section is slightly higher overall in Figure 4-30 since rail ton-kilometers in Figure 4-30 have increased to approximately 1.02 times that of Figure 4-29. The increase in ton-kilometers despite the total transport tonnage remaining the same is likely because the selected target items shown in Figure 4-30 (b) have a longer average transport distance within the rail network than the items subject to uniform conversion. By strategically selecting items suitable for rail transport, even with the same share target (weight-based), it is possible to more fully utilize the rail infrastructure capacity, further increasing the rail share on a ton-kilometre basis.

3) Effects on Import and Export Cargo and the Role of Specific Hubs

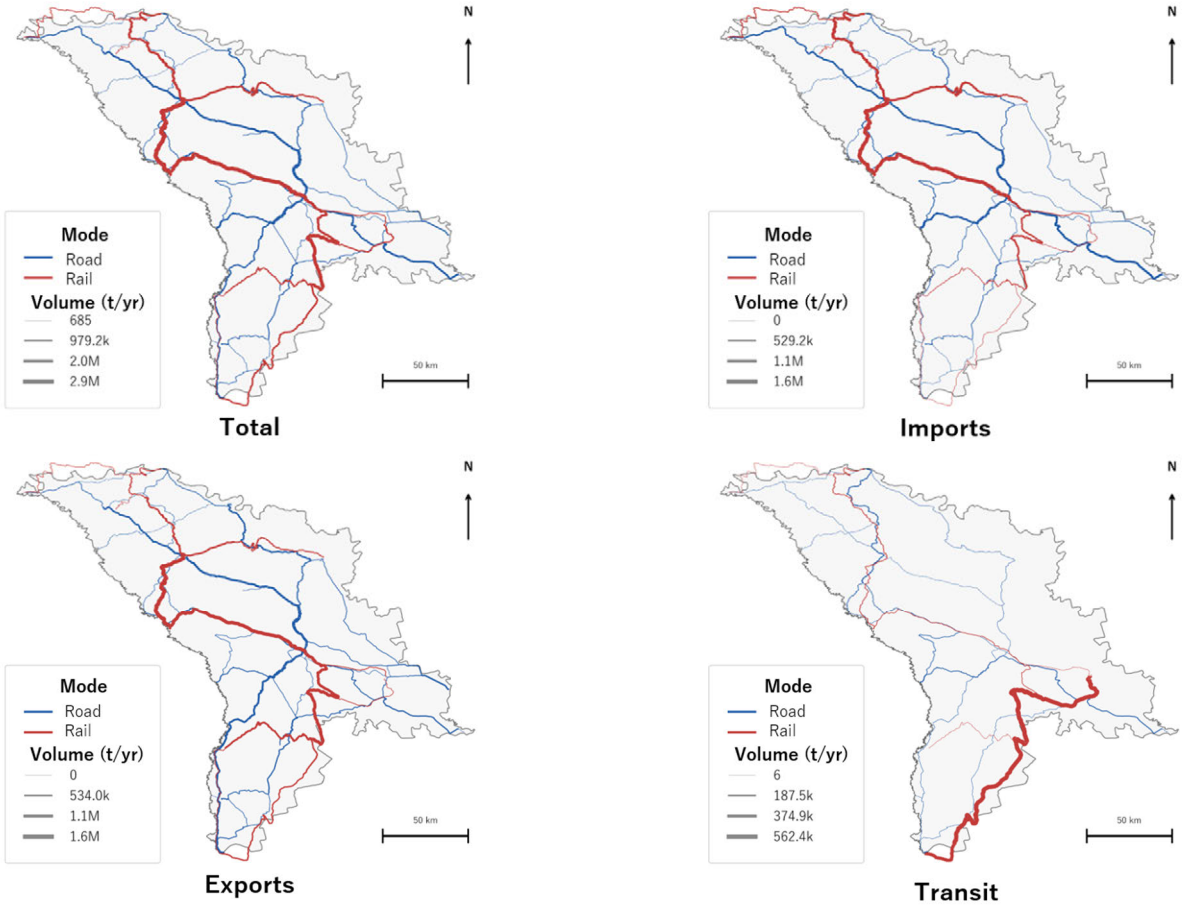
Regarding imports, the risk of saturation on the main road from the western border to Chișinău is mitigated by diverting traffic to rail.

Regarding exports, given that Moldova's railway network concentrates on major trunk lines, shifting the focus to specific goods (Figure 4-30) has further solidified the network's role as a "core corridor" connecting local production hubs (FEZs and IPs) to the border. Precisely because it is a simple network without complex branches, concentrating on goods well-suited for rail transport will increase the transport density of major railway lines, thereby maximizing rail as a means of mass transport.

4) Deepening Strategic and Environmental Significance

Expanding the railway's competitive advantage not only in international transit freight but also in domestic import and export freight transport aligns with the European Green Deal and Moldova's "Mobility Strategy 2030." In particular, as shown in Figure 4-30, promoting a targeted shift based on freight characteristics serves as a practical and effective strategic guideline for maximizing the efficiency of infrastructure investment while simultaneously reducing road maintenance costs and mitigating environmental impact.

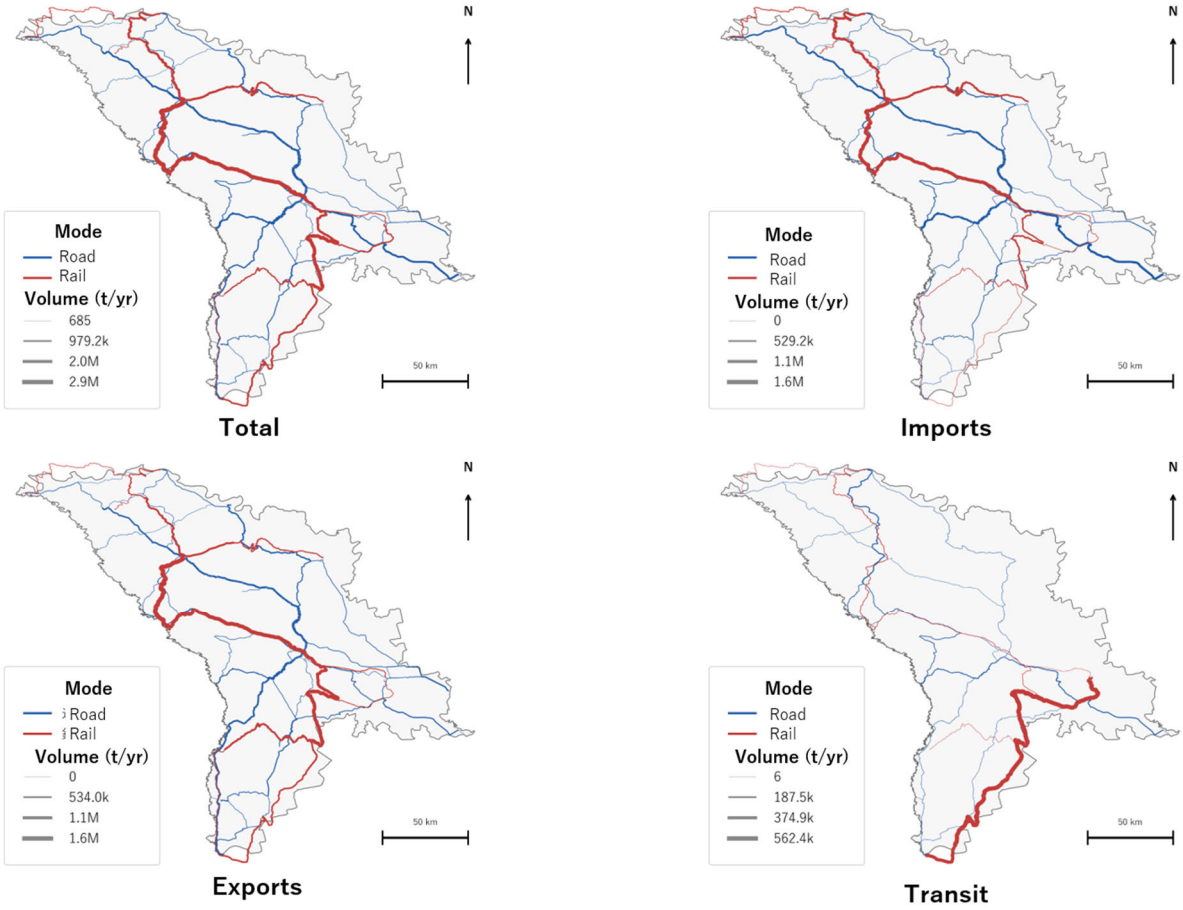
Furthermore, specific methodologies and evaluations for modal shift from road to rail, as well as comparisons between the volume of goods shifted (demand) and rail transport capacity (supply), are detailed in "5.8. Current Status of Road Freight Transport and Examination of Modal Shift Potential."



Note: The volume of cargo passing through the Ungheni border is 1.56 million tons (imports: 1.04 million tons, exports: 430,000 tons, transit in: 20,000 tons, transit out: 70,000 tons).

Source: JICA Survey Team

Figure 4-29 Moldova Freight Flow Map (2035, with Modal Shift)



Note: The volume of cargo passing through the Ungheni border is 1.43 million tons (Imports: 980,000 tons, Exports: 370,000 tons, Inbound Transit: 13,000 tons, Outbound Transit: 53,000 tons)

Source: JICA Survey Team

Figure 4-30 Moldova Freight Flow Map (2035, with Modal Shift only for Freight Suitable for Rail Transport)

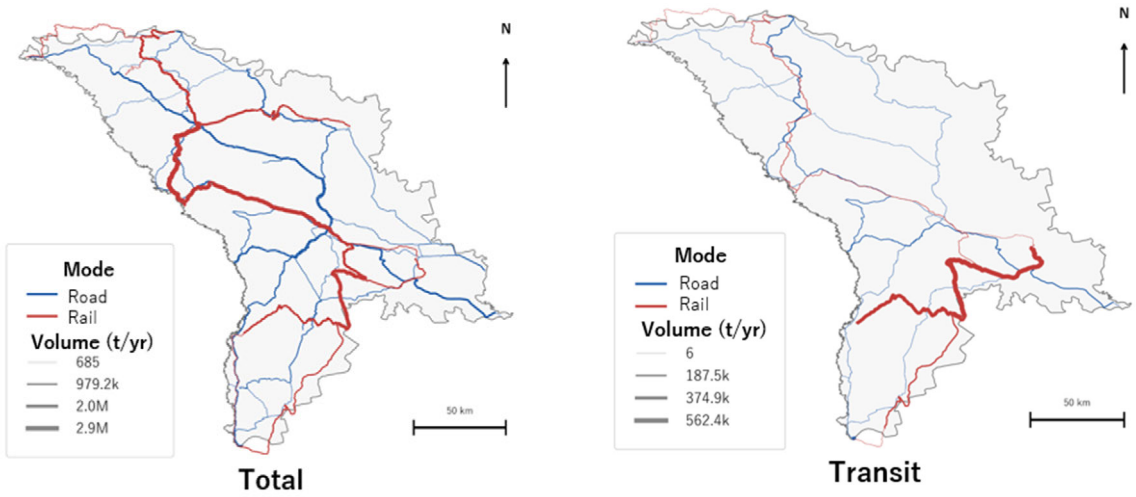


Figure 4-31 Moldova Freight Flow Map (2035; Modal Shift Applies only to Freight Suitable for Rail Transport; Assuming the Fălciu–Prut-2 Border Crossing is Opened)

Chapter 5 Promotion of Rail Freight Transport in Moldova

5.1 The Role of Railways in Moldova

Historically, railways in Moldova served as the primary mode of transport for heavy cargo and long-distance shipments; however, in recent years, there has been a shift toward road transport, and the modal share of freight transport has remained at approximately 5.2% (2024). The main cargo items consist primarily of bulk goods such as grains, construction materials, and petroleum products. Since Russia invaded Ukraine, railways have played a strategic role in transporting Ukrainian grains as part of the "Solidarity Lanes" initiative.

As for passenger transport, domestic demand has plummeted, and while international trains connecting Chișinău with Romania (Iași, Bucharest) and Ukraine (Kyiv) play a primary role, their market share remains extremely limited. The infrastructure consists primarily of the former Soviet broad-gauge track (1,520 mm); except for a few double-track sections, nearly the entire network is non-electrified and single-track, and speed restrictions due to aging infrastructure are a major factor hindering competitiveness. Currently, as a candidate for EU membership, integration into the TEN-T network is promoted, and modernization aimed at strengthening connectivity with Europe—such as converting the Ungheni–Chișinău section to standard gauge (1,435 mm)—is positioned as a key element of national strategy.

5.1.1 Organization of Railway-Related Agencies

Moldova's railway sector is currently in a transitional phase, shifting from a Soviet-style vertically integrated model to one with separate operations and infrastructure that comply with EU standards. Organizational reforms are underway, following the new "Code of Railway Transport No. 19/2022," adopted in 2022.

(1) Central Government and Regulatory Authorities

The central government and regulatory agencies related to railways are as follows.

1) MIRD:

The primary administrative agency responsible for policy formulation, regulation, development, and O&M of the entire transport sector, including the railway sector.

- Role: Responsible for formulating transportation policy, promoting international connectivity (such as TEN-T), and developing legal and regulatory frameworks.
- It oversees subordinate organizations such as the SRA and leads policy formulation and reform in the railway sector.

2) Public Property Agency (APP):

An agency representing the Moldovan government that exercises shareholder rights over the SOE CFM and manages state assets. CFM is wholly state-owned through the APP.

3) Ministry of Economic Development and Digitalization (MEDD):

Responsible for promoting economic policy and optimizing the business environment. It may be a key stakeholder in specific logistics projects, such as the development of the Bereşti multimodal transport terminal.

(2) CFM

CFM currently operates as a vertically integrated SOE responsible for both infrastructure management and train operations (passenger and freight). Its organizational structure is as follows:

- Number of Employees: The average number of registered employees in 2024 was 4,978, down 734 from the same period in 2023. At CFM, the number of employees has declined significantly since 2018 due to various factors, such as a lack of replacements for retirees.
- Headquarters: Located in Chișinău and managed by the Chief Executive Officer (CEO) and the Board of Directors. The Board of Directors includes members from relevant government ministries.
- Regional Offices: There are 46 or 47 regional branches, which operate directly under the headquarters (CEO). Major locations include Oknytsia, Bălți, Ungheni, Chișinău, Tighina, Basarabeasca, and Giurgiulesti.
- Divisions: In addition to the Freight, Passenger, and Infrastructure divisions, the company operates four rolling stock depots (in Chișinău, Tighina, Bălți, and Basarabeasca) and a locomotive and freight car maintenance division.

It faces chronic funding shortages, unpaid wages, aging infrastructure, and organizational inefficiency, making fundamental reform a pressing challenge.

(3) Railway Sector Reform and New Organization (Transitional Structure)

Based on the new 2022 law, CFM is planning and implementing an organizational restructuring in accordance with the EU Railway Package as follows.

1) Planned New Companies (CFM Split)

The current CFM is scheduled to be reorganized and split into the following independent JSCs:

- CFM Infra (Infrastructure Management Company): Responsible for the management and maintenance of railway infrastructure.
- CFM Marfă (Freight Transport Company): Responsible for operating freight trains.
- CFM Călători (Passenger Transport Company): Responsible for operating passenger trains. * In addition to this, the establishment of companies to manage non-core assets and departments to

oversee staff transfers during the transition period is also being considered. Furthermore, there are suggestions that a single entity combining freight and passenger operations, named "CFM Pasageri și Marfă," may be established.

2) New Regulatory and Safety Agencies

As part of the reform, efforts are underway to establish and strengthen the following government agencies.

- Railway Agency (Agenția Feroviară): An administrative authority established under the jurisdiction of the Ministry of Infrastructure and Regional Development. It is responsible for issuing safety certifications, granting driver licenses, regulating the railway market, and monitoring TSI.
- Bureau for Investigation of Accidents and Incidents in Transport: Its establishment is mandated as an independent body to investigate railway accidents and incidents.

3) Relationships and Hierarchy Among Organizations

The relationships and hierarchy among organizations following the transition to the new structure are as follows.

- Policy and Ownership: Managed by the government (MIRD for policy, APP for ownership).
- Regulation and Supervision: The newly established Railway Agency will grant safety authorizations and monitor the market for CFM and future private operators.
- Operation: Currently managed centrally by CFM, but in the future, the system will transition to a model where the infrastructure manager (CFM Infra) and railway operators (CFM Marfă/Călători and private operators) enter contracts (access agreements).

This reform aims to separate the accounting for infrastructure management and operations, ensure management independence, and liberalize the railway market (entry of private operators).

5.1.2 Legal Framework

(1) Overview and Basic Legislation

Moldova's railway sector is currently transitioning from a former Soviet-style vertically integrated model to a model compliant with EU standards; the legal foundation for this reform is the "Code of Railway Transport No. 19/2022," adopted in 2022.

This law aims to transpose the EU's railway acquis communautaire into domestic law based on the AA between Moldova and the EU. Specifically, it incorporates parts of the following key EU directives:

- Directive 2012/34/EU: Establishment of a Single European Railway Area (separation of infrastructure management and operations).
- Directive 2016/798/EU: Railway Safety Directive.
- Directive 2007/59/EC: Directive on the certification of train drivers.

(2) Key Provisions of the Railway Transport Act (No. 19/2022)

1) Separation of Infrastructure Management and Operations (Unbundling)

The new law mandates the separation of infrastructure management functions from railway transport operations (freight and passenger). As a result, CFM, currently a vertically integrated SOE, is scheduled to be reorganized into the following independent joint-stock companies (JSCs):

1. CFM Infra: An infrastructure manager responsible for the management and maintenance of railway infrastructure
2. CFM Pasageri și Marfă (or separate entities CFM Marfă and CFM Călători): Railway operators responsible for passenger and freight transport
3. Non-Core Asset Management Company: An entity responsible for managing non-core assets and surplus personnel during the transition period
4. These newly established companies will operate separately and independently, without being controlled by a holding company.

2) Liberalization of the Railway Market and Introduction of Competition

Legally, the railway market will be liberalized, allowing private operators other than SOEs and foreign railway operators to provide railway services within Moldova under certain conditions. Consequently, fair and non-discriminatory rules, such as the setting of track access charges, must be established to guarantee access to the infrastructure.

3) Establishment of New Regulatory and Supervisory Bodies

To ensure sector oversight and safety, the establishment of the following bodies is mandated:

- Railway Agency (Agenția Feroviară): An administrative authority established under the Ministry of Infrastructure and Regional Development. It is responsible for licensing railway operators, issuing safety certifications, licensing train drivers, and monitoring interoperability (TSI).
- Accident Investigation Bureau: An independent body responsible for investigating railway accidents and incidents.

(3) Financial Framework and Contractual Relationships

The new law and the related reform roadmap require establishing contractual relationships between the state and railway operators to ensure the financial sustainability of the railway sector.

- Multi-Annual Infrastructure Contract (MAIC): A contract concluded between the infrastructure manager (the future CFM Infra) and the government (the Ministry of Infrastructure and Regional Development). This mechanism ensures that the state guarantees the necessary funding for infrastructure maintenance and renewal over the long term.

- Public Service Contract (PSC): A contract under which the government provides loss compensation (reimbursement) to the railway operator (the future CFM Călători) for unprofitable domestic passenger transport, aiming to eliminate the cross-subsidization of the passenger sector by freight revenue as practiced in the past and to enhance financial transparency.

(4) Challenges and Future Outlook

Although legal frameworks are progressing, full implementation has not yet been achieved. The process of splitting and privatizing CFM (converting it into a JSC), separating assets, and establishing separate accounting systems is ongoing, with completion targeted for around 2026–2027. Furthermore, as a candidate for EU membership, with an eye toward integration into the TEN-T network, the introduction of the European standard gauge (1,435 mm) and compliance with TSIs are also subjects of legal consideration.

5.2 Basic Information on the Moldovan State Railways (CFM)

Basic information regarding CFM is below. Details on each item are in the following sections.

Table 5-1 Basic Information on CFM

<table>
<tr><td colspan="2">Year Founded</td><td>1871</td></tr>
<tr><td colspan="2">Total Length</td><td>1,232 km (*1)</td></tr>
<tr><td colspan="2">Length by Gauge (km)</td><td>Wide gauge (1,520 mm): 1,218 km
Standard gauge (1,435 mm): 14 km (*1)</td></tr>
<tr><td colspan="2">Length by track type (km)</td><td>Single-track: 1,192 km
Double track: 40 km</td></tr>
<tr><td colspan="2">Electrification</td><td>No electrification on the entire line</td></tr>
<tr><td colspan="2">Number of stations</td><td>79</td></tr>
<tr><td colspan="2">Number of bridges</td><td>218</td></tr>
<tr><td colspan="2">Number of tunnels</td><td>1</td></tr>
<tr><td colspan="2">Signal and Communication System</td><td>Automatic Block System (472.1 km)
Semi-automatic block system (654.1 km)
Of the 226 level crossings, 181 are equipped with automatic level crossing systems</td></tr>
<tr><td rowspan="3">Number of Rolling Stock (*2)</td><td>Locomotives</td><td>134 units (of which 43 are in service)</td></tr>
<tr><td>Freight cars</td><td>4,485 cars (of which 2,378 are in service)</td></tr>
<tr><td>Passenger Cars</td><td>Diesel Multiple Units (DMUs): 7 sets; 212 passenger cars (78 in service)</td></tr>
<tr><td colspan="2">Freight volume (*3)</td><td>
<table>
<tr><th>Unit</th><th>2021</th><th>2022</th><th>2023</th><th>2024</th></tr>
<tr><td>thousand tons</td><td>3,317.6</td><td>3,815.1</td><td>3,947.3</td><td>2,448.4</td></tr>
<tr><td>million ton-kilometers</td><td>658.4</td><td>1,219.5</td><td>802.4</td><td>486.8</td></tr>
</table>
</td></tr>
<tr><td colspan="2">Passenger traffic (*3)</td><td>
<table>
<tr><th>Unit</th><th>2021</th><th>2022</th><th>2023</th><th>2024</th></tr>
<tr><td>1,000</td><td>316.7</td><td>356.6</td><td>439.5</td><td>320.4</td></tr>
<tr><td>million people-kilometers</td><td>12.2</td><td>21.5</td><td>45.7</td><td>39.8</td></tr>
</table>
</td></tr>
</table>

Sources: *1: https://www.meti.go.jp/meti_lib/report/2022FY/060112.pdf,
*2: Strategy for the EU integration of the Ukrainian and Moldovan rail systems,
*3: CFM Activity Report 2021-2024

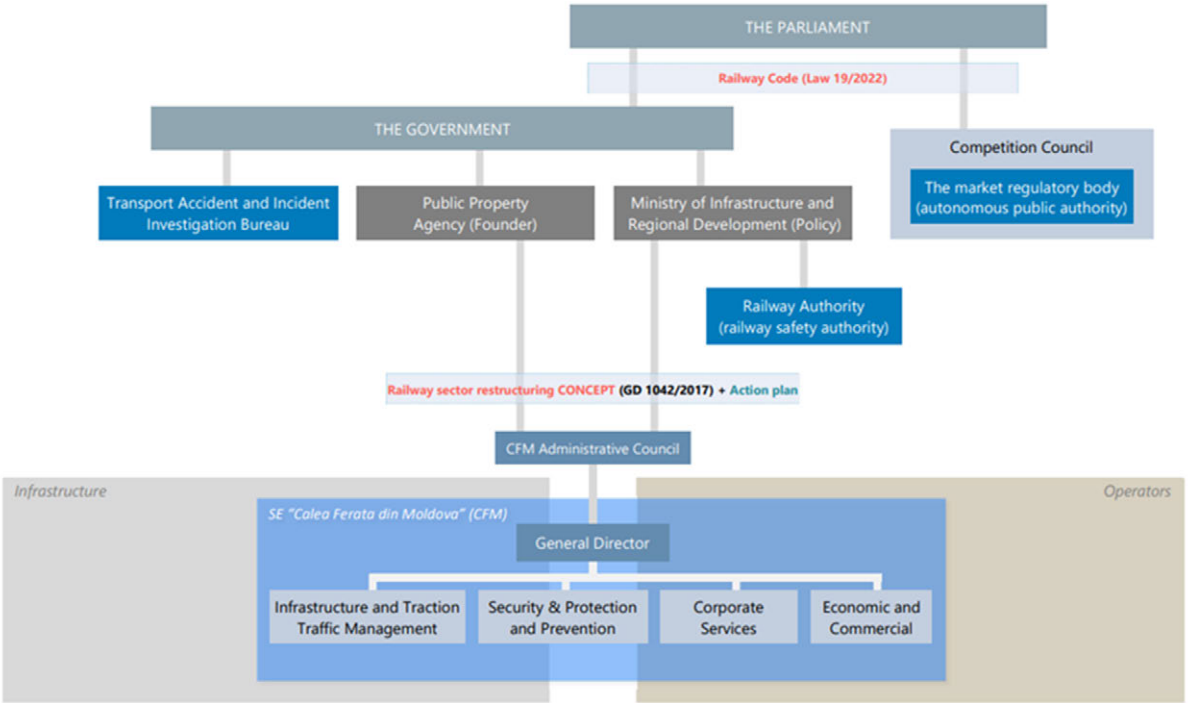
5.3 Organization and Structure of the Moldovan State Railways (CFM)

5.3.1 CFM Organization and Structure

CFM is an organization under the MIRD (Figure 5-1). The organizational chart of CFM for 2021 is in Figure 5-2. At the top is the CEO (Director General), and under him, four main departments are headed by a designated Vice CEO (Vice Director General).

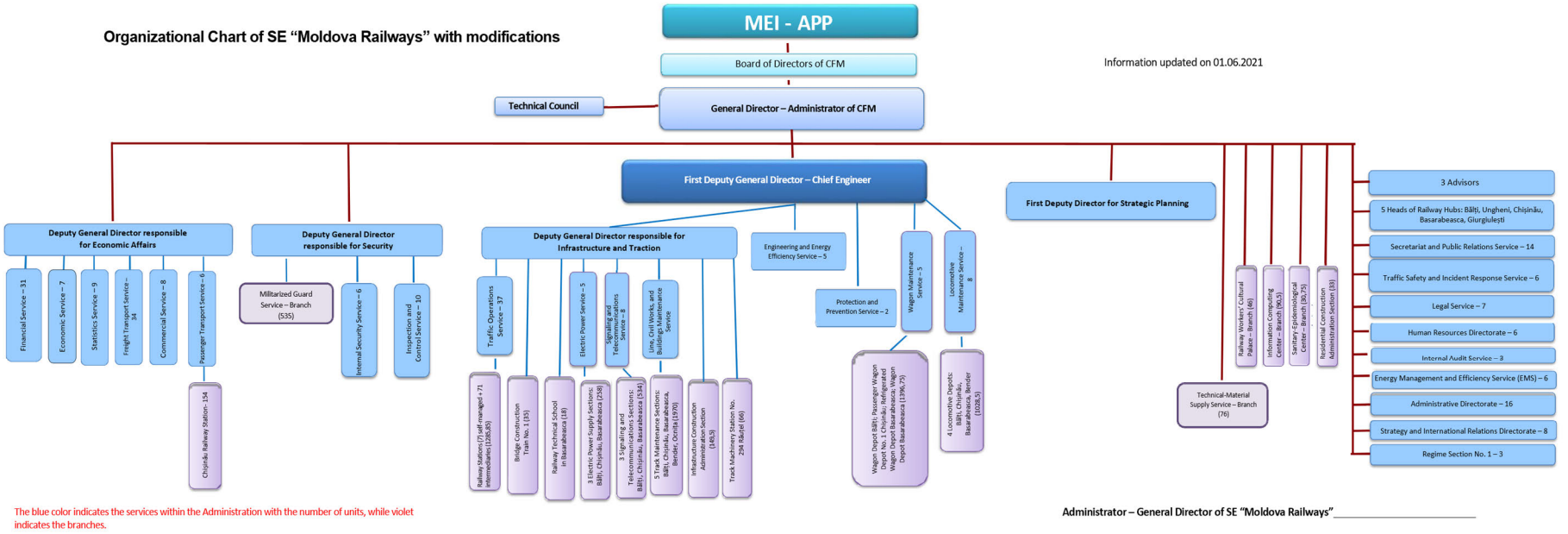
- Infrastructure and Traffic Management Division
- Safety Management Division
- Commercial (Sales) Division
- Corporate Services Division

In addition to these major divisions, departments responsible for back-office functions—such as Audit, General Affairs, Public Relations, and International Affairs—have been established under the direct CEO supervision.



Source: CFM

Figure 5-1 CFM's Position as a Government Agency



Source: CFM

Figure 5-2 CFM Organizational Chart (Before the Transition to the New Structure)

The number of CFM employees by rank and age as of January 2024 is in Table 5-2. As of January 2024, the total number of employees was 4,997, with those aged 50 and older accounting for 3,197, making it a "super-aging organization" where 64% of the workforce is aged 50 or older. While the average age is undisclosed, if we calculate it using the minimum age of each age group (18 for the 18–30 group), the result is 49.4 years, suggesting that the actual average age exceeds 50.

Generally, in private companies, an average age exceeding 40 is considered an "aging workforce." When Japan Freight Railway Company (Japan Railways (JR) Freight) was established in 1987 through a spin-off from the Japanese National Railways, the average age was 45. At the time, this was the highest average age among the seven JR companies. Although JR Freight began general recruitment in 1992, there was a shortage of mid-career employees to train and mentor the newly hired young employees, and it took time to establish systems for employee training and the transfer of technical skills. Looking at CFM's workforce composition by generation, "young employees" aged 30 or younger account for only about 3.6%, while "older employees" aged 65 or older make up 9.1%, representing an even greater "shortage of mid-career staff" than that previously seen at JR Freight, and the situation is considered extremely dire from the perspective of technical knowledge transfer.

Table 5-2 Number of CFM Employees by Class and Age (as of January 2024)

Age	Employee Class										Male	Female	Total
	Advanced		Intermediate (specialized high schools) (colleges)		Intermediate (Vocational Schools)		Vocational schools		Specialized (training) secondary schools incomplete				
	Male	Female	Male	Female	Male	Female	Male	Female	Male	Female			
18–30	9	17	16	10	31	4	41	23	22	6	118	60	178
31–40	56	50	52	26	60	8	145	46	62	14	375	144	519
41–50	93	79	80	68	148	55	343	117	101	19	765	338	1,103
51–59	86	92	143	103	264	73	559	174	70	14	1,124	454	1,578
60–62	46	31	53	52	99	27	283	82	18	2	499	194	693
63–65	27	15	66	29	49	26	194	51	8	2	344	124	468
65–	43	33	59	43	55	20	143	43	18	1	322	136	458
Total	360	317	469	331	706	213	1,708	536	299	58	3,547	1,450	4,997
Total (Male and Female)	**677**		**800**		**919**		**2,244**		**357**		**4,997**		**4,997**

Source: CFM

To break out of its current situation, CFM is implementing organizational and structural reforms. Due to a decline in transportation revenue caused by the prolonged Russian invasion of Ukraine, CFM is facing a severe deficit. This has led to delayed salary payments (Up to 7–8 months. Resolved as of July 2026.) and, because salary levels are significantly lower than those in the private sector, a shortage of applicants for new positions. Consequently, CFM has been compelled to restructure its organization and is proceeding to

streamline it by reorganizing and consolidating both operational and non-operational departments. This restructuring is continuing into 2026. Table 5-3 summarizes the authorized staffing levels and current headcount by region as of August 2025. Table 5-2 shows that the workforce, which stood at 4,997 in January 2024, fell to 3,809 by August 2025, a decrease of 1,188 employees. Meanwhile, the authorized staffing level stands at 6,077, resulting in a shortfall of 2,204 employees and a vacancy rate of 36%. Therefore, CFM is attempting to streamline the organization through restructuring to reduce the authorized staffing level and minimize the discrepancy between the authorized and actual employee counts. This restructuring also serves the following purposes:

- Reduction of labor costs
- Rejuvenating the organization by laying off older employees and hiring younger ones
- Revising salary levels, which are lower than those in the private sector (salary increases)
- Resolving the issue of unpaid wages

Table 5-3 CFM's Standard and Current Staff Numbers by District as of August 2025

District	Standard Staffing Level	Current Staff	Staff on Leave	Planned Hires	Planned Retirements	Number of vacancies	Vacancy rate
Oknytsia	652	424	26	31	17	240	37%
Bălți	1,334	900	23	65	34	426	32%
Chișinău	2,235	1,354	40	141	31	811	36%
Tighina	36	154	1	6	5	182	54%
Basarabeasca	1,391	882	13	33	20	509	37%
Giurgiulesti	130	95	8	8	2	37	29%
Total	6,077	3,809	111	284	109	2,204	36%

Source: Compiled by the research team based on CFM materials

During a hearing with CFM in January 2026, it was stated that the districts shown in Table 5-3 would be consolidated and reorganized into the following three districts in February 2026. Personnel transfers are scheduled to take place over several months, and the restructuring is expected to be completed within 2026.

- Northern District: Merging Oknytsia and Bălți
- Central District: Merging Chișinău and Tighina
- Southern District: Merging Basarabeasca and Giurgiulesti

The projected number of staff in each district following the consolidation and reorganization is as follows:

- Northern District: 540 employees (a reduction of 1,446)
- Central District: 712 (a reduction of 1,859)
- Southern District: 723 (a reduction of 798)

The planned staffing levels for employees not assigned to specific districts (such as those at headquarters) are currently under review.

5.3.2 CFM's Financial Situation

CFM's operating income and expenses from 2020 to 2024 are shown in Table 5-4. CFM's operating income had been in the red even before Russia invaded Ukraine; although it turned a profit only in 2022, in 2024—the most recent year—transportation revenue fell by nearly 40% year-on-year, resulting in an operating loss exceeding 300 million Moldovan lei (approximately 2.77 billion yen).

Table 5-4 CFM's Operating Income/Loss from 2020 to 2024

Unit: Moldovan lei

	Operating Revenue	Operating Expenses	Operating Profit/Loss
2020	599,050,833.0	685,899,071.0	(86,848,238.0)
2021	624,689,579.0	656,435,846.0	-31,746,267.0
2022	1,282,755,252.0	1,121,803,770.0	160,951,482.0
2023	1,075,669,746.0	1,121,571,946.0	-45,902,200.0
2024	635,139,000.0	938,637,900.0	-303,498,900.0

Source: CFM website

The actual results for CFM's total revenue and expenses for 2023 and 2024 are shown in the Table 5-5 and Table 5-6. As mentioned earlier, revenue in 2024 fell below 60% of the plan, a result strongly influenced by Russia's invasion of Ukraine. On the other hand, expenses amounted to only 87% of the planned figure. This is because the railway business generally has a high proportion of fixed costs—such as labor costs and equipment maintenance expenses—that are not affected by transport volume or revenue. As a result, CFM's overall balance sheet, including all revenue and expenses, showed a deficit of 144 million Moldovan lei in 2023 and 323 million Moldovan lei in 2024.

As shown in the breakdown of revenue at Table 5-5, freight transport revenue accounts for approximately 80% of total revenue, while passenger transport revenue accounts for less than 10%. This demonstrates that CFM's railway operations are primarily focused on freight transport.

As shown in Table 5-6 transportation costs account for more than 90% of total expenses. The breakdown of transportation costs is shown in

Table 5-7. Of the 2024 transportation costs, approximately 50% consists of salaries, and an additional 12% consists of social insurance premiums. In other words, personnel-related expenses account for 62% of the total. This extremely high proportion of personnel costs is generally thought to be due to the following reasons.

- ① Staff salary levels are too high
- ② Operational efficiency is extremely poor, and staff productivity is low

As mentioned earlier, CFM is unable to recruit new staff due to low salary levels, so reason ① does not apply. Therefore, it is believed that CFM's expense structure results in abnormally high labor costs due to reason ②: "operational efficiency is extremely poor, and staff productivity is low."

Table 5-5 CFM Revenue for 2023 and 2024

Unit: thousand Moldovan lei

Item	2023 Actual	2024			Year-over-Year Change
		Plan	Actual	Vs. Plan	
Freight Transport	961,485.9	990,000.0	533,776.6	53.9%	55.5%
Passenger transport	51,824.4	60,000.0	45,432.7	75.7%	87.7%
Railway ancillary revenue	62,359.5	63,000.0	55,929.7	88.8%	89.7%
Other income	28,889.7	60,000.0	28,942.1	48.2%	100.2%
Revenue from fixed asset transactions	8,314.2	8,600.0	17,966.3	208.9%	216.1%
Income from financial transactions	13,131.5	13,000.0	20,244.2	155.7%	154.2%
Non-operating income	2.3	0.0	0.0		0.0%
Total Revenue	**1,126,007.5**	**1,194,600.0**	**702,291.6**	**58.8%**	**62.4%**

Source: CFM Activity Report 2024

Table 5-6 CFM Expenses for 2023 and 2024

Unit: thousand Moldovan lei

Item	2023 Actual	2024			Year-over-Year Change
		Plan	Actual	Vs. Plan	
Transportation costs	1,173,117.3	1,078,596.0	938,637.9	87.0%	80.0%
Incidental expenses	19,514.9	17,471.0	14,820.5	84.8%	75.9%
Other operating expenses	56,498.0	58,569.0	47,230.0	80.6%	83.6%
Investment expenses	2,685.3	2,137.0	2,021.8	94.6%	75.3%
Financial transaction expenses	17,083.3	14,020.0	22,187.3	158.3%	129.9%
Extraordinary expenses	982.5	0.0	19.9		2.0%
Total Expenditures	**1,269,881.3**	**1,170,793.0**	**1,024,917.4**	**87.5%**	**80.7%**

Source: CFM Activity Report 2024

Table 5-7 Breakdown of Transportation Costs for 2023 and 2024

Unit: thousand Moldovan lei

Item	2023	2024				Year-over-year change
		Plan	Actual	Percentage change Percentage	Compared to plan	
Salaries	543,329.2	502,439.0	471,665.1	50.2%	93.9%	86.8%
Social insurance	130,255.3	120,585.0	113,176.3	12.1%	93.9%	86.9%
Procurement	59,940.8	53,900.0	41,234.5	4.4%	76.5%	68.8%
Transportation fuel	154,884.9	154,072.0	90,615.0	9.7%	58.8%	58.5%
Fuel for other uses	17,825.5	10,000.0	8,768.1	0.9%	87.7%	49.2%
Electricity	16,755.9	13,000.0	12,704.7	1.4%	97.7%	75.8%
Depreciation	94,199.2	92,000.0	93,503.3	10.0%	101.6%	99.3%
Other	149,039.8	125,600.0	103,515.7	11.0%	82.4%	69.5%
Major Repair Expenses	6,886.6	7,000.0	3,455.2	0.4%	49.4%	50.2%
Total	**1,173,117.3**	1,078,596.0	**938,637.9**	100.0%	**87.0%**	**80.0%**

Source: CFM Activity Report 2024

Table 5-8 CFM Income and Expenditures for 2023 and 2024

Unit: thousand Moldovan lei

	2023 Actual	2024 Plan	2024 Actual
Total Revenue	1,126,007.5	1,194,600.0	702,291.6
Total Expenses	1,269,881.3	1,170,793.0	1,024,917.4
Net Income	-143,873.8	23,807.0	-322,625.8

Source: CFM Activity Report 2024

5.3.3 CFM Education, Training, and Human Resource Development

CFM owns a railway school in Basarabeasca. The railway school was established to train locomotive engineers and operations management staff. However, due to budget and staffing shortages, the current student count is zero. Although not directly operated by CFM, a school established by the Ministry of Education in Bălți provides training for staff of the signaling and communications systems.

Since locomotive engineers operate in conjunction with rolling stock, they are assigned to the Rolling Stock Division. The current number of locomotive engineers is 65. As mentioned above, no training for locomotive engineers is currently being conducted. The training period for locomotive engineers is 2.5 years, but CFM plans to revise the regulations as part of its restructuring. Since the details of the regulatory changes have not yet been decided, no further information was available.

5.4 Operations of the Moldovan State Railways (CFM)

5.4.1 Overview of CFM's Passenger Volume

Passenger transport volumes from 2021 to 2024 are shown in Table 5-9 and Table 5-10. Passenger transport volume reached approximately 440,000 in 2023, but in other years, it stabilized at just over 300,000. Passenger-kilometers increased to 45.7 million in 2023, roughly double the levels of 2021 and 2022, but fell to 39.8 million in 2024. Although the number of passengers in 2024 remained at 320,000, the same as in 2021 and 2022, passenger-kilometers increased compared to those years due to a higher number of transit passengers.

Table 5-9 CFM Passenger Volume from 2021 to 2024

Unit: Thousands

Year	2021	2022	2023	2024
Total	316.7	356.6	439.5	320.4
International passengers	9.8	108.6	159.1	113.7
Transit passengers	101.5	0.0	56.0	66.7
Domestic passengers	205.4	248.0	224.4	140.0

Source: CFM Activity Report 2021-2024

Table 5-10 CFM Passenger-Kilometers from 2021 to 2024

Unit: million passenger-kilometers

Year	2021	2022	2023	2024
Total	12.2	21.5	45.7	39.8
International passengers	0.9	11.2	16.3	11.6
Transit passengers	3.1	0.0	17.9	21.3
Domestic passengers	8.2	10.3	11.5	6.9

Source: CFM Activity Report 2021-2024

Table 5-11 shows freight volume of CFM from 2021 to 2024, while Table 5-12 shows freight ton-kilometers. Freight volume showed a slight upward trend from 2021 to 2023 but plummeted sharply in 2024. Freight ton-kilometers were particularly high in 2022, likely due to increased transit cargo, resulting to a longer average transport distance. In contrast, freight ton-kilometers significantly declined in 2024. The decrease in both freight volume and freight ton-kilometers in 2024 was likely driven by reduced exports and transit freight, suggesting a strong impact from Russia's invasion of Ukraine.

Table 5-11 CFM Freight Volume from 2021 to 2024

Unit: Thousand tons

Year	2021	2022	2023	2024
Total	3,317.6	3,815.1	3,947.3	2,448.4
Exports	1,083.1	1,035.5	985.3	573.7
Imports	1,297.8	863.4	1,062.4	889.7
Transit	439.2	1,202.1	1,182.2	458.7
Domestic	497.5	714.1	717.4	526.3

Source: CFM Activity Report 2021-2024

Table 5-12 CFM Freight Ton-Kilometers from 2021 to 2024

Unit: million ton-kilometers

Year	2021	2022	2023	2024
Total	658.4	1,219.5	802.4	486.8
Exports	216.6	301.5	169.9	93.4
Imports	166	125.8	169.8	127.2
Transit	124	551.9	246.7	102.6
Domestic	151.7	240.3	216	163.6

Source: CFM Activity Report 2021-2024

5.4.2 CFM Operational Status

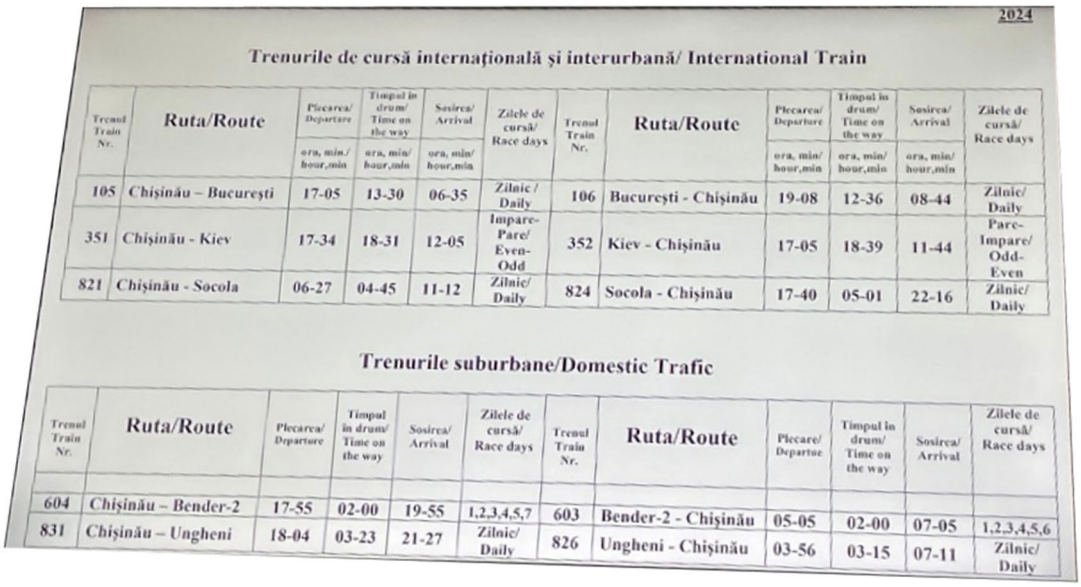
Only three round-trip international trains and two round-trip domestic trains are currently in operation. Figure 5-3 shows the train schedule for Chișinău Station, the capital's main station. International trains run between Bucharest and Socola in Romania and between Kyiv in Ukraine, while domestic trains run between Tighina and Ungheni. Both domestic round-trip services depart from Tighina and Ungheni in the middle of the night or early morning, arriving in Chișinău in the morning; the return trips depart from Chișinău in the

evening, arriving in Tighina and Ungheni at night. It is believed that these schedules were set to meet the needs of passengers who stay in Chișinău for a day on business or other errands before returning home. (When the research team happened to ask a café employee—a former resident of Ungheni—about the purpose of the trains, they received the following response: "Although freight trains have a set schedule, they do not operate unless there is a request from a customer.")

The main cargo for domestic freight transport is petroleum (fuel), with 15,000 to 18,000 tons transported monthly. The departure stations are Ungheni, Galati, and Giurgiulesti, and the destination station is Chișinău.

Regarding transit freight, 32,000 tons of iron ore were previously transported monthly from Ukraine to Romania; however, demand for transport services ceased in September 2025 when ArcelorMittal's Hunedoara plant, the recipient of the iron ore, ceased operations.

Grains are a major cargo for both exports and transit. The export cargo is from Giurgiulesti and Ungheni to Romania. There are two routes used for transit cargo: one enters the CFM line from Otaci in the north and passes through Ungheni to Romania, and another enters the CFM line from Cuciurgan in the southeast and passes through Giurgiulesti to Romania.



2024

Trenurile de cursă internațională și interurbană/ International Train

Trenul Train Nr.	Ruta/Route	Plecarea/ Departure ora, min./ hour,min	Timpul în drum/ Time on the way ora, min/ hour,min	Sosirea/ Arrival ora, min/ hour,min	Zilele de cursă/ Race days	Trenul Train Nr.	Ruta/Route	Plecarea/ Departure ora, min/ hour,min	Timpul în drum/ Time on the way ora, min/ hour,min	Sosirea/ Arrival ora, min/ hour,min	Zilele de cursă/ Race days
105	Chișinău – București	17-05	13-30	06-35	Zilnic / Daily	106	București - Chișinău	19-08	12-36	08-44	Zilnic/ Daily
351	Chișinău - Kiev	17-34	18-31	12-05	Impare-Pare/ Even-Odd	352	Kiev - Chișinău	17-05	18-39	11-44	Pare-Impare/ Odd-Even
821	Chișinău - Socola	06-27	04-45	11-12	Zilnic/ Daily	824	Socola - Chișinău	17-40	05-01	22-16	Zilnic/ Daily

Trenurile suburbane/Domestic Trafic

Trenul Train Nr.	Ruta/Route	Plecarea/ Departure	Timpul în drum/ Time on the way	Sosirea/ Arrival	Zilele de cursă/ Race days	Trenul Train Nr.	Ruta/Route	Plecare/ Departue	Timpul în drum/ Time on the way	Sosirea/ Arrival	Zilele de cursă/ Race days
604	Chișinău – Bender-2	17-55	02-00	19-55	1,2,3,4,5,7	603	Bender-2 - Chișinău	05-05	02-00	07-05	1,2,3,4,5,6
831	Chișinău – Ungheni	18-04	03-23	21-27	Zilnic/ Daily	826	Ungheni - Chișinău	03-56	03-15	07-11	Zilnic/ Daily

Source: JICA Survey Team

Figure 5-3 Train Schedule at Chișinău Station

5.4.3 CFM Fare Structure

Passenger fares are fixed, with no discount programs or similar schemes. Fares vary depending on the travel distance and class of service (1st, 2nd, or 3rd class). Detailed fare tables are in Table 5-13.

For international services, the fare from Chișinău to Bucharest is 745 Moldovan lei for 2nd class and 1,697 Moldovan lei for 1st class; all coaches on this route are sleeper cars. The fare from Chișinău to Socola is 170 Moldovan lei for 1st class, 130 Moldovan lei for 2nd class, and 110 Moldovan lei for 3rd class. The service from Chișinău to Kyiv is currently suspended.

For freight transport, the fare structure for domestic shipments is calculated based on transport distance, cargo weight, and commodity type. A tariff table is available on the CFM website. In general, longer transport distances are subject to higher discount rates, and volume discounts are available for certain commodities.

International freight transport follows a tariff policy common to CIS countries, which is revised annually. The tariff covers only transport charges; additional fees apply separately, including freight car preparation fees, station usage fees, shunting fees, border freight car inspection fees, and customs clearance fees. Other charges are particularly complex in international transport, and customers are often unaware of which charges apply. As a result, railway freight forwarders act as intermediaries between customers and the CFM (Cargo Forwarding Manager) to calculate these charges. Consequently, customers enter transport contracts either directly with the CFM or through a railway freight forwarder. Freight rates and other charges are fixed and do not vary by customer.

Since the CFM is only responsible for rail transportation, customers must independently arrange cargo collection and delivery, cargo handling at stations, and car consolidation. In the case of car consolidation, \customers specify the freight cars to be used, while the CFM arranges the actual allocation of the cars.

In addition, because calculating other charges is highly complex, customers typically contract with rail forwarders for international transport. These forwarders act primarily as agents, arranging contractors as needed rather than performing operational services such as trucking or cargo handling themselves

Table 5-13 CFM Domestic Passenger Fare Table

Nr. d/o	Denumirea serviciului	Unitate de măsură, distanța, km	**Prețul (fără TVA), MDL**		
			Tren-diesel D1M cl.III, vagon standard, tren -diesel D1	Tren-diesel D1M cl.II, vagon cu locuri	Tren-diesel D1M cl.I, vagon compartiment
1.	Transport de pasageri în trafic intern	1-20	**15**	**20**	**25**
		21-30	**18**	**21**	**25**
		31-40	**23**	**25**	**28**
		41-50	**29**	**32**	**36**
		51-60	**35**	**38**	**43**
		61-70	**40**	**44**	**51**
		71-80	**46**	**50**	**58**
		81-90	**51**	**56**	**65**
		91-100	**56**	**62**	**71**
		101-110	**61**	**67**	**78**
		111-120	**66**	**72**	**84**
		121-130	**70**	**78**	**90**
		131-140	**74**	**82**	**96**
		141-150	**78**	**87**	**102**
		151-160	**82**	**91**	**107**
		161-170	**86**	**96**	**112**
		171-180	**89**	**100**	**117**
		181-190	**93**	**104**	**122**
		191-200	**96**	**107**	**127**
		201-250	**108**	**122**	**144**
		251-300	**129**	**146**	**173**
		301-350	**150**	**169**	**202**

Source: CFM

5.4.4 CFM Transportation Planning and Train Operations Management

While passenger transport has fixed train schedules and timetables, freight transport plans are created monthly. There are four categories: domestic, imports, exports, and transit. The "Automated Export System (AES) Plan," a system developed during the Soviet era, is currently operated under Ukrainian leadership. Scheduled shipment volumes for Ukraine and Poland are registered in this system, and plans are formulated based on this data. The maximum speed for passenger trains is 120 km/h and 70 km/h for freight trains; however, due to insufficient track maintenance, transport plans currently set speeds at approximately 40 km/h for passenger trains and 30–40 km/h for freight trains.

In actual train operations, passenger trains run according to the scheduled timetable. Freight trains, however, may be ordered by the control center to suspend operations if their load falls below a certain threshold. As a result, only about 50% of freight trains are running.

According to the signal office at Chișinău Station, although freight trains have a scheduled timetable, they rarely operate on schedule. Instead, once preparations are complete, the station informs the dispatcher that the train is ready to depart. The dispatcher then contacts along the route and the destination station to confirm their readiness to handle the train. After these confirmations are received, an updated timetable is prepared, and the train is authorized to depart.

The Movement Department and the Dispatcher handle the train operations management. Their respective roles are as follows.

(1) Duties of the Movement Department

- Train Scheduling
- Securing the necessary rolling stock (locomotives, freight cars, passenger cars) and train operators (booking) based on train schedules (passenger) and transport requests from customers (freight forwarders)
- Communication with the Dispatcher (e.g., instructions for handling incidents)

(2) Dispatcher

- The control room is located only in Chișinău. Transportation control is managed from three locations: Chișinău (Central Line), Bălți (Northern Line), and Căinari (Southern Line).
- Even in sections where automatic and semi-automatic signalling systems are in place, Automatic Train Stop (ATS) is not used, so signals are manually operated at each station
- Once a station confirms a train has passed, it notifies the control center. The control center verifies the time and creates a running record
- Control exchanges information with stations and train operators via voice (telephone).
- Many stations have already been closed; since signal operations cannot be performed at these closed stations, train movements are managed using passage tickets rather than signals.

- Some signal equipment is malfunctioning and currently under repair (confirmed during an interview with the Signal Department).
- Regarding train connections with Ukraine, they frequently communicate by phone with Ukrainian dispatchers (though this has not been confirmed, based on experience in Japan, it is presumed that they provide updates at regular intervals).
- For trains traveling from Ukraine to Moldova, the Ukrainian side registers necessary information—such as car numbers, car type codes, car ownership country codes, cargo item codes, and destination station codes—into the former Soviet Union's railway information system (Automated System for Operational Management of Transportation: ASOUP). Moldovan dispatchers can access the system to retrieve only the necessary data.
- When a train arrives from Ukraine, there is no specific communication between the control centers of the two countries; instead, the train driver contacts them by voice (telephone).

(3) Management of Precautions Regarding Train Operations

The planned train schedule includes the following information for each section

- Signal type for each section (automatic, semi-automatic, paper-based)
- Traction limits (maximum traction tonnage) and length restrictions (maximum train length) for each section

Passenger trains are indicated by black lines, freight trains by red lines, and trains from Romania by green lines.



Source: JICA Survey Team

Figure 5-4 Chișinău Station Signal Box



Source: JICA Survey Team

Figure 5-5 Station Staff Waiting to Hand the Passage Ticket to the Engineer

5.4.5 Workflow for Freight Transport

The workflow for freight transport, from contract to settlement, is as follows.

1. The customer enters into a basic contract with CFM and receives an access ID for the transport request system within PEGAS (CFM's management system for operational tasks such as train reservations, customer information management, cargo handling, and railcar consolidation). (If the customer has a contract with a rail freight forwarder, the forwarder will handle the subsequent procedures on their behalf.)
2. The customer (railway forwarder) enters basic information such as origin and destination stations, shipment date, cargo type, and shipment volume into the PEGAS transport request system.
3. For domestic transport, the data is notified only to CFM; for international transport to Ukraine, it is notified to UZ, and the respective national railways coordinate to determine whether transport is possible under the requested conditions.
4. Once both CFM and UZ register "Transportation Possible" in PEGAS, transportation is approved, and thereafter, the customer (railway forwarder) arranges for freight cars and station handling, etc.
5. Once all arrangements are complete, CFM collects the freight cars designated by the customer
6. The freight train is operating
7. At the destination station, the invoice transported with the railcars is processed and forwarded for billing.
8. The customer makes payments (for international transport, customers pay to both UZ and CFM; due to the complexity, the rail forwarder acts as an intermediary).

5.4.6 CFM's Digitalization

CFM currently operates the following systems:

(1) ASOUP: International rail freight transport management system for countries of the former Soviet Union

(2) EXPRESS 3: International passenger rail transport management system for countries of the former Soviet Union

(3) PEGAS: CFM's management system for operational tasks such as train reservations, customer information management, cargo handling, and car consolidation

(4) FOXPRO: Operational management system for train drivers (managing consecutive duty hours, etc.)

(5) Tef-PD: A system for registering and managing various freight transport documents

(6) 1C: An accounting system developed during the Soviet era

There are no other systems (such as asset management or maintenance management). ASOUP and PEGAS were originally mainframe systems, but they currently run on Windows servers. An overview of each system is provided below.

(1) ASOUP

Developed during the Soviet era, this system is widely used across the former Soviet states. Details of freight cars coupled with international freight trains (type, number, country of origin, main specifications, etc.) and cargo details (item, weight, shipper, consignee, etc.) are registered and shared to railway operators in transit countries and the destination country.

The software is distributed to railway operators in each participating country and operated domestically within each country. Each country manages its own data, while information is shared through a common data platform.

Since the outbreak of the conflict in Ukraine in 2022, data connectivity has been limited to Ukraine, Moldova, and the three Baltic states, while connections with other countries have been discontinued.

The software has not been updated since 2022, and the license for the currently used base software will expire in 2028.

(2) EXPRESS3

The passenger version of ASOUP. It has equivalent functionality and currently operates in the same manner as ASOUP.

(3) PEGAS

Since ASOUP manages only cross-border freight cars and the contents of the cargo in international freight transport, it does not handle train reservations (fare calculations), customer details (customer name, cargo to be transported, departure and arrival stations, etc.), cargo handling details (scheduled and actual start and

end times, handling locations, handling contractors, etc.), and railcar readiness status (collected railcar numbers, etc.)—information related to the operations and revenue of freight transport (domestic and international). Currently, it is linked to the CFM website, but a mobile version is reportedly under development.

(4) FOXPRO

FOXPRO is a system for managing train drivers' schedules. The reason a dedicated system was developed for train drivers is likely that there are often detailed regulations on consecutive duty hours and rest periods. However, at the Basarabeasca Operations District I visited, driver schedules were managed manually, and it did not appear that this FOXPRO system was in use.

(5) Tef-PD

In rail freight transport, waybills (containing the car number, type, cargo details, shipper, consignee, etc.) are created for each freight car and are transported along with the cargo by the train crew. In the case of international transport, the Agreement on International Goods Transport by Rail (SMGS) (the Organization for Cooperation between Railways (OSJD) standard consignment note) or the Uniform Rules Concerning the Contract of International Carriage of Goods by Rail (CIM) (the EU standard consignment note) are transported with the freight. Tef-PD is a system for registering and managing the data on these waybills, and CFM staff at the originating station (border station) enter the data upon receipt of the waybill. CFM staff at the destination station (border station) verify that the data registered in Tef-PD matches the contents of the received waybill (checking for missed deliveries, etc.).

(6) 1C

Accounting software developed by Russia during the Soviet era. Since 2022, there has been no system support, making it impossible to resolve issues or perform updates.

The IT department faces the following issues.

1. Systems developed primarily in Russia during the Soviet era (ASOUP, EXPRESS3, C1) will no longer receive system support after 2022, meaning they can only be maintained at their current state. Regarding ASOUP, the license for the underlying base software will expire in 2028, and there is a possibility that it will become unusable.
2. All systems are operated on Windows Server, but the server hardware was installed between 2010 and 2015. The likelihood of failures due to aging is increasing. Since the manufacturer has discontinued parts supply, repairs may not be possible even if a failure occurs.
3. Since Romania is an EU member state, there is no system integration; instead, shipping information is entered into Excel and sent via email, which is a time-consuming process. The EU's standard specifications (such as data formats) differ from those of the former Soviet Union, creating significant hurdles for system integration.

4. For Tef-PD, CFM staff must manually enter waybills received on paper, which is time-consuming. CFM will eliminate manual entry by establishing data connections for domestic and international shipments; however, UZ does not have the resources to develop the system integration.
5. CFM wants to systematize its asset and maintenance management, but lacks both the funds and the expertise to develop a system.

5.5 Infrastructure and Maintenance Management at the Moldovan Railways (CFM)

5.5.1 Railway Network

CFM route maps are in Figure 5-6, CFM Route Map and Maintenance. CFM routes have three lines: the Northern Line, the Central Line, and the Southern Line. The main sections, distances, and number of stations for the line are shown in Table 5-14. Note that some stations are temporarily closed due to staff shortages. Therefore, stations marked as “closed” in the 2025 train timetable we obtained have been excluded from the station count.

The entire network is non-electrified, and most of it is single-track; double-track sections total only 40 km. The track gauge is Russian gauge (1,520 mm), but standard gauge (1,435 mm) tracks have been laid at Ungheni and Giurgiulesti on the border with Romania to connect with the CFR network.

Table 5-14 Section Distances and Number of Stations on the Main Sections of the CFM

Line Name	Major Section	Distance (km)	Number of Stations
Northern Line	Oknytsia–Bălți–Ungheni	184.2	13
	Bălți–Kobasna	146.5	10
Central Line	Ungheni–Chișinău–Basarabeasca	233.9	15
Southern Line	Basarabeasca–Giurgiulesti	152.7	11
	Basarabeasca–Prut 2	104.0	4
	Giurgiulesti ~ Prut 2	96.8	3

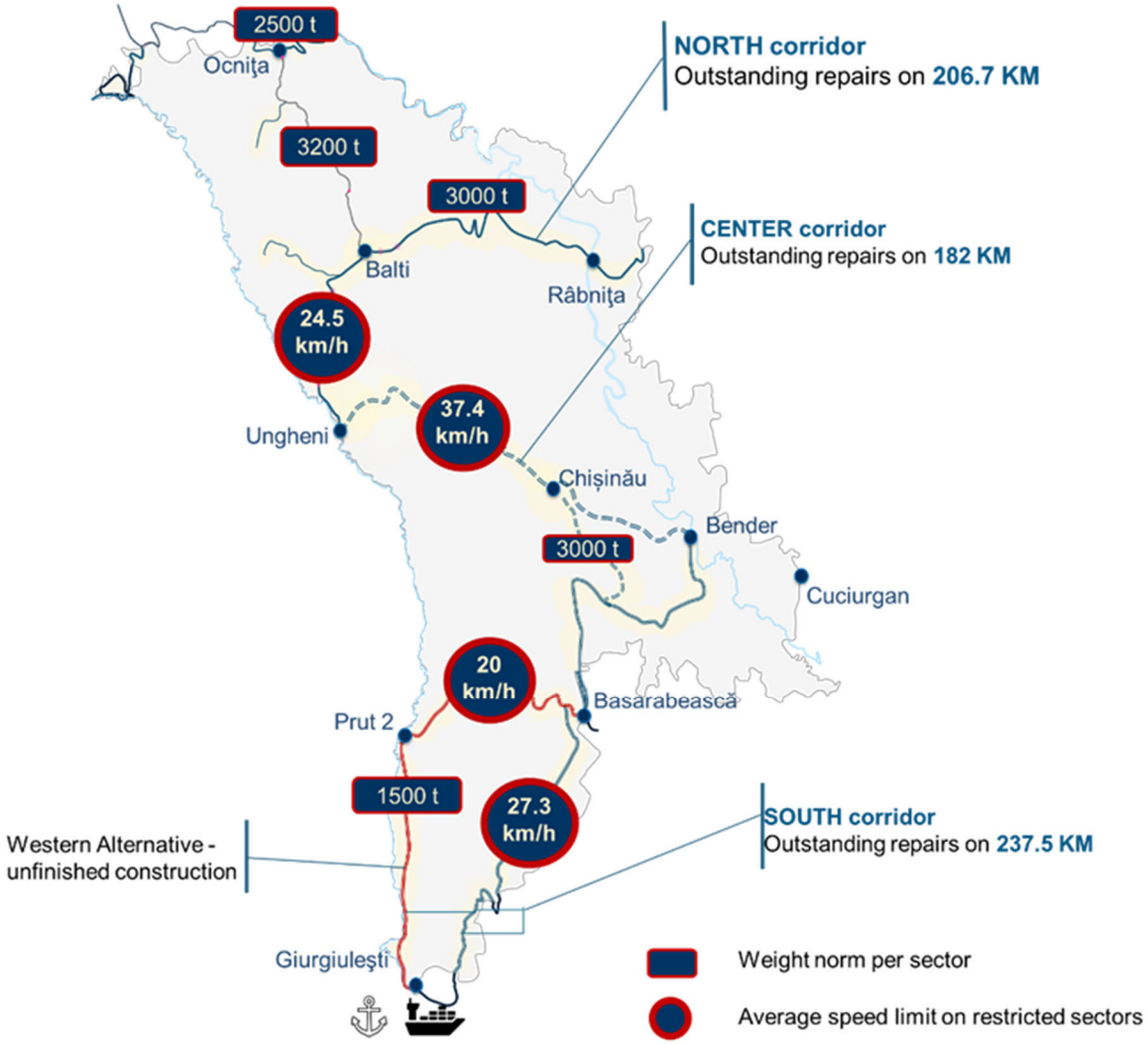
Source: 2025 Train Schedule, CFM



Source: CFM

Figure 5-6 CFM Route Map and Maintenance Districts

5.5.2 Track and Civil Engineering Facilities



Source: CFM

Figure 5-7 Maximum Traction Tonnage for Each Line and Speed Limits in Restricted Sections

Figure 5-7 shows the maximum hauling capacity for each line and the speed limits in restricted sections. While the main lines can haul 3,000 tons, the section between Prut 2 and Giurgiulesti is limited to 1,500 tons. The axle load is set at 23.5 tons because the tracks were constructed to Soviet standards. Speed-restricted sections are generally designated for areas undergoing repair work; however, as CFM has not been able to carry out sufficient track maintenance, as described later, it has designated even unmaintained sections as restricted areas. As shown in Figure 5-7, trains operate at reduced speeds in these speed-restricted sections to prevent derailments and track damage.

Based on regulations from the former Soviet Union era, CFM has established its own track maintenance regulations, "Instructions for the Maintenance of Rail Tracks." However, due to a shortage of personnel and equipment, the inspections and maintenance specified in the regulations cannot be fully implemented; in practice, the following inspections and maintenance are carried out:

- Twice a year, track material inspections (sleeper inspections) are conducted along the entire line. While regulations stipulate 1,840 sleepers per kilometre for 1,520 mm gauge tracks, if the number of sleepers falls below 800 per kilometre after inspection, corrective action (sleeper replacement) is taken.
- Every month, track misalignment is measured along the entire line using a track misalignment detection car (CFM owns only one such vehicle, a former Soviet-made car manufactured in 1950 and stored at the Chișinău Division).
- If track misalignment exceeds the standard value, the inspector contacts the maintenance division to request maintenance. (Due to budget constraints, prompt maintenance cannot be performed; until the issue is resolved, speed limits are set, and trains must proceed at reduced speeds. There are three speed limit levels 15 kilometres per hour (kph), 25 kph, and 40 kph—and the standard specifies which one to adopt.)
- Preventive maintenance is not performed. Track maintenance is limited to addressing only those sections where defects are discovered.
- In addition to the above, a rail fracture inspection team in each division measures rail fractures. They cover 120 km per month per party (4 staff). Rail condition is assessed by tapping (tapping the rail and checking with a stethoscope-like device).

CFM's track maintenance system is organized into the following five branches. Branch boundaries are shown on the map in Table 5-15.

- ПЧ-1 = Chișinău
- ПЧ-2 = Tighina
- ПЧ-3 = Basarabeasca
- Branch 5 = Bălți
- ПЧ-6 = Oknytsia

Each district is further divided into maintenance districts (District), and each maintenance district is further divided into teams (Team). (The head of a single maintenance district is responsible for 25–30 km.)

The number of maintenance districts, current staffing levels, and standard staffing levels for each district are shown in Table 5-15. Although the standard staffing level is 1,749, the current staffing level is only 940, resulting in a staffing rate of 53%; thus, only about half of the required maintenance personnel have been secured.

Table 5-15 Track Maintenance Districts, Current Staff, and Standard Staffing Levels in the CFM District (as of October 2025)

No	Branch	Number of Districts	Current Number of Staff	Standard Staffing Level
PC-1	Chișinău	11	149	329
PC-2	Tighina	10	117	264
PC-3	Basarabeasca	16	311	521
PCH-5	Bălți	9	218	369
PCH-6	Oknytsia	10	145	266
	Total	56	940	1,749

Source: CFM

Note that CFM is currently reorganizing maintenance districts and sub-districts to consolidate the current five districts into three, so the number of maintenance districts and sub-districts changes frequently. Therefore, the information in Table 5-15 is based on data available at the time of the survey.

Furthermore, CFM is facing not only a shortage of workers but also a worsening shortage of track maintenance equipment. Table 5-16 summarizes the number of operational units, the standard required inventory, and the shortage of representative small-scale track maintenance equipment—such as portable generators, hydraulic jacks, electric tampers, and rail flaw detectors—for each district. For all types of equipment, only about half of the units are operational, reflecting a situation like that of the track maintenance workforce.



Source: JICA Survey Team

Figure 5-8 Aging Equipment (Portable Generators)



Source: JICA Survey Team

Figure 5-9 Tools for Manual Track Maintenance

Table 5-16 Number of Small-Scale Track Maintenance Equipment Units (Operational), Target Number, and Shortfall

(1) Number of currently available units (operational)

No	Branch	Number of districts	Number of Power Generators	Number of Hydraulic Jacks	Number of Hand Tie Tamper	Number of Rail Flaw Detectors	Number of staff
ПЧ-1	Chișinău	11	7	30	77	5	**149**
PCH-2	Tighina	10	16	86	107	6	**117**
PC-3	Basarabeasca	16	3	72	100	13	**311**
PCH-5	Bălți	9	9	73	75	8	**218**
PCH-6	Oknytsia	10	18	85	90	7	**145**
	Total	**56**	**53**	**346**	**449**	**39**	**940**

(2) Number of required devices based on standards (Standard)

No	Branch	Number of districts	Number of Power Generators	Number of Hydraulic Jacks	Number of Hand Tie Tamper	Number of Rail Flaw Detectors	Number of Staff
ПЧ-1	Chișinău	11	22	176	176	11	**329**
PCH-2	Tighina	10	20	160	160	10	**264**
PC-3	Basarabeasca	16	32	256	256	16	**521**
PCH-5	Bălți	9	18	144	144	9	**369**
PCH-6	Oknytsia	10	20	160	160	10	**266**
	Total	**56**	**112**	**896**	**896**	**56**	**1,749**

(3) Number of missing devices (Number in operation – Target number)

No	Branch	Number of Districts	Number of Power Generators	Number of Hydraulic Jacks	Number of Hand Tie Tamper	Number of Rail Flaw Detectors	Number of Staff
ПЧ-1	Chișinău	11	-15	-146	-99	-6	**-180**
PCH-2	Tighina	10	-4	-74	-53	-4	**-147**
PC-3	Basarabeasca	16	-29	-184	-156	-3	**-210**
PCH-5	Bălți	9	-9	-71	-69	-1	**-151**
PCH-6	Oknytsia	10	-2	-75	-70	-3	**-121**
	Total	**56**	**-59**	**-550**	**-447**	**-17**	**-809**

Source: CFM

Furthermore, as shown in Table 5-2, the CFM workforce is aging, and the track maintenance division is no exception. During an on-site inspection of track maintenance work, most of the workers were middle-aged or older, likely 50 or older. Additionally, due to a shortage of equipment, much of the work is performed manually, resulting in extremely low efficiency.



Source: JICA Survey Team

Figure 5-10 Scene of Track Maintenance Work

5.5.3 Freight Station

As mentioned earlier, CFM is involved only in the shunting of freight cars and train operations. Therefore, CFM does not operate any freight stations where cargo is loaded or unloaded. CFM operates only yards where freight cars are shunted in and out of "freight handling facilities" operated by customers or freight handling operators, and where cars are swapped out according to destination to form trains. Figure 5-11 shows the oil handling facility operated by DANUBE OIL COMPANY, which is adjacent to Giurgiulesti Station. This facility is equipped with both standard-gauge tracks from Romania and Russian-gauge tracks from Moldova. Petroleum fuels (gasoline, diesel) are unloaded from tank cars (standard gauge) arriving from Romania and transferred to on-site storage tanks and then loaded from the storage tanks into tank cars (Russian gauge) destined for transport within Moldova and Ukraine. These operations are carried out by DANUBE OIL COMPANY. CFM is responsible for moving tank cars arriving from Romania to the DANUBE OIL COMPANY premises, as well as moving tank cars loaded with petroleum products destined for Moldova and to Ukraine from the DANUBE OIL COMPANY premises to Giurgiulesti Station, where the tank cars are sorted by destination to form trains, and operating those trains.

A freight yard is located adjacent to the passenger station at Chișinău Station (Figure 5-12 , Figure 5-13). This freight yard is co-located with the Chișinău Rolling Stock Maintenance Depot. Here, freight cars attached to arriving trains are sorted by destination to form new trains, while cars whose inspection periods have expired are detached and shunted to the depot. Conversely, cars that have completed their inspections are shunted from the depot and attached to the necessary trains.

Thus, the "freight stations" operated by CFM are not "stations that handle freight" but rather "stations that sort freight cars and form trains"—in other words, they are known as "marshalling yards".

Although it is currently not in use, a facility for transloading containers from standard-gauge container trains arriving from Romania to Russian-gauge container trains has been constructed at Berești Station,

adjacent to Ungheni Station (Figure 5-14). Although this transshipment facility began operations in 2021, container train services ceased following Russia's invasion of Ukraine in 2022, and it has reportedly remained unused since then, partly due to a crane malfunction. Meanwhile, near this facility, there is a privately operated container transshipment yard that handles the transfer of containers arriving by train from Romania onto container trailers. Figure 5-15 shows the private container transshipment yard. Standard-gauge tracks are laid in the overgrown area on the right, and we were told that container freight cars enter the yard when transshipment operations are underway (though, from what we could see, it did not appear to be in frequent use).





Source: JICA Survey Team

Figure 5-11 The Oil Loading/Unloading Facility of the DANUBE OIL COMPANY Adjacent to Giurgiulesti Station



Source: JICA Survey Team

Figure 5-12 Freight Yard Adjacent to Chișinău Station



Source: JICA Survey Team

Figure 5-13 Signal Box for Shunting Operations at Chișinău Station



Source: JICA Survey Team

Figure 5-14 Remains of the Container Transshipment Facility at Bereşti Station



Source: JICA Survey Team

Figure 5-15 Container Transshipment Yard of a Freight Carrier Near Bereşti Station
(Rail Tracks are Laid in the Overgrown Area on the Right)

5.5.4 Railway Safety Equipment

The entire line uses automatic or semi-automatic signalling systems; however, these date back to the Soviet era and are malfunctioning in many sections. Currently, the paper-token system (passes) has been introduced in sections where automatic or semi-automatic signalling is out of service, as well as in sections with long station-to-station block intervals.

Station operating equipment is checked for proper operation once a day, and repairs are arranged if any abnormalities are found. Additionally, inspection work is conducted monthly by a team consisting of station representatives, signal and communications engineers, and power engineers. Equipment outside of stations (such as main lines) is inspected once a year. Inspections are conducted on a regional office basis. There are three regional offices for the signalling system: North, Central, and South. The total number of staff is 287, comprising 112 in the North, 88 in the Central, 84 in the South, and 3 at headquarters. However, the standard staffing level based on the scale of the facilities is 511, meaning the current staff is approximately half of the standard level.

The ratio of signal to communications staff is roughly equal, but cable inspections and similar tasks are performed regardless of department (since the cables are buried together).

The organizational structure includes one General Chief per bureau, 28 Chiefs, 65 technicians, and 33 field workers in the signalling division, and 26 Chiefs, 58 technicians, and 15 field workers in the communications division (*Note: However, since the signalling system is currently undergoing restructuring, it is unclear when these figures were last updated.).

Conventional communication cables have signal and communication types, which are placed together underground alongside the tracks. In some areas, fibre-optic cables have also been laid.

There are 226 level crossings, 181 of which are automated.



Source: JICA Survey Team

Figure 5-16 An Operational Traffic Signal (Left) and an Unused Traffic Signal (Right)

Current traffic signal maintenance faces challenges due to the aging and shortage of maintenance equipment, as well as difficulties in obtaining replacement parts for failures caused by deteriorating infrastructure. Much of the equipment dates to the Soviet era, and many maintenance tools and spare parts are Russian-made. However, these items are currently difficult to procure due to the present geopolitical situation.

5.5.5 Rolling Stock and Maintenance Depot

The number of vehicles owned by CFM and currently in service is shown in Table 5-17. Both mainline and shunting locomotives are extremely scarce. Given the small size of the country, even if a locomotive can make one round trip per day, only 16 round trips—equal to the number of mainline locomotives in service—can be operated daily. Furthermore, this number decreases even further when inspections and repairs are considered. The 12 mainline locomotives purchased from Kazakhstan in 2022 currently serve as the mainstay of the fleet (Figure 5-17).

There are two types of locomotive inspections: a semi-annual periodic inspection and an annual technical inspection. The decision to schedule an inspection is based on either the elapsed time or the number of operational kilometers. Freight cars undergo only a major component inspection once every three years; the periodic inspections (often conducted every three months in many countries) and general inspections (often conducted every four to seven years in many countries) practiced in various nations are not implemented here.

The inspection standards for locomotives were established during the Soviet era, and shunting locomotives are inspected in accordance with those standards. However, since the mainline locomotives purchased from Kazakhstan cannot be inspected using the Soviet-era standards—which are now too outdated—inspections are conducted based on maintenance guidelines provided by the manufacturer.

The reason for purchasing locomotives from Kazakhstan is reportedly that EU locomotive manufacturers find it difficult to comply with OSJD standards* and that their prices are high.

*OSJD: A railway organization comprising member states such as the former Soviet Union, Eastern European countries, China, South Korea, Vietnam, Laos, and Afghanistan. As the name suggests, it primarily focuses on standardization and the creation of common rules regarding international transport.



Source: JICA Survey Team

Figure 5-17 Locomotives Purchased from Kazakhstan (Overview and Driver's Cab)

Table 5-17 Number of Rolling Stocks Owned and Currently in Operation by CFM (as of 2022–2023)

Type		Number Owned	Number in Service	Notes
Main Line Locomotives		77	16	12 new cars (manufactured in Kazakhstan)
Shunting locomotive		57	27	12 new cars (9 Russian gauge, 3 standard gauge)
Freight Cars		4,485	2,378	
Freight car breakdown (repeated)	Open-top cars	1,186	897	
	Grain Hopper Cars	721	633	
	Tank Car	396	384	
	Covered car	635	157	
	Flatcar	292	110	
	Other	1,255	197	
Registered Private Freight Cars			250	

Source: CFM Inventory (2022–2023)

The rolling stock maintenance system consists of four depots: Chișinău (passenger locomotives), Bălți, Tighina, and Basarabeasca (freight locomotives). There are four depots for passenger and freight cars: Chișinău (passenger cars), Basarabeasca, Bălți (freight cars), and Basarabeasca (refrigerated freight cars). Restructuring is also underway for rolling stock maintenance, with plans to consolidate depots into three locations—Bălți, Chișinău, and Basarabeasca—that will serve both locomotives and passenger and freight cars. Consequently, the current workforce of 800 is scheduled to be reduced to 300. In addition to enhancing individual technical skills, salaries will be increased to reduce staff turnover and attract new hires.

Due to a shortage of both personnel and budget, the current maintenance situation has reached a point where locomotives cannot be repaired and are being left neglected. At the Chișinău Depot, which was inspected, two shunting locomotives were left idle because there was no budget for repairs. Since it is unclear when these locomotives will be repaired, they have reportedly been removed from the official inventory.



Source: JICA Survey Team

Figure 5-18 Shunting Locomotives Left Unattended due to a Lack of Funds for Repairs (Chișinău Depot)

5.5.6 Bogie Exchange Facility

A bogie exchange facility has been established in Ungheni to swap Moldovan Russian-gauge bogies with Romanian standard-gauge bogies, enabling passenger and freight cars to operate between the two countries.

The bogie replacement facility has two tracks; since each track can accommodate seven cars, a total of 14 cars can be replaced at once. A single replacement operation—which involves uncoupling the freight cars (or passenger cars) from a long train, replacing the bogies, and recoupling the cars—takes two hours. Therefore, 168 cars can have their bogies replaced in a single day. Currently, there are no cross-border freight train operations. Rail services are limited to the overnight passenger train between Chișinău and Bucharest, which operates 10 cars or fewer, leaving ample capacity available.



Source: JICA Survey Team

Figure 5-19 Bogie Replacement Facility at Ungheni Station



Source: JICA Survey Team

Figure 5-20 Lifting a Bogie at the Bogie Replacement Facility at Ungheni Station (Sleeper Car)

5.6 Existing Plans and Ongoing Projects for Moldova's Railways

5.6.1 Major Strategies and Investment Plans for Moldova's Railways

Existing plans for Moldova's railways are being pursued in a hybrid manner based on two main pillars: "Modernization and maintenance of the former Soviet system (emergency rehabilitation of the existing 1,520 mm broad gauge)" and "Physical and institutional integration into the EU system (construction of new 1,435 mm track and legal framework development)." In particular, since the war in Ukraine, the strategic importance of the "Solidarity Lanes" has increased, and projects supported by the EU and international financial institutions (EIB, EBRD) are accelerating.

(1) National Strategy and EU Integration Strategy

1) National Mobility Strategy 2030

Approved in 2024, this strategy is an MP that replaces the previous "Transport and Logistics Strategy 2013–2022." It sets the goals of harmonization with EU transport policy and full integration into the TEN-T.

2) EU Integration Strategy for the Ukraine-Moldova Railway (CFM) System (2023)

This strategy, developed by the European Commission and JASPERS (EIB), proposes the development of a backbone network based on the EU standard gauge (1,435 mm).

The construction of a standard-gauge line between Ungheni and Chișinău—linking the Romanian border to the capital—has been designated as Moldova's top priority (Priority 1).

(2) Key Infrastructure Development Projects

The major projects currently underway or in the planning stage are as follows.

1) Southern Corridor Rehabilitation Project (Funding: EBRD/EIB/EU)

- Tighina–Giurgiulesti Section: Rehabilitation work is underway on the section connecting Tighina, Basarabeasca, and the Giurgiulesti Port to ensure access. Once rehabilitation is complete, operations without speed restrictions are expected to be possible, provided proper maintenance is conducted. (Therefore, the implementation of proper maintenance after project completion is key to enabling sustained high-speed operations.)
- Reopening of the Basarabeasca–Berezyne (Ukraine) Line: This route, which bypasses the Transnistria Region and ensures a border connection with Ukraine, was restored in 2022.

2) Northern and Central Corridor Rehabilitation Projects (Funding: EBRD/EIB/EU)

- Section: Valcinet–Oknytsia–Bălți–Ungheni–Chișinău–Căinari.
- Details: Utilizing loans from the EBRD and EIB (including grants from the European Commission), this project will carry out urgent repairs to the existing tracks. The goal is to eliminate speed restrictions caused by deteriorating track conditions and restore the line's capacity to handle heavy freight. (Therefore, proper maintenance following the completion of construction will be key to enabling sustained high-speed operation.) Note that this project involves the rehabilitation of the existing broad gauge (1,520 mm) track and does not include conversion to standard gauge.

3) Elimination of the Missing Link at the Romanian Border (Fălciu–Prut 2) (Funding: Own Funds)

- Section: Reconstruction of the approximately 2 km missing link section on the Moldovan side between the Romanian border station of Fălciu and the Moldovan border station of Prut 2.

- Purpose: This project aims to establish a corridor connecting Romania to Ukraine (towards Odesa) via Moldova by reconstructing an approximately 2-kilometer missing link on the Moldovan side between the Fălciu border station in Romania and the Prut 2 border station in Moldova. The construction was executed using own funds, and the line was opened to traffic in April 2026.

4) Modernization of the Ungheni–Chișinău Section (Standard Gauge Conversion and Electrification)

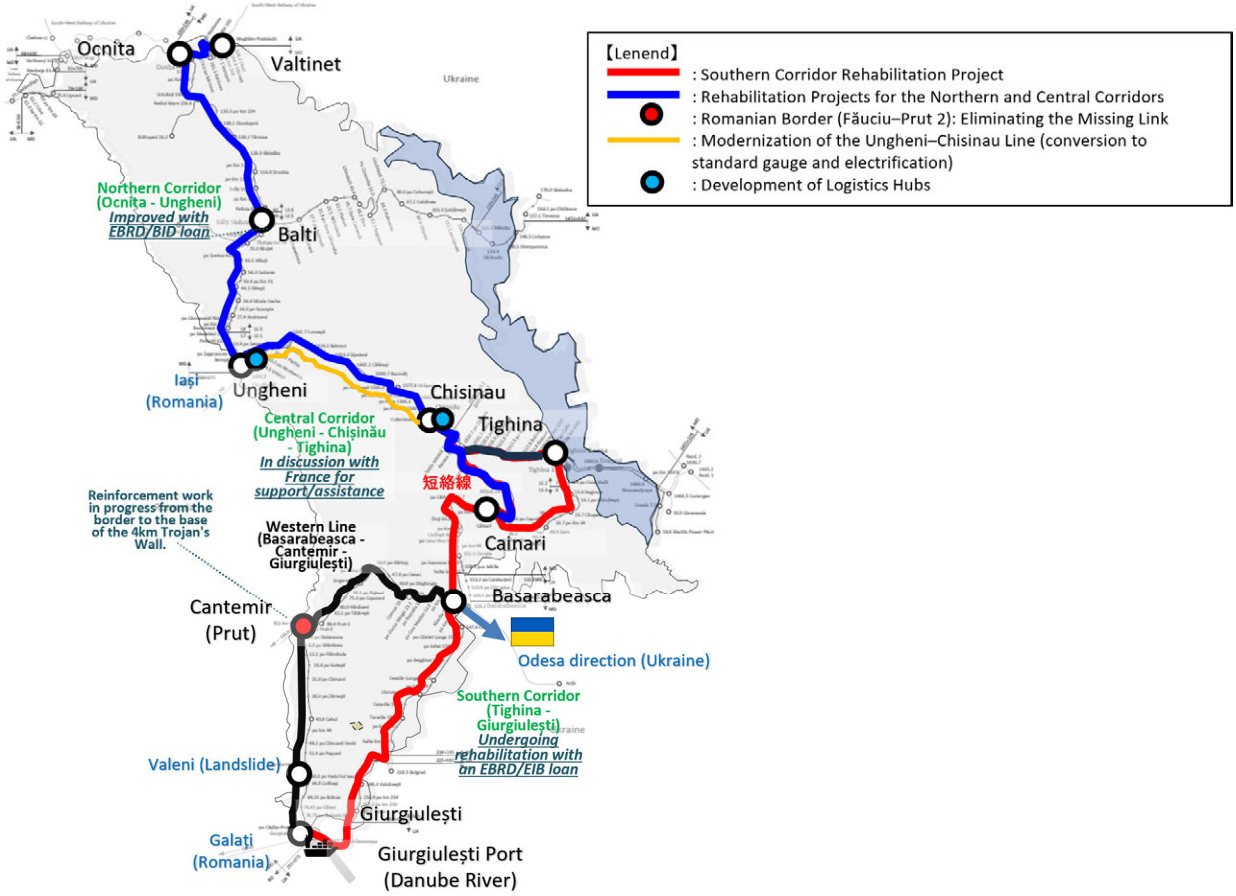
- Overview: This project involves laying new European standard gauge (1,435 mm) track and electrifying the section from Ungheni on the Romanian border to the capital, Chișinău.
- Objective: To fundamentally strengthen connectivity with the EU by enabling direct through-service from Romania (Iași) and eliminating the need for bogie changes and transshipment operations at the border. A pre-FS is currently being conducted with support from the EIB.

5) Development of Logistics Hubs

- Berești Multimodal Transport Terminal: There are plans to develop a multimodal logistics center capable of handling both broad-gauge and standard-gauge railways at Berești Station near Ungheni, and an F/S is currently underway.
- Chișinău Inland Freight Terminal: Plans are also being considered for the construction of an intermodal terminal in the capital city of Chișinău.

(3) Rolling Stock Maintenance Plan

- Locomotives: Although 12 TE33AC diesel locomotives manufactured in Kazakhstan were introduced in 2020, Soviet-era locomotives remain significantly aged, and further replacement is required.
- Freight and Passenger cars: Given that many cars have exceeded their service life, the modernization plan (Investment Program) calls for the procurement of grain hopper cars and container platforms.



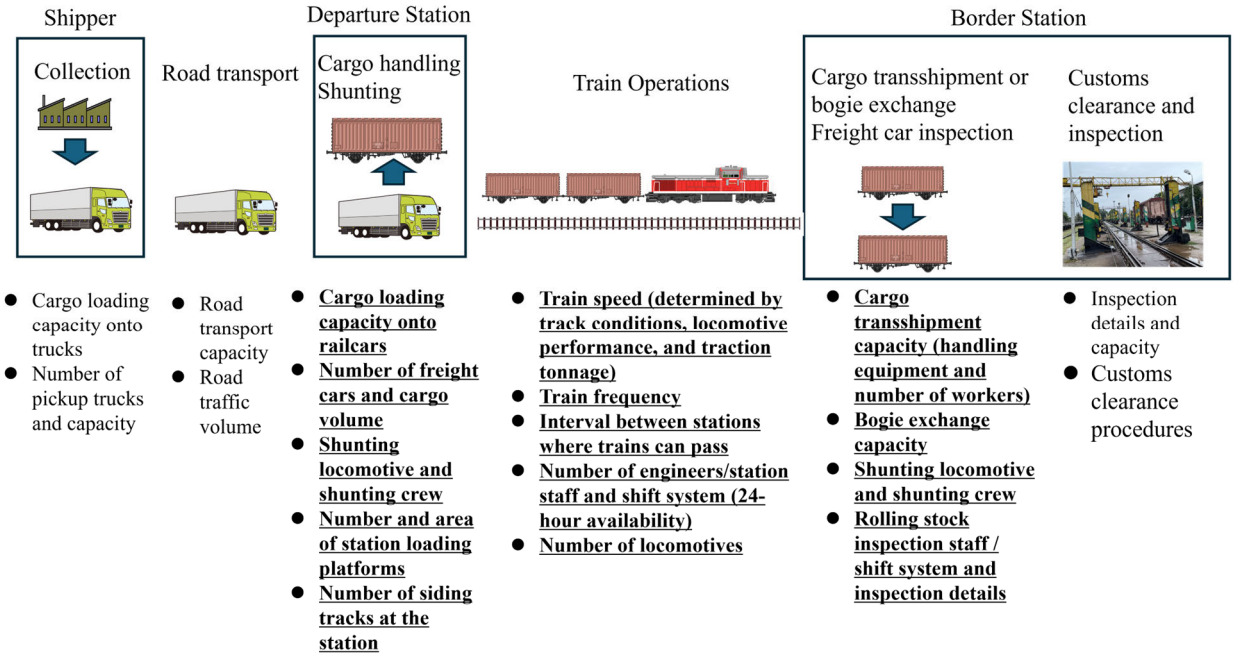
Source: Prepared by the research team based on CFM materials

Figure 5-21 Map of CFM Railway Lines and Key Infrastructure Projects

5.7 Current Status and Challenges of Rail Freight Transport

5.7.1 Supply-Demand Gap Analysis and Bottlenecks

Because rail freight transport involves many operations, bottlenecks occur at each stage. The following diagram illustrates the flow of international rail freight transport, using shipped cargo as an example, up to the country's border station. The flow is divided into "operations at the shipper's pickup location," "road transport to the station," "operations at the departure station," "train operation on the main line," and "operations at the border station. "After crossing the border, the processes of "train operation on the main line," "operations at the destination station," "road transport to the delivery address," and "operations at the consignee's delivery address" are carried out in the reverse order of the outbound process (loading → unloading). The conditions listed below each operational site determine the operational capacity (time and handling capacity) at that site. Within this flow, the railway operator is involved in "operations at the departure station," "train operations on the main line," and "operations at the border station." Therefore, we will examine potential bottlenecks in each operation at stations and along the main line using information and data obtained from the survey. However, even among station operations, there are tasks in which CFM does not participate. For these tasks, we will only note that they fall outside CFM's scope of responsibility.



Source: Prepared by the JICA Survey Team

Figure 5-22 Flow in International Rail Freight Transport (from Shipment to the Country's Border)

(1) Operations at the Departure Station

At the originating station, the forwarder is responsible for transferring cargo from trucks to railcars, and CFM is not involved in this process. Therefore, the "cargo loading capacity onto railcars" and "number and area of station loading platforms" shown in Figure 5-22 are not considered.

1) Number of Freight Cars and Cargo Volume

CFM's operational freight cars consist of 633 grain hopper cars, 897 open-top freight cars, 384 tank cars, and 157 covered cars. Since the cargo loading capacity of these freight cars ranges from 60 to 70 tons, we will assume a uniform 70 tons for estimation purposes. Additionally, we assume that trains make one round trip every two days, considering cargo loading and unloading times. The following table shows the estimated monthly and annual freight capacity if all operational freight cars are fully utilized. Note that privately owned freight cars (Figure 5-23) are operated according to the owners' freight demand and are therefore excluded from this estimate. However, in this scenario, if each train consists of 40 cars, 52 trains would be in operation; since there are only 16 mainline locomotives available for service, there is currently a surplus of freight cars, and they do not pose a bottleneck.

Table 5-18 Monthly and Annual Transport Capacity Estimated Based Solely on the Number of Freight Cars in CFM Operations

Freight Car Type	CFM Operation Number of Freight Cars	Transportation per Freight Car Tonnage	Monthly Round Trips	Monthly Transport Volume (tons)	Annual Transport Volume (tons)
Grain hopper cars	897	70	15	941,850	11,302,200
Open-top cars	633	70	15	664,650	7,975,800
Tank cars	384	70	15	403,200	4,838,400
Covered car	157	70	15	164,850	1,978,200
			Total	2,174,550	26,094,600

Source: Compiled by the survey team based on CFM data



Source: JICA Survey Team

Figure 5-23 Private Grain (Wheat) Freight Cars Owned by TRANS OIL

2) Shunting Locomotive and Shunting Crew

CFM currently has 27 shunting locomotives, three of which are standard gauge units. CFM considers its fleet of Russian-gauge shunting locomotives to be sufficient; however, it still identifies a shortage of standard-gauge shunting locomotives. Standard-gauge tracks are available at two locations near the Romanian border: Giurgiulesti and Ungheni. Two locomotives are at Giurgiulesti and one in Ungheni.

The shunting locomotives in Giurgiulesti are responsible for moving freight cars arriving from Romania to the shippers' oil transshipment and grain storage facilities. Based on an on-site inspection, the process of moving freight cars to each facility, including coordination time with the receiving facilities, was observed to take approximately one hour. Since the "shunting in" and "shunting out" of freight cars are performed as a set, the total time required to move a single freight train is estimated to be about two hours. Furthermore, due to the current shortage of shunting personnel at the station and the limitation of operations to daytime hours, shunting operations are estimated to require approximately 10 hours. Based on these conditions, the current capacity for receiving trains from Romania at Giurgiulesti is approximately 10 trains per day.

Ungheni is also home to shippers' oil transshipment terminals and grain storage facilities, where freight cars arriving from Romania are handled and transferred. Additionally, freight cars are moved to the bogie exchange facility for further operations. I boarded a sleeper train between Chișinău and Bucharest and experienced the bogie exchange process in Ungheni; it took about an hour and a half from the train's arrival to its departure. It is believed that this process would take even longer for long freight trains. Therefore, assuming—as with Giurgiulesti—that it takes about two hours to move one train set of freight cars and that the daily operating time is 10 hours, it is estimated that Ungheni can handle approximately five trains per day from Romania.

3) Number of Siding Tracks at the Station

Regarding the number of siding tracks at the station, they are currently used infrequently due to the low number of trains. Figure 5-25 shows a portion of the signal interlocking panel at Ungheni Station; the upper group of tracks represents the sidings, and the lower group represents the arrival and departure tracks. There are 8 siding tracks and 6 arrival and departure tracks. The arrival and departure tracks are used for trains arriving from and departing to the main line, as well as for shunting operations to the stabling tracks, various depots, and bogie exchange facilities. Based on current estimates, even with operations limited to 10 daytime hours, approximately three trains can be handled per day on each track. Therefore, the station is considered capable of accommodating up to 18 train arrivals and departures per day.

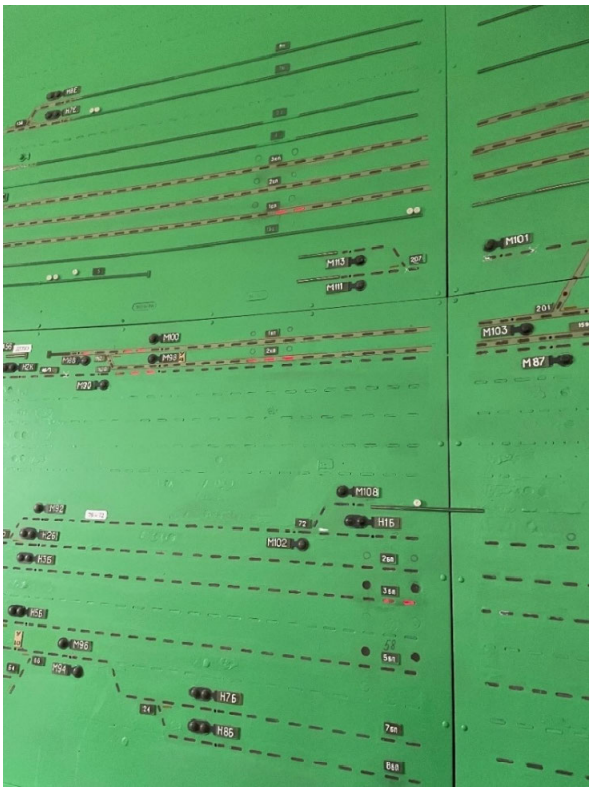
Since I was unable to visit the signal control room at Giurgiulesti Station, I estimated the number of storage tracks using Google Earth. Figure 5-24 shows the arrival and departure tracks at Giurgiulesti Station, which are believed to number 6. Since this is the same as Ungheni Station, it is believed that Giurgiulesti Station can also handle 18 train arrivals and departures per day.

Figure 5-26 shows a portion of the signal interlocking panel at Chișinău Station. Similar to Ungheni Station, the upper tracks are siding tracks (five tracks), and the lower tracks are arrival and departure tracks (four tracks). Furthermore, there is a marshaling yard at the rear of Chișinău Station, where freight car formation changes and stabling take place. Since Chișinău Station moves freight cars to the marshaling yard immediately after a train arrives, it is believed that even with only four arrival and departure tracks, there will be no operational issues regarding train arrivals and departures.



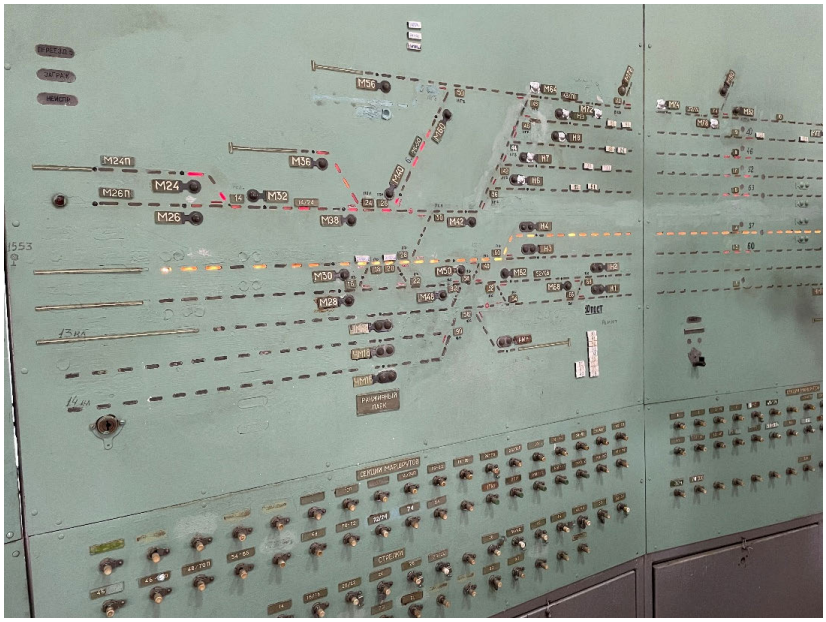
Source: Google Earth (red line indicates CFM)

Figure 5-24 Arrival and Departure Tracks at Giurgiulesti Station



Source: JICA Survey Team

Figure 5-25 Signal Interlocking Panel at Ungheni Station (Top: Siding Tracks; Bottom: Arrival/Departure Tracks)



Source: JICA Survey Team

Figure 5-26 Signal Interlocking Panel at Chișinău Station (Top: Siding Tracks; Bottom: Arrival/Departure Tracks)

(2) Train Operations

CFM is fully responsible for train operations. Therefore, we will verify the items listed in Figure 5-22 .

1) Train Speed

In Japan, the specified traction capacity (tonnage) and locomotive type for freight trains are determined in advance. Based on these settings, a running curve is created to calculate the travel time between stations for each train. A precise train schedule is then created based on this travel time. However, in Moldova, although there are planned freight train schedules, in practice, the system operates as follows: once the shipper (forwarder) notifies that loading is complete, the locomotive depot is contacted to arrange for a locomotive and engineer. While the maximum traction tonnage is set for each section, the type of locomotive to be used is not predetermined; therefore, the dispatcher creates the schedule on the spot based on the train's actual traction tonnage and the performance of the available locomotives.

Upon reviewing the planned timetable, it was evident that it had been created, assuming a uniform speed of approximately 30 km/h. This is likely because, at the time of planning, the actual train load and the type of locomotive were unknown, so 30 km/h was set as the speed at which a train with the maximum load could reliably operate. Therefore, we will examine bottlenecks using the 30 km/h average speed adopted in the planned timetable.

2) Train Frequency and Interval Between Stations Where Trains Can Pass

On single-track sections, the distance between stations where up and down trains can pass each other, along with the average speed, is a key factor determining the maximum number of trains that can operate. Table 5-19 divides the route into sections based on the stations where train passing is scheduled in the planned timetable and indicates the distances between them. The three main sections targeted were: (1) Oknytsia–Chișinău, (2) Chișinău–Basarabeasca, and (3) Basarabeasca–Reni (Giurgiulesti).To calculate the train transit time for each section, the distance of each section was divided by the "30 km/h" speed set in the previous section, and the result was expressed as "travel time (minutes)."

Using the section with the longest "travel time," it was calculated how many trains could pass through it in 24 hours. Note that since time is required for train stops and ticket exchanges, we multiplied the travel time by 1.1 and then divided the result by 24 hours. The result is shown in the "Number of Trains That Can Operate." As noted in the table, this "number of trains" includes both up and down trains. The section with the lowest number of trains that can pass through is "(2) Chișinău–Basarabeasca," where the result showed that only 16 trains per day—or 8 round trips—can operate. The other two sections also have fewer than 20 trains, meaning they cannot accommodate 10 round-trip trains per day.

Table 5-19 Distance between Stations Where Trains Pass Each other, Travel Time, and Estimated Number of Trains that can be Operated

i) Oknytsia–Chișinău

Station (Section)			Distance (km)	Travel Time (min)	Number of Trains That Can Operate
Oknytsia	~	Rediul-Mare	17.5	35.0	Note: Total of both
Rediul-Mare	~	Tîrnova	20.2	40.4	
Tîrnova	~	Gîzdița	9.9	19.8	
Gîzdița	~	Sofia	21.2	42.4	
Sofia	~	Bălți	22.1	44.2	
Bălți	~	Hiliuți	17.2	34.4	
Hiliuți	~	Stolniceni	**33.6**	**67.2**	**19**
Stolniceni	~	Berești	27.9	55.8	
Berești	~	Ungheni	8.3	16.6	
Ungheni	~	Unceşti	4.7	9.4	
Unceşti	~	Pîrlița	10.7	21.4	
Pîrlița	~	Cornești	12.1	24.2	
Cornești	~	Bahmut	7.4	14.8	
Bahmut	~	Sipoteni	11.0	22.0	
Sipoteni	~	Călărași	11.1	22.2	
Călărași	~	Bucovăț	11.5	23.0	
Bucovăț	~	Strășeni	13.1	26.2	
Strășeni	~	Ghidighici	14.2	28.4	
Ghidighici	~	Chișinău	11.9	23.8	

ii) Chișinău–Basarabeasca

Station (Section)			Distance (km)	Travel Time (min)	Number of Trains That Can Operate
Chișinău	~	Socoleni	37.7	75.4	Note: Total of top and bottom
Socoleni	~	Tighina	18.8	37.6	
Tighina	~	Causeni	17.0	34.0	
Causeni	~	Căinari	**40.0**	**80.0**	**16**
Căinari	~	Zlot	18.4	36.8	
Zlot	~	Cimișlia	18.4	36.8	
Cimișlia	~	Basarabeasca	24.0	48.0	

iii) Basarabeasca–Reni (Giurgiulesti) section

Station (Section)			Distance (km)	Travel Time (min)	Number of Trains Per Day
Basarabeasca	~	Abaclia	9.9	19.8	Note: Total of top and bottom
Abaclia	~	Ceadîr-Lunga	34.5	69.0	
Ceadîr-Lunga	~	Taraclia	24.8	49.6	
Taraclia	~	Junction 208KM	11.6	23.2	
Junction 208KM	~	Vulcănești	**37.2**	**74.4**	**17**
Vulcănești	~	Etulia	16.7	33.4	
Etulia	~	**Reni**	26.8	53.6	

Source: JICA Survey Team

3) Main Line Locomotives

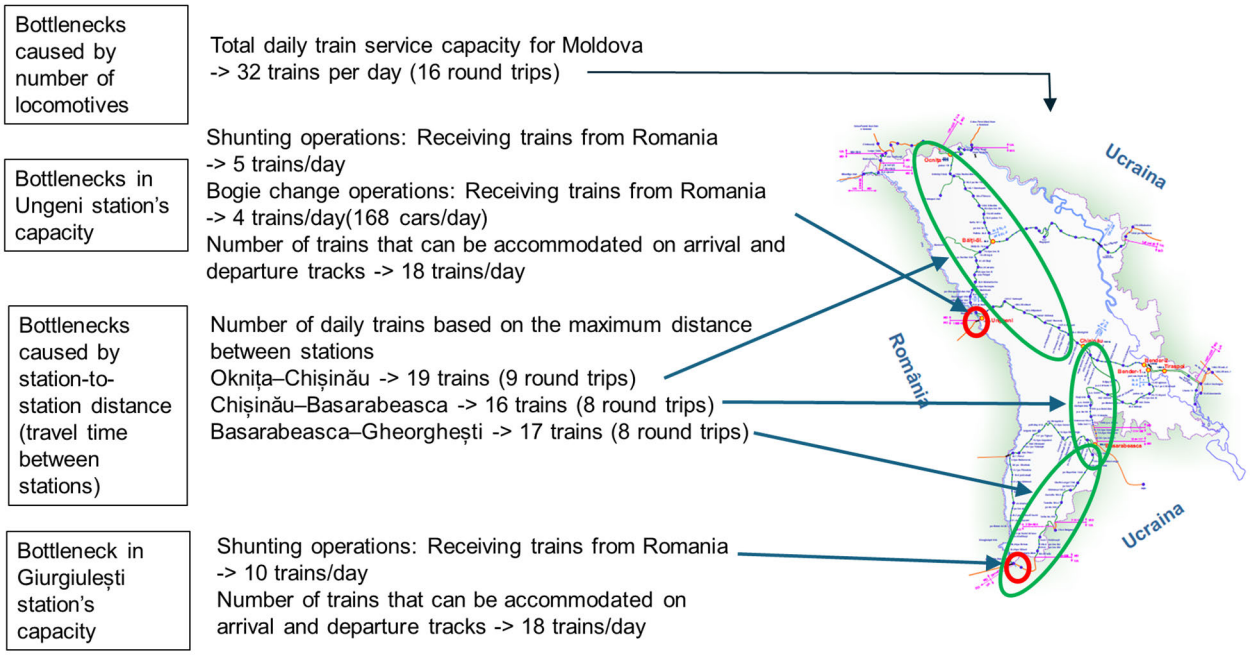
Currently, only 16 locomotives are operational on the main line. Assuming one round trip per day, only 16 round trips, or 32 trains, can be operated throughout Moldova.

(3) Border Stations

Regarding operations at border stations, cargo transshipment between Russian-gauge and standard-gauge freight cars is handled by shippers and forwarders; CFM is not involved. Therefore, the "freight loading capacity per car" and "number and area of station loading platforms" shown in Figure 5-22 are excluded from consideration. Since shunting operations are verified at the departure station, this section focuses on verifying bogie exchange capacity. As mentioned earlier, the bogie exchange capacity is 168 bogies per day. If a single train consists of 30 cars, only six trains can have their bogies exchanged; if a train consists of 40 cars, only 4 trains can have their bogies exchanged.

(4) Summary of Bottlenecks

The results of the individual bottleneck analyses for each element—specifically the factors with the greatest impact: number of locomotives, shunting operations, bogie exchange operations, headway constraints due to station-to-station distances, and arrival/departure track capacity—are summarized in Figure 5-27. In the current main line operations, the bottleneck is the limited availability of only 16 operational locomotives, rather than constraints on headway due to station-to-station distances. At Ungheni Station, the connection point with Romania, bogie replacement operations are the bottleneck, while at Giurgiulesti, shunting operations are the bottleneck. The number of trains that can be received daily from within Moldova, and from Romania at both stations, as well as the transport capacity, assuming each train consists of 40 freight cars loaded with 70 tons each, are shown in Table 5-20. Ungheni can accept 19 trains from within Moldova and Giurgiulesti can accept 17 trains, for a total of 36 trains; however, since the locomotive capacity is the bottleneck at 32 trains, the number of locomotives is the limiting factor here as well.



Source: JICA Survey Team

Figure 5-27 Summary of Bottlenecks for Each Element (Only Elements with Significant Impact)

Table 5-20 Current Maximum Daily Train Arrivals and Departures and Transport Capacity at Ungheni Station and Giurgiulesti Station

Current maximum daily train arrivals and departures (total for both directions) at Ungheni and Giurgiulesti

Station	From within Moldova	From Romania
Ungheni	19 trains	4–5 trains
Giurgiulesti	17 trains	10 trains
(Number of locomotives)	32 trains	

Maximum daily transport capacity (tons) is based on 40 cars per train and 70 tons per car (total for both directions)

Stations	From within Moldova	From Romania
Ungheni	53,200	11,760
Giurgiulesti	47,600	28,000

Source: JICA Survey Team

5.7.2 Challenges Facing Moldovan Railways (CFM) as Seen by Ukrainian Railways (UZ) and Romanian Railways (CFR)

A series of interviews with UZ and CFR were conducted to identify the challenges with CFM as perceived by each organization. Both UZ and CFR expressed highly critical assessments.

(1) Challenges Facing the Moldovan State Railways (CFM) from the Perspective of Ukrainian Railways (UZ)

Due to the impact of Russia's invasion of Ukraine, Ukraine is currently in a state of war. As the survey team was unable to confirm the challenges facing CFM with UZ, the JICA Ukraine Support Office conducted interviews during a meeting with UZ on January 14, 2026. The issues with CFM cited by UZ are as follows.

The challenges identified by UZ regarding CFM are as follows.

1) Fares

CFM's transit rates are 70% higher than UZ's. For many exporters, this renders the route economically unviable and is the most significant bottleneck to utilizing the Moldovan route.

2) Transportation Costs

Almost all of Moldova's railway lines are non-electrified. As a result, freight transport costs are approximately three times higher than when using electrified lines within Ukraine.

3) Infrastructure Condition

Moldova's railway network is in a state of severe disrepair. Consequently, track capacity (transport capacity) is low, and operating speeds are slow.

4) Lack of Locomotives

CFM does not possess enough locomotives to handle large-scale freight transport. To address this critical shortage of locomotives, UZ is forced to consider using its own locomotives within Moldovan territory.

5) Organizational and Financial Issues

CFM faces serious institutional and financial problems. It is effectively in a state of financial bankruptcy, with a fragile organizational foundation and declining staff morale.

6) Geopolitical Barriers

Several key border checkpoints have been blocked by the Transnistria region, creating physical barriers to transportation.

As described above, UZ has issued a harsh assessment of the CFM route, viewing it essentially as nothing more than a backup (alternative) route if Ukraine's main routes are severed. However, on the other hand, UZ assesses that if freight rates are reduced and the locomotive shortage is resolved, there is potential for transporting cargo such as iron ore and petroleum products to ports on the Danube River, and it is hoping for comprehensive support from JICA and others to resolve CFM's challenges.

Currently, due to the war, information controls are strict, and even CFM has been unable to obtain information on system development and other initiatives being pursued by UZ. However, communication between UZ and CFM has not been severed. Most recently, in January 2026, UZ visited CFM to discuss

increasing rail freight volumes between the two countries, improving operational procedures, and technical cooperation.

Moldova, Ukraine, and the three Baltic states have historically used the former Soviet Union's railway standards and have maintained their facilities by importing various railway parts from Russia. However, these countries have now severed ties with Russia and will need to maintain and manage their railway systems independently in the future. Given these circumstances, it is expected that UZ will continue its cooperative relationship with CFM.

(2) Challenges Facing the Moldovan State Railways (CFM) from the Perspective of the Romanian State Railways (CFR)

The issues with CFM cited by CFR are as follows.

1) Fares and Charges

CFM's rail freight rates are high, and since they were set by the government, there is no discount system. Furthermore, charges other than rail freight rates (such as the freight car preparation fee, station usage fee, shunting fee, freight car inspection fee at the border, and customs clearance fee, as shown in Section 5.4.3) are also high, making rail transport costs uncompetitive compared to truck freight rates. Additionally, since the Odesa Port route is cheaper, CFM cannot compete with Odesa Port either. In Romania, freight transport has been liberalized, and freight rates reflect market conditions. While the Romanian side applies competitive rates suited to the freight market, CFM maintains inflexible rates that do not reflect market prices.

It is believed that CFM's high freight rates are due to too few trains in operation, forcing it to set rates high enough to cover fixed costs. To overcome this, CFM must increase the number of trains in operation to reduce per-train fixed costs, and further lower freight rates and cargo-handling fees to enhance its market competitiveness. Additionally, cargo transshipment increases transport time and costs, so efficient and economical transshipment must be achieved.

2) Time

The time required for cargo transshipment is extremely long due to a shortage of cargo-handling equipment, which necessitates manual handling. Depending on the timing of arrival, the process can take an average of six hours per railcar. Furthermore, since trains can only operate during daylight hours (due to a shortage of CFM staff, station signal operations are not available 24 hours a day), delays can compound depending on the time of day, resulting in delays of 12 or even 24 hours.

3) Requirement for Prepayment

While Romania generally uses a post-payment system where freight charges are billed after transport, CFM requires prepayment. This increases the burden on customers and is a reason why rail freight is often avoided (in Japan, rail freight transport also uses a post-payment system with month-end billing,

but during the JR era, a security deposit was required to guarantee payment. Currently, JR Freight does not require a security deposit.

As described above, CFR has issued a harsh evaluation of CFM. However, CFR also acknowledges the CFM staff's high morale and safety standards. CFR expressed its expectation that CFM will resolve the issues it raised and stated that it will cooperate with CFM to address these challenges.

5.7.3 Challenges of the Moldovan State Railways (CFM) from the User's Perspective

(1) Characteristics Sought by Users in Freight Rail Transport and a Comparison of Systems Across Countries

When selecting a mode of transport or a carrier, customers consider the following factors:

- Transportation costs: Are they lower than those of other modes of transport or carriers? (Door-to-door comparison)
- Transportation time: Is it faster than other modes of transport or carriers? (Door-to-door comparison)
- Reliability: Few transportation issues and no cargo damage
- Safety: No accidents during transport
- Clarity of contracts and billing: Are the contract terms easy to understand, and are the billing procedures clear and simple?
- Environmental Considerations: Does it offer superior CO_2 reduction benefits during transport?

Which of these criteria to prioritize and how much weight to assign to each when selecting a carrier varies depending on the customer and the cargo. For cargo with low unit prices and a limited budget for freight costs, "cost" tends to be the top priority, while for hazardous materials, "safety" takes precedence due to the potential impact of incidents. For home delivery and online retail goods, where delivery deadlines are strict, there is a tendency to prioritize "reliability and safety." Generally, rail transport excels over its rival, truck transport, in terms of "reliability," "safety," and "environmental considerations." Therefore, by improving other factors such as "transportation costs," "transportation time," and "clarity of contracts and settlements," it is possible to enhance the competitiveness of rail transport and make it the mode of transport of choice for customers.

To clarify CFM's status regarding the competitive conditions mentioned above, we have compared CFM's freight transport system (contracts, freight rates, liability allocation, etc.) with the railway transport systems of other countries, including Japan (Table 5-21).

There are many similarities with other state-owned railways, such as the State Railway of Thailand (SRT) and Indian Railways (IR). On the other hand, the differences between the liberalized EU and Japan are striking. It is believed that these differences led to the evaluation of CFM by CFR, as discussed in Section 5.7.2 .

Table 5-21 Comparison of Freight Rail Transport Systems by Country

	Moldova (CFM)	Thailand (SRT)	India (IR)	Japan (JR Freight)	EU	United States (Class I, II, III)
Freight Rates System	**Set by the government. No customer-specific discounts**	A tariff schedule exists, but discount negotiations are possible	Designated by the Ministry of Railways. No customer-specific discounts.	A tariff schedule exists, but freight rates are negotiated directly with the carrier	Charges for the use of ground infrastructure are set by standard EU rules. Customers are free to negotiate with freight forwarders or agents	Negotiations are open, but since Class I carriers hold a strong position, contracts based on the tariff are becoming more common.
Contract Methods	**The freight rate system is complex, making it difficult for general businesses to handle; therefore, forwarders often act as agents to enter into contracts**	Contracts can be made directly with customers or through forwarders	Contracts for government-controlled commodities such as coal are made with the relevant government agency, while contracts for other bulk and container cargo are made with freight forwarders	Contracts for containers are with freight forwarders, while contracts for bulk cargo are with client companies (logistics subsidiaries)	Contracts for the use of ground infrastructure are between government agencies and participating operators.	For Class I and II, contracts are with agents, who then contract with freight forwarders or customers
Freight rates Payment Method	**Prepayment**	Month-end billing, paid for the following month	Billed at the end of the month, paid the following month	Billed at the end of the month, paid the following month	As per contract (generally post-payment)	Based on contract (generally post-payment)
Railway operator operations Scope	**Train transportation only**	Train transportation only	Train transportation only	Freight handling at stations, train transport, and temporary storage of freight	Shared among operators	Class I provides train transport only; Class II and III provide freight handling and storage services at stations
Privately owned Rolling stock availability	**Customers may own freight cars**	Both locomotives and freight cars can be owned by the customer	Freight cars may be owned by freight forwarders. Most of the freight cars owned by IR are covered freight cars	Only tank cars are owned by private companies	Both locomotives and freight cars are owned by participating companies. Leasing companies also exist	Freight cars can be owned by private companies. Leasing companies also exist

Source: JICA Survey Team

(2) Challenges for CFM as Seen Through a Comparison of Systems in Various Countries

Referring to the table above, we summarize the challenges facing CFM regarding the previously mentioned "transportation costs," "transportation time," and "clarity of contracts and settlements."

1) Transportation Rates

Until now, CFM's fares have been set by the government, and CFM has had no authority to change them. Although fares are not fixed and are reviewed periodically, UZ and CFR have pointed out that they are set high to reduce CFM's deficits. As a result, it is believed that the company had fallen into a vicious cycle: "raising fares to reduce deficits" → "customers avoiding rail travel due to high fares" → "increasing deficits." On March 2, 2022, amendments to the Railway Transport Code of the Republic of Moldova (Code No. 19) were passed. The new Railway Transport Code came into effect on February 18, 2024. With an eye toward EU accession, this new code stipulates that the government will retain ownership of railway infrastructure while allowing private companies to enter the railway transport sector. With the admission of private companies, fare setting has shifted from government approval to being determined by the operators. However, coordination with relevant ministries and the newly established Railway Commission is required. As of the end of February 2026, there is no information regarding new private sector entrants, and CFM has not announced any changes to the fare system, suggesting that the transition period to the new Railway Transport Code is still ongoing.

Because rail transport has a high ratio of fixed costs, the break-even point cannot be raised without increasing revenue by transporting more cargo. To increase revenue, fares must be set based on the prevailing rates of other transport modes (such as trucking), and fares must be made flexible to respond to market trends. It is important for CFM to transition to the new Railway Business Act as soon as possible, investigate prevailing rates and market trends, and set new fares accordingly.

2) Transportation Time

In rail freight transport, transit time encompasses not only the actual train running time but also the total transit time, including cargo loading and unloading times, departure and arrival operations (shunting, inspections, etc.), and the time required to transport goods to and from the origin and destination. Under CFM's current scope of operations, its responsibilities cover "train running time" and "departure and arrival handling time" (including locomotive and engineer scheduling, coordination with dispatch and stations, timetable creation, shunting, inspections, etc.). "Train running time" is determined by various factors, such as terrain (gradients), whether the line is single-track or double-track, track conditions, and the performance of locomotives and freight cars. The current average speed of freight trains is 30 km/h or less, and the average speed of trucks is 20–30 km/h. Therefore, there is little difference in "travel time," but rail transport takes longer than trucks due to "waiting time for passing on single-track lines" and "operational time for departure and arrival." To reduce transport time, the following initiatives are necessary:

- Maintenance to keep the tracks in good condition
- Introduction of powerful locomotives and freight cars capable of high-speed operation (around 100 km/h)
- Expansion of passing facilities (passing tracks)

- Prompt allocation of drivers and locomotives through advance coordination with shippers and freight forwarders
- Early establishment of operating schedules through advance coordination with shippers and freight forwarders
- Establishment of on-time departure trains (with predetermined departure times) through coordination with shippers and forwarders
- Reducing train inspection times through the introduction of inspection equipment
- Digitization of inspection documents and labor-saving measures through IT implementation

3) Clarity in Contracts and Settlements

Contracts and settlements are back-office operations, and companies aim to reduce costs. Therefore, if contracts and settlements are cumbersome and time-consuming, customers will be reluctant to use the service. The current CFM has been identified as having the following issues regarding contracts and settlements:

- The fare and fee structure is complex, making it difficult for anyone other than specialized freight forwarders to calculate transportation costs
- Various charges are required in addition to freight rates
- Advance payment of freight charges is required
- Inability to negotiate freight rates (e.g., volume discounts)
- To address the above issues, the following measures are considered necessary:
- Simplify the freight rate system and provide online freight rate calculation services
- Switching to a post-payment system (if necessary, introducing a freight payment guarantee system to prevent unpaid freight charges)
- Introduction of discount schemes for individual contracts, such as long-term contract discounts and volume discounts

(3) Issues with CFM According to Users

The following are the CFM challenges identified by Moldovan shippers and transport companies interviewed in this survey. Ultimately, these challenges are issues related to transportation costs, transit times, and the clarity of contracts and settlements, as mentioned above.

Table 5-22 Challenges with CFM Identified by Moldovan Companies (Shippers, Transport Companies)

1. Significant deterioration and insufficient capacity of infrastructure and vehicles	Aging and severe shortage of stock:	Most locomotives and freight cars (such as grain hopper cars and tank cars) have exceeded their service life, and there is a shortage of available freight cars. The condition of the freight cars is also poor, and cases of quality deterioration—such as grain damage caused by water leakage—have been reported.
	Deterioration of the rail network and reduced speeds:	Due to insufficient maintenance of track infrastructure, the average speed of trains is low, at around 10–30 km/h, resulting in a high risk of delivery delays. Furthermore, there have been instances in the past where CFM ignored advance warnings from the private sector regarding track collapses caused by landslides (on the West Line), raising doubts about its maintenance capabilities.
	Obsolescence of cargo handling equipment:	At facilities such as the Chișinău Container Terminal, issues have been pointed out regarding aging cranes and insufficient platform strength (e.g., inability to withstand the axle load of modern reach stackers), and some facilities are currently out of service.
2. Loss of price competitiveness and opaque freight rate structures	Loss of competitive advantage over trucking:	Due to repeated fare increases in recent years, rail's former price advantage has been lost, making it more expensive compared to the faster and more flexible truck transport.
	Opaque and unstable pricing structure:	Freight rate setting is perceived as arbitrary; ad hoc pricing policies—such as hastily proposing rate reductions when customers shift to trucking due to price hikes—are causing customer distrust. Furthermore, freight rate calculations are based on an outdated and complex system, and in some cases, shippers are forced to perform the calculations themselves.
3. Bureaucratic organizational structure and lack of commercial mindset	Inflexible Operations and Difficulty in Communication:	CFM has a closed-off culture often described as a "state within a state" and lacks the willingness to meet customers' commercial needs. Freight car dispatch requests require monthly planning applications, and the system has been criticized for its inflexibility in responding to sudden fluctuations in demand.
	Delays in Digitalization and Operational Inefficiency:	Dispatch requests still require the submission of paper documents and in-person delivery with stamps, taking several days for approval. Essential visibility for modern logistics—such as communication systems that still rely on telegrams and inadequate freight tracking systems that can only track rough locations between stations - remains lagging.
	Brain Drain:	Due to past restructuring and other factors, several experienced specialists well-versed in railway operations and cargo handling facilities have left the industry, resulting in a significant decline in organizational expertise and operational efficiency.
4. Declining transport reliability and irresponsible response (liability issue)	A Culture of Exemption from Liability for Cargo Theft and Loss:	Incidents of cargo (such as grain) being stolen or lost during transport are occurring frequently. However, contracts stipulate that CFM bears no liability whatsoever as long as the seals on the railcars remain intact. This irresponsible approach is driving customers away from rail transport.
5. Operational constraints due to structural and external factors	Barriers Due to Differences in Gauge:	The coexistence of Moldova's broad gauge (1,520 mm) and the standard gauge (1,435 mm) used in Romania and other EU countries necessitates bogie changes and transshipment operations at the border, resulting in significant time delays and additional handling costs.
	Connection constraints with railway operators of the neighboring countries:	There are also external constraints related to international connectivity: since Romanian railway operators require full-train operations (consisting of 30 to 35 cars), small and medium-sized shippers in Moldova—who cannot consolidate large volumes of cargo at once—find it difficult to utilize rail transport.

Source: Prepared by the JICA survey team based on corporate interviews

On the other hand, the following challenges regarding the Moldovan State Railways (CFM) and rail transport via Moldova, as identified from the user perspective through interviews with Japanese logistics

companies and trading firms, are as follows. For Japanese companies, even without considering CFM-related issues, there is generally little need to route cargo through Moldova from a broader logistics perspective that includes Ukraine. As a result, awareness of the transport corridor passing through Moldova remains low.

Table 5-23 Challenges Regarding CFM and Rail Transport via Moldova Pointed Out by Japanese Companies (Trading Companies and Transport Companies)

1. Lack of railway infrastructure and cargo handling/storage facilities		When considering rail transport routes via Moldova, the lack of infrastructure near the border and in some other areas is a serious bottleneck.
	Lack of yard space and transshipment facilities:	There have been cases where a rail route from the Constanta Port in Romania, via Basarabeasca in Moldova, to Odesa in Ukraine was projected as a transport route for aid supplies for Ukraine's reconstruction (such as railway rails). However, this route required transshipment operations in locations such as Galati, Romania, to accommodate differences in track gauge. Furthermore, compared to the route via Poland, there was a shortage of facilities—such as yard space and sidings—necessary for the safe handling and storage of long-length cargo. As a result, the route was not adopted as physical constraints took precedence over freight rate comparisons.
2. Lack of Competitiveness in the Regional Logistics Network (Comparison with Other Routes)		In the current wide-area logistics system for Ukraine, the route via Moldova is costlier and less efficient compared to routes through other countries (particularly via Poland).
	Lack of Competitive Advantage Over Truck Transport:	When comprehensively considering the hassle of transshipment, the costs of multiple handling operations, and transit times, road transport is often more efficient and timelier for inland transport (e.g., transporting several containers at once), making it difficult to identify any advantages for rail transport.
	Disadvantages in connecting with maritime transport routes:	The route to Moldova via Romania (Constanta Port) faces extended lead times due to the lack of direct container ship services from Japan and Asia, necessitating transshipment. On the other hand, the Northern European route via Poland (Gdansk Port, etc.) offers lower sea freight rates and relatively smooth customs clearance (T1 clearance), leading many logistics operators to prioritize truck transport via Poland. Even for super-heavy cargo, land and river transport is conducted directly from Constanta Port to Ukraine, bypassing Moldova.
3. Low Awareness and Demand Among Japanese Companies		Due to the infrastructure challenges mentioned above and the convenience of other routes, there is little momentum among Japanese logistics companies and shippers to utilize Moldova.
	The Reality of Being a "Country Not Passed Through":	Based on records of equipment and general cargo shipments to Ukraine, Moldova was bypassed as a logistics route.
	Low willingness to switch to alternative routes:	Although issues such as waiting times due to immigration regulations at the border have arisen on the currently dominant route via Poland, these have not led to a critical logistical bottleneck. Consequently, Japanese companies have little interest or need to develop and use a new route via Moldova, and no specific requests for improvements have emerged.

Source: Prepared by the JICA survey team based on corporate interviews

5.8 Current Status of Road Freight Transport and Examination of Modal Shift Potential

5.8.1 Current Status and Challenges of Road Freight Transport in Moldova

To understand the current status and challenges of road freight transport in Moldova, as mentioned earlier, we conducted interviews with shippers and carriers handling Moldova's major export goods.

(1) Current Status and Challenges of Road Transport

Road transport in Moldova is the dominant mode of transport, accounting for 87% of total freight volume (2024, National Bureau of Statistics of Moldova), and plays an indispensable role, particularly in trading with the EU. The main goods transported are diverse, including retail goods, electrical cables, wine, fruits, vegetables, container cargo from China, petroleum products (gasoline, diesel, LPG), cement raw materials, and approximately 4.5 million tons of grain annually. The primary reasons users choose road transport are the lower costs and shorter transit times compared to rail. For example, for container transport from the Constanta Port, truck freight rates (approximately €1,500) are half that of rail (approximately €3,000), and transit time is less than half that of rail. Furthermore, in petroleum product transport, rail transport costs twice as much as trucking. It is unutilized due to a shortage of freight cars, complex and inefficient paperwork, and slow digitization, leading to increased reliance on road transport, which offers superior mobility and flexibility.

However, with the expansion of road transport, many serious challenges have come to light. In terms of infrastructure, road conditions in Moldova are poor, and there are still sections—particularly in the south (such as between Cahul and GIFP)—where vehicles can only travel at speeds of around 10 km/h. Furthermore, road damage caused by overloaded grain transport trucks, severe traffic congestion in Chișinău, and a lack of rest facilities and parking lots for truck drivers are major problems.

The biggest bottlenecks in operations are waiting times and customs clearance procedures at BCPs. Chronic congestion occurs at BCPs on the Romanian and Ukrainian borders, forcing vehicles to wait an average of 12 hours, and in some cases, as long as 24 to 36 hours. Delays come from a shortage of customs officials on the Romanian side, cumbersome paperwork, and the use of different customs systems across the three countries (Moldova, Romania, and Ukraine). Furthermore, the risk of unjustified fines at the border due to the lack of axle load scales at the Constanta Port, the risk of accidents during the transport of hazardous materials, and the concentration of petroleum product imports at a specific BCP (Leușeni) are also factors hindering the efficiency and safety of road transport. Details of the hearing results are in the table below.

(2) Moldova Transit Transport

Among the companies interviewed, only two dealing in energy resources currently continue to use transit transport via Moldova. Company C, a petroleum wholesaler, transports diesel and gasoline from refineries in Romania to Ukraine. However, most shipments are sent directly from Romania to Ukraine, and transit via Moldova is limited to certain storage facilities. Trucking company G transports approximately 750 tons per month from Constanta, Romania, via Giurgiulesti, Moldova, to oil storage facilities in Odesa, at the request of a petroleum wholesaler.

It has become clear that there are serious challenges from three perspectives—cost, infrastructure, and soft factors—in promoting transit transport via Moldova. The main challenges are as follows.

- **Significant Lack of Cost Competitiveness**

  Freight rates on the route through Moldova are extremely high compared to the neighboring countries and other modes of transport. Reports indicate that rail container transport from the Constanta Port to Moldova can be twice as high as trucking. In some cases, they are 40% higher per kilometer. As high freight rates and poor service have become the norm, the route via Moldova has effectively been ruled out as a transit option.

- **Aging Transportation Infrastructure and Lack of Supporting Facilities**

  In addition to the overall aging of rail infrastructure, freight car transshipment facilities are undeveloped, preventing the system from realizing its potential as a mass transport mode. Furthermore, road conditions on major routes are poor for road transport, with a critical shortage of parking lots as waiting areas and rest stops near BCPs. These physical constraints significantly compromise transport safety and efficiency.

- **Inefficiencies in Customs Procedures and Administrative Operations**

  Transiting through Moldova adds an extra customs clearance step. The reliance on manual, analog processes poses a significant barrier. In particular, at the CFM, procedures have not been digitized, requiring manual preparation and submission of documents at the counter. Furthermore, staff shortages at the BCP are slowing down processing times, leading to chronic truck backlogs.

Furthermore, changes in the external environment are having a significant impact. With the reopening of the Odesa Port in June 2024, much of the demand for transporting low-cost bulk cargo has returned to it, further reducing the need to transit through Moldova. At present, except for certain energy resource shipments and a small number of customers who avoid the Odesa Port due to safety concerns, there is little economic rationale for choosing the route through Moldova.

Table 5-24 Current Status and Challenges of Road Transport as Identified Through Interviews with Major Shippers and Carriers

Company Name	Main Routes	Major Cargo Items	Transport Volume (including seasonality)	Travel Time (Lead Time)	Transportation Costs	Challenges and Issues Related to Transportation
Company A (Freight Forwarder)	• China → Constanta Port → Moldova • Kyiv → Chișinău	• Retail goods, electrical cables, wine, fruits, vegetables, container cargo from China	• 99% of total cargo volume is transported by truck	• Kyiv–Chișinău: Up to 1 day • Round-trip by truck: approximately 3–4 days	• $1.80–$2.00 per km	• Delays in customs clearance at the Romania/Ukraine border • Long wait times at the Ukrainian border (25–36 hours)
Company B (Ocean carrier - Container)	• Constanta Port → Moldova (primarily by truck)	• Grains, wine, alcohol, apple juice, liquid bulk	• Total annual market volume: 45,000 TEU (imports and exports combined)	• Border crossing typically takes 1–2 days	—	• Shortage of customs officials on the Romanian side and cumbersome paperwork • Heavy fines due to inadequate axle weight measurements between Constanta and the border • Road damage caused by overloaded trucks
Company C (Oil Wholesaler)	• Chișinău → Various locations in Moldova • Romania → Moldova (jet fuel, etc.)	• Jet fuel, high-octane gasoline, various petroleum products	• 100,000–150,000 tons per year (to Moldova)	–	–	• Risk of accidents due to the transport of hazardous materials • Low safety awareness among drivers • Unreliability of trucking companies' dispatch services
Company D (Oil Wholesaler)	• Romania (Refinery) → Leușeni BCP → Chișinău • GIFP → Various locations in Moldova	• Gasoline, Diesel, LPG	• Daily transport (volumes undisclosed)	• Border crossing: Typically, 2 hours (4–5 hours during system downtime)	• More economical than rail (a difference of $2–3 per ton)	• Poor road conditions within Moldova • Severe traffic congestion in Chișinău
Company E (Cement manufacturing)	• GIFP → Rezina • Rezina → Iași (Romania) • Domestic transport in Moldova	• Cement (exports), petroleum coke, coal, slag, etc. (raw material imports)	• Exports: Monthly average of 1,500 tons • Decreases in winter due to lower construction demand	• GIFP–Rezina: 10–12 hours	• 350 lei/ton/km (cheaper than rail)	• Difficult to secure a large number of trucks (e.g., 80 trucks) at once • Low load capacity per truck
Company F (Trucking company)	• Constanta/Ploiești → Leușeni BCP → Chișinău • GIFP → Chișinău	• Petroleum products (90% of shipments)	• Imports from Romania: 11,000 tons/month • Domestic: 25,000 tons/month	• Romania–Chișinău: 3 days (round trip) • GIFP–Chișinău: 10 hours (round trip)	• Direct import: $53/ton • GIFP–Chișinău: $20/ton	• Road conditions on the Cahul-GIFP route, etc., are poor (traveling at 10 km/h) 7 • Lack of rest areas (parking lots) for truck drivers • Axle weight limits on access roads
Company G (Trucking company)	• Romania/Bulgaria → Leușeni BCP → Moldova • Constanta → GIFP → Ukraine	• Petroleum products (gasoline, diesel, LPG)	• Imports from Romania: 29,250 tons/month • To Ukraine: 750 tons/month	• Round trip to Romania: 2 days • Round trip to Bulgaria: 3 days	• 3 lei/km per 26 tons (example)	• Long average BCP waiting time of 12 hours • Shortage of BCP staff and slow processing speeds • Customs systems vary by country
Company H (Grain Association)	• Moldova → Romania, Bulgaria, Turkey	• Grains, oilseeds, vegetable oils	• Approx. 4.5 million tons are transported by road annually • Peak season: July–October	–	–	• Excessive strain on logistics infrastructure during harvest season • Severe congestion at BCPs along the Romanian border

Source: Compiled by the JICA Survey Team

Table 5-25 Challenges and Issues Identified Through Interviews with Major Shippers and Carriers Regarding the Promotion of Import and Export Cargo Transportation via the Moldova Transit Route

Hearing Service Provider	Transit	Ukraine Import/Export	Romania Import/Export	Comments on Import/Export Cargo Transiting Through Moldova
Company A (Freight Forwarder)	×	Exports: × Imports ✓	Exports: ✓ Imports: ✓	• The production areas for coal and iron ore from Ukraine are in Russian-occupied territories (eastern Ukraine), and supplies have stopped. →The Galati Steelworks in Romania has closed, so there is no demand. • Moldovan freight trains are not permitted to enter Ukraine due to the risk of bombing within Ukraine. • Passing through Transnistria is difficult, and routes to Ukraine are limited. • Rail freight rates for container transport from the Constanta Port to Moldova are twice the trucking rates. • In Giurgiulesti, trucks are congested in a narrow region within Moldova due to the proximity of the Ukraine-Romania border.
Company B (Shipping Company - Containers)	×	×	Exports: ✓ Imports: ✓	• Since the Odesa Port reopened in June 2024 and most bulk cargo has returned to Odesa, there is virtually no transit cargo through Moldova. • The Odesa Port poses high security risks, and its use for container transport is very limited. • **Some Ukrainian customers** use **the Constanta Port for safety reasons**, but they do not need to pass through Moldova. (Direct transport to Romania)
Company C (Oil Wholesaler)	○	×	Exports: × Imports: ✓	• Exports diesel and gasoline from Romanian refineries and storage facilities to Ukraine. • Most exports to Ukraine **are transported directly** by rail **via the Romania-Ukraine route**. →The majority of shipments to Ukraine are destined for storage facilities in the country's northwest, where the situation is stable. → **Rail freight rates per kilometer in Romania are 40% lower than CFM rates**. (Rail freight rates between Giurgiulesti and Chișinău are twice those between Constanta and Chișinău.) • Ukrainian exports via Moldova are transported by barge and rail to the Romania-Moldova border (Giurgiulesti), and then by truck from Moldova to Ukraine (100,000–150,000 tons per year). → Due to safety concerns regarding storage facilities around Odesa, customers transport diesel and gasoline directly to their destinations by truck. → While barge capacity is limited due to low water levels on the Danube, rail capacity is constrained by track capacity within Romania.
Company D (Oil Wholesaler)	×	×	Exports:× Imports: ✓	• Moldova's railway infrastructure, which has bulk transport capacity, is aging, **and freight rates are higher than trucking rates**. Freight cars must transship at the Romania-Moldova border. • CFM procedures are undigitized; when using freight cars, documents must be prepared manually and submitted directly to CFM.
Company E (Cement Manufacturing)	×	Exports: ✓ Imports: ×	Exports: ✓ Imports: ✓	• Regarding cement exports to Ukraine, ports are not possible because Ukraine has imposed a 95% anti-dumping duty on Moldovan cement since 2020. (Slag, a raw material, is imported from Ukraine.)
Company F (Trucking company)	×	×	Exports: × Imports: ✓	• When the war in Ukraine began, petroleum products were transported to the Reni Port in Ukraine via Romania or Moldova. On some routes, shipments were transported directly from Romania to the Reni Port in Ukraine without passing through Moldova. → Currently, transit shipments via Romania-Moldova-Ukraine are not being conducted. • There are no facilities in Moldova where truck drivers can rest.
Company G (Trucking company)	○	×	Exports: × Imports: ✓	• Provide **truck transport** via Romania (Constanta) – Moldova (Giurgiulesti-Reni or Giurgiulesti-Palanca) – Ukraine (Odesa). → Transportation to oil storage facilities in Odesa. → The transport volume is approximately 750 tons per month, and the travel time between Constanta and Odesa is about one day. → The route via Giurgiulesti-Reni is shorter, but road conditions are poor. On the other hand, the route via Giurgiulesti-Palanca is longer, but the road conditions are good. The utilization rate is 80% via Reni and 20% via Palanca. • **There is no designated parking area for trucks waiting at the BCP**. Throughout Moldova, facilities where truck drivers can rest are limited. • There is a shortage of BCP staff, resulting in slow processing times.
Company H (Grain Association)	-	-	-	• Immediately following Russia's invasion of Ukraine, demand for transit shipments via Moldova increased. However, as the Odesa Port resumed operations and became capable of loading large vessels, **the need for transit shipments via Moldova** has decreased. • Ukraine has a vast territory and long transport distances. Furthermore, Ukraine has a more developed railway infrastructure than Moldova and possesses a large number of freight cars. Consequently, Ukraine utilizes **railways, which are capable of high-volume transport**, **to move grain**. • Moldova's railways operate at slow speeds. While transshipment facilities between Romania and Ukraine are well-developed, **Moldova's rail transshipment facilities are not**. → There is a tendency to avoid transport via Moldova.

Source: Compiled by the JICA Survey Team

5.8.2 Commodities with Potential for Modal Shift from Road to Rail Transport

(1) Criteria for Selecting Items for Modal Shift

This study identified promising import and export items to promote a shift from road transport to rail-based intermodal transport (modal shift). The selection follows these three criteria.

- Transport volume: Bulk cargo originating from or destined for Moldova and Ukraine and transported to (or via) Romania.
- Immediate Infrastructure Availability: Cargo that maximizes the use of CFM's existing infrastructure, does not require additional capital investment, and allows for the benefits of rail transport.
- Logistics concentration: There must be continuous large-volume imports and exports with specific countries or ports.

(2) Strategic Goods Eligible for Modal Shift

Based on the aforementioned criteria, items eligible for modal shift have classifications. Below are items expected to shift to rail transport or remain on rail, based on field surveys and trade statistics analyses.

Table 5-26 Items Targeted for Modal Shift and Continued Rail Transport, and Rationale for Selection

Classification	Item	Selection Criteria and Flow Characteristics
Exports from Moldova	Grains (wheat, corn, sunflower seeds)	There is significant demand for bulk transport from the northern grain-producing region to the ports of Constanta (Romania) or Giurgiulesti, which existing railway infrastructure (including silo connections) can accommodate.
	Vegetable Oil (Sunflower Oil)	Transportation by tanker trucks is efficient and well-suited for bulk transport.
Moldova Imports	Fuel (refined petroleum, LPG)	Imports from Romania or southern ports. Rail transport is advantageous from the perspective of safety in transporting hazardous materials and bulk transport to storage facilities.
Ukraine-related	Iron, iron ore, and construction materials	Due to the extremely heavy weight of these goods and the significant damage they cause to road surfaces, rail transport is essential. Imports of crushed stone for construction might increase due to demand from post-war reconstruction.
	Fuel (Transit)	Route from Turkey and other countries via Giurgiulesti to Ukraine. While truck transport is currently predominant, there is significant potential for efficiency gains by shifting to rail.

Source: Prepared by the JICA Survey Team

5.8.3 Analysis of Modal Shift Potential and Bottlenecks for Candidate Routes

(1) Potential, Benefits, and Challenges of a Modal Shift from Road to Rail

The Moldovan government and the EU are promoting a modal shift to rail to reduce environmental impact and alleviate border congestion; however, market realities indicate an increasing reliance on road transport.

1) Benefits of Modal Shift

If the shift to rail is realized, the following multifaceted effects can be expected.

a) Improved Transport Efficiency and Elimination of Border Congestion

Currently, long lines of trucks have become the norm at the Moldova-Romania border (particularly around Albița-Leușeni and Giurgiulesti), with waiting times sometimes lasting several days. Since rail can transport large volumes of cargo at once (equivalent to 50–100 trucks per train), it can dramatically expand border-crossing capacity and help alleviate road congestion[29].

b) Infrastructure Maintenance

The deterioration of road infrastructure caused by overloaded trucks represents a significant financial burden for Moldova. Shifting heavy freight to rail can help reduce road maintenance costs.

c) Environmental Impact Reduction Measures

The Ministry of Environment of Moldova has a Climate Change Policy Division. The Paris Agreement enables it to formulate and promote policies for GHG emission reduction and climate change adaptation, aiming to promote low-GHG development and improve resilience to climate change. Moldova's Nationally Determined Contribution (NDC) sets targets to reduce GHG emissions by 71% by 2030 and by 75% by 2035, compared to 1990 levels.

Furthermore, while Moldova is making a nationwide effort to advance policies for EU accession, there is a need to promote a modal shift in light of the EU's target to double rail transport by 2050 to reduce GHG emissions.

2) Structural Challenges Hindering the Modal Shift

Despite the theoretical benefits, the shift from rail to road continues. The following serious challenges underline this trend.

a) Lack of Cost Competitiveness and Tariff Issues

In the fall of 2025, CFM decided to raise grain transport rates by an average of 7%, and by up to 42% under certain conditions. While this measure was intended to address soaring fuel costs and unpaid wages, it ultimately caused the rail sector to lose its price competitiveness.

- **Price Reversal**: According to on-site interviews, while rail freight rates are rising, trucking rates are trending downward due to intensifying competition. For example, the Grain Exporters Association (Agrocereale) warns that rising rail transport costs are squeezing farmers' profits (resulting in losses of 200 to 400 lei per ton) and accelerating the shift to trucking[30].
- **Unclear Pricing**: Changes that disadvantage major shippers—such as the elimination of volume discounts—are also driving the shift away from rail[31].

[29] Moldova railway reform: Single freight train replaces 100-truck convoy - Moldova1.md, https://moldova1.md/p/65444
[30] Moldovan rail tariffs threaten to shift grain transport to roads - Moldova 1, https://moldova1.md/p/59034/moldovan-rail-tariffs-threaten-grain-transport-shift-to-roads
[31] New railway tariffs reduce the competitiveness of Moldovan grain - logos-pres.md, https://logos-pres.md/en/news/new-tariffs-for-railway-transportation-reduce-competitiveness-of-moldovan-grain/

b) Disparities in Transit Time and Flexibility

Interviews with local companies point to the long lead times associated with rail transport.

- **Travel time**: A shipment from northern Moldova to the Giurgiulesti Port takes 1–2 days by truck. However, it requires 7–12 days by rail, and in some cases, even longer.
- **Last mile**: Many farmers and warehouses have no rail sidings, requiring truck transport (lateral transport) to the railway station. These transshipment costs and the hassle involved are factors driving the choice to use direct truck transport from the outset.

c) Physical Constraints of Infrastructure and Rolling Stock

- **Differences in Track Gauge**: Moldova and Ukraine use broad gauge (1,520 mm), while Romania uses standard gauge (1,435 mm), necessitating bogie changes or transshipment at border crossings (such as Ungheni), which is a major cause of time loss and increased costs.
- **Speed Limits**: Due to aging tracks, train speeds are limited to 15–30 km/h on many sections, reducing the turnover rate of freight cars and lowering overall transport capacity[32].
- **Shortage of Rolling Stock**: The availability rate of locomotives and grain hopper cars is low, and they are unable to meet demand during peak harvest seasons.

d) Institutional and Operational Challenges

- **Cumbersome Procedures**: The application process for rail transport still relies on paper-based systems and ad hoc coordination, making it significantly less convenient compared to the digitized dispatch systems used in trucking.
- **CFM's Management Crisis**: CFM suffers from chronic wage arrears (delays of 3 to 9 months), leading to low staff morale and a constant risk of strikes, causing shippers to lose confidence in the stability of transport services[33]. As of July 2026, delayed salary payments have been resolved.

[32] Moldova's railway tariff hike sparks fear over export competitiveness, https://radiomoldova.md/p/60774/moldova-s-railway-tariff-hike-sparks-export-competitiveness-fear

[33] Moldova: Workers struggle for fair wages at Moldovan Railway (CFM), https://www.business-humanrights.org/fr/derni%C3%A8res-actualit%C3%A9s/moldova-workers-struggle-for-fair-wages-at-moldovan-railway-cfm/

Table 5-27 Comparison of Transport Modes in Moldova (as of 2025)

Item	Rail Transport	Road Transport	Remarks
Major Cargo	Fuel, construction materials, some grains	Grains, general consumer goods, machinery	Rail's share of grain transport has fallen to 20% or less
Pure transportation costs*	$37/ton or more	$28–$35 per ton	Trucks are approximately 10–20% cheaper
Additional cost factors	Transportation costs to the station, transshipment fees, and waiting charges	Direct transport from farm to port is possible (no additional fees)	Rail is more expensive in terms of total logistics
Lead time*	7–12 days	1–2 days	Trucking is significantly faster
Infrastructure Fees	Included in freight charges	Vignette (road usage tax paid when using roads) applicable to all roads	Trucks are charged on the entire road network, but the rates feel reasonable
Border crossings	Long wait times due to gauge conversion and paperwork	May have to wait several days due to traffic congestion	Digitalization has a greater impact on reducing transit times for rail
Transport capacity	1 train set = equivalent to about 100 trucks	1 unit = approx. 25 tons	Rail offers economies of scale through bulk transport

*: Between northern Moldova and the Giurgiulesti Port

Source: Compiled by the JICA survey team based on survey team materials and various other sources

(2) Evaluation of the Modal Shift from Road to Rail

1) Comparison of the Volume of Cargo Subject to Modal Shift and Railway Capacity, as well as Necessary Measures on the Railway Side

4.3.3 Based on the future demand calculated in the previous chapter, the differences in logistics volume depending on whether a modal shift occurs are summarized in Table 5-28. Approximately 3 million tons of freight will shift to rail because of the modal shift. Table 5-29 shows that the calculated capacity exceeds the post-modal shift demand analysed in Chapter 4.3.3 for every item.

Table 5-28 Freight Transport Volume by Mode in 2035 and Changes Due to Modal Shift

	Freight transport volume by mode in 2035 and changes due to modal shift with and without Change in Road Freight Volume [million tons]	Changes in Road Transport Changes in Change in rail transport [million tons]	Road transport Freight Volume [million tons]	Rail Transport Freight volume [million tons]
No modal shift	-	-	9.7	4.4
35% shift of Convert 35% of all road freight items	-3.0	3.0	6.0	6.9
Convert only cargo suitable for rail transport (rail share: 45%)	-3.0	3.0	6.0	6.9

	Whether a modal shift Changes in Change in Road Transport [million ton-km]	Changes in road transport Change in Change in rail transport [million ton-km]	Road transport Freight Volume [billion ton-km]	Rail Transport Freight volume [billion ton-km]
No modal shift	-	-	1.82	0.65
35% modal shift of all road freight	-635	742	1.18	1.39
Convert only freight suitable for rail transport (rail share: 45%)	-660	779	1.16	1.43

Source: JICA Survey Team

Table 5-29 Comparison of Railway Capacity and Railway Transport Demand in 2035

		Transportation/ Transshipment Capacity [Mil. tons]	2035 Demand [Million tons]	
			35% conversion of Conversion of 35% of all road freight	Convert only Conversion of only freight suitable for rail transport (Rail share: 45%)
Nationwide	Total number of domestic locomotives	12.6	6.9	6.9
Sections By section	Oknytsia–Chișinău	5.4	3.0	3.1
	Chișinău–Basarabeasca	4.8	2.4	2.4
	Basarabeasca–Giurgiulesti	4.8	1.2	2.1
By Station	Ungheni Station	2.5	2.3	2.2
	Giurgiulesti Station	10.8	1.0	1.1

Note: Number of cars per train: 40 tons/car, cargo volume per car
50 cars per train, calculated based on 300 operating days per year.

Source: Prepared by the JICA survey team

2) Estimated GHG Emission Reductions from Modal Shift

GHG emission reductions resulting from project implementation are the difference between GHG emissions under the baseline scenario (e.g., continued use of existing freight transport modes such as trucks) and those resulting from a modal shift to rail freight transport (project emissions).

- Calculation of Baseline Emissions

The baseline emissions for the target year (2035) are the GHG emissions under the "Without Case" scenario, where the modal split for that year remains the same as it is currently (2021). Therefore, baseline emissions are calculated by multiplying the rail transport ton-kilometers after project implementation (when a modal shift to rail has occurred: "With Case") by the 2021 modal split ratios and the CO_2 emission factor (Table 5-30).

$BE_y = \Sigma_i (BTKM_{2035} \times MS_{i,2021} \times EF_{TKM,i})$

$BTKM_{2035}$: Rail transport ton-kilometers in 2035 With Case (1,334,295,418 t-km/year)

$MS_{i,2021}$: Share of mode of transport i in 2021 under the baseline scenario (%)

$EF_{TKM,i}$: CO_2 emission factor per ton-kilometre for transport mode i (t-CO_2/t-km)

Table 5-30 Calculation of Baseline Emissions

	$BTKM_{2035}$	**MS_{2021}**	**EF_{TKM}**	**$BTKM_{2035} \times MS_{2021} \times EF_{TKM}$**
Railway	**1,390,099,481**	33.87%	2.20×10^{-5}	10,357
Road		66.10%	1.73×10^{-4}	158,952
River		0.01%	3.90×10^{-5}	4
Air		0.03%	1.49×10^{-3}	610
			Total (t-CO_2/year)	**169,924**

Source: Goods transport, modes of transport, 1995–2024 (National Bureau of Statistics of Moldova)
Joint Guidelines for CO_2 Emission Calculation Methods in the Logistics Sector Ver. 3.1, Ministry of Economy, Trade and Industry, Ministry of Land, Infrastructure, Transport and Tourism (July 2016)

- Calculation of Project Emissions (With Case)

Calculated by multiplying the rail transport ton-kilometers in the With Case (where the share of other transport modes is zero) by the CO_2 emission factor per ton-kilometre for rail and other modes.

$PE_y = BTKM_{2035} \times EF_{PKM,rail}$

$EF_{PKM,rail}$: CO_2 emission factor per ton-kilometre for rail and other modes (2.2×10^{-5} t-CO_2/t-km),

$BTKM_{2035}$ = 1,390,099,481 (t-km) × 22 $^{\times 10^{-5}}$ (t-CO_2/t-km) = 30,582 t-CO_2/year

- Calculation of GHG Reduction

$ER_{2035} = BE_{2035} - PE_{2035}$

ER_{2035}: GHG emission reductions resulting from project implementation in 2035 (t-CO_2/year)

BE_{2035}: GHG emissions under the baseline scenario for 2035 (t-CO_2/y)

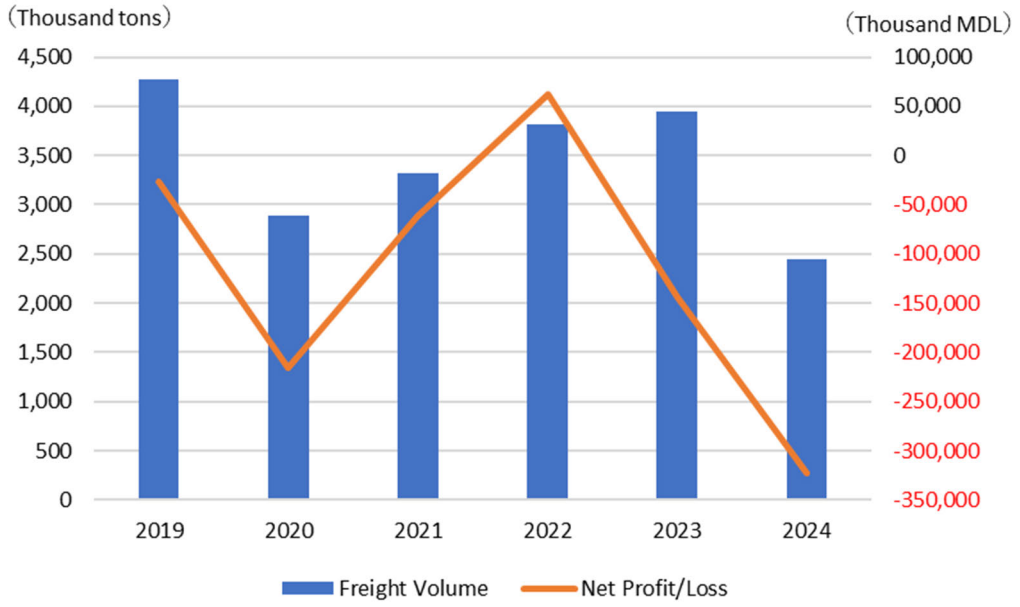
PE_{2035}: GHG emissions under the project scenario in 2035 (t-CO_2/y)

ER_{2035} = 169,924 t-CO_2/year – 30,582 t-CO_2/year = 139,341 t-CO_2/year

The GHG reduction effect resulting from the modal shift to rail (2035) is estimated to be 139,341 t-CO_2/year.

3) Impact of CFM on Management Improvement

The following figure shows annual freight volume and net profit/loss based on CFM data. Freight volume temporarily decreased in 2020 due to the impact of COVID-19. However, from 2022 to 2023, immediately following the Russian invasion of Ukraine, as mentioned earlier, the blockade of the Black Sea led to a sharp increase in the volume of Ukrainian grain transported to Romania via land routes (rail and truck) and through Danube river ports, increasing freight volume utilizing CFM. However, since 2024, as operations at major Black Sea ports such as the Odesa Port have stabilized, the mainstream of grain exports has returned to maritime transport, and the volume of cargo using the CFM has decreased. Furthermore, as shown in the following figure, although the balance turned positive temporarily in 2022, it returned to a deficit in 2023. While the 2022 surplus came from high freight rates contributing to improved earnings, the company has a fragile financial structure: decades of neglect in investing in tracks, systems, and rolling stock have led to rising maintenance costs, and combined with soaring fuel costs, this makes it easy for the company to slip back into the red. Furthermore, wage delays stemming from the sales slump during the 2020–2021 pandemic continued through 2024, severely impacting working conditions and livelihoods, with approximately 600 employees forced onto furloughs for several months. (Currently, the unpaid wage balance has been eliminated through organizational restructuring, asset sales, and government support.).



Source: CFM

Figure 5-28 CFM's Annual Freight Volume and Net Profit/Loss

The report on CFM's financial analysis published in October 2023 (Financial Study of Operational Profitability, through Various Evolution Scenarios of CFM, 10 October 2023) includes a break-even analysis, identifying the following indicators as benchmarks for maintaining profitability:

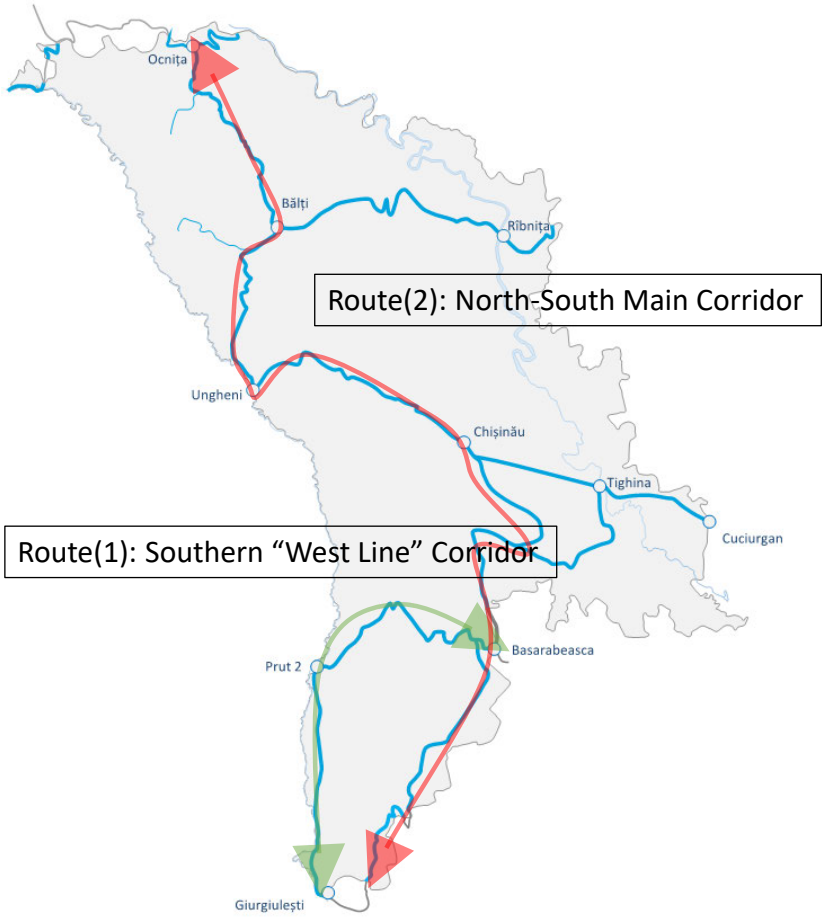
Freight rate of 321 Moldovan Leu (MDL)/ton (2023 equivalent) or freight volume of 3,984 thousand tons

- **Freight rate**: The average rate in 2022 was 316 MDL/ton. Taking into account Moldova's inflation rate (8% per year), converting (deflating) the break-even point of 321 MDL/ton to its 2022 value results in 298 MDL/ton. Since the 2022 average unit price (316 MDL/ton) exceeds the break-even point, calculations indicate that profitability could remain at the 2022 cargo unit price.
- **Freight Volume**: In 2024, the freight volume was 2,448 thousand tons. Therefore, to reach the break-even point, an increase of 3,984 – 2,448 = 1,536 thousand tons is required, representing a 63% increase compared to 2024.

Recent trends show that rail freight volume has been declining. To increase rail freight volume, it is necessary to improve transport capacity by renewing aging infrastructure and rolling stock and enhancing freight transport speeds. At the time of this study, it was difficult to conduct a detailed analysis of the relationship between facility renewal and profitability improvement due to limited information. Intuitively, it will not be easy to immediately increase freight volume to more than 1.6 times the current level (an increase of over 63% compared to 2024). It will be necessary to monitor the reaction of the freight transport market (shippers) and CFM's operational performance (the effectiveness of the rehabilitation) following large-scale rehabilitation works supported by the EBRD and the EU.

(3) Analysis of Major Routes with Conversion Potential

Based on field surveys and the latest trends, the following two routes are identified as having the highest potential for modal shift (see figure below).



Source: JICA Survey Team

Figure 5-29 Key Routes with Potential for Modal Shift

1) Route 1: Southern "Western Line" Corridor (Giurgiulesti – Cahul – Prut 2 – Basarabeasca)

A strategic route running from the Giurgiulesti Port—Moldova's only international port—along the Romanian border through southern Moldova to the Ukrainian border (Basarabeasca). Its strategic importance is growing, particularly for the transport of fuel and reconstruction materials (such as crushed stone) destined for Ukraine.

a) Detailed Route

- **Starting Point: Giurgiulesti**
  - An international free port on the Danube River. From here, access to the Danube waterways and the Black Sea is available, as well as a rail connection to Romania (Galati).
- **Intermediate Stop: Cahul – Prut 2**
  - A route heading north along the Prut River on the Romanian border. Prut 2 Station has a BCP connecting to Fălciu Station on the Romanian side. Maintenance work is currently underway to reopen it.

- **Starting point: Basarabeasca**
  - This border station connects to major railway junctions in Ukraine (toward Artsy/Berezyne) and serves as a railway hub in southern Moldova.
- **Other**
  - There is also a corridor that bypasses the section between Giurgiulesti and Prut 2, crossing the border bridge from Fălciu Station in Romania to Prut 2, and then proceeding to Ukraine via Basarabeasca.

b) Rationale for Modal Shift

- Suitability for heavy cargo (construction materials and fuel): "Crushed stone (construction aggregate)" necessary for Ukraine's post-war reconstruction and infrastructure development, as well as "fuel" destined for Ukraine, are extremely heavy, and transporting them by truck causes significant damage to road infrastructure (particularly Route R34). Since railways can transport large volumes of heavy cargo at once, using this route is the most rational option.
- Avoiding Border Congestion (Bypass Function): Currently, BCPs between Ukraine, Moldova, and Romania (such as Giurgiulesti-Reni) are chronically congested with trucks. By revitalizing this railway route (particularly via Prut 2–Fălciu), we can bypass the congested road borders and achieve smooth cross-border logistics.
- Effective Utilization of Existing Infrastructure (Closing the Missing Link): This section, which has been dormant for a long time (particularly between Cahul, Prut 2, and Basarabeasca), is undergoing self-financed phased rehabilitation. To realize the benefits of this investment as soon as possible, efforts to promote its use are required.

c) Expected Effects

① Economic Viability (Costs and Revenues)

- **Maintenance Status and Costs**: Rehabilitation work is underway on sections that have been out of service, such as the Cahul–Prut 2–Basarabeasca segment. Additionally, repairs were completed in April 2026 by restoring the section affected by a large-scale landslide (approximately 300 meters) in Văleni, between Cahul and Jiu-Lăcustă. (All of the above work is being funded entirely with internal resources.)
- **Revenue Forecast**: With the reopening of this section (particularly the Văleni–Giurgiulesti segment), CFM anticipates approximately 10 million lei (about 500,000 euros) in additional monthly revenue[34]. This will provide critical cash flow for CFM's financial restructuring.

[34] Moldovan Railway enterprise announces significant progress: increased revenues, reduced debts, paid salary arrears - Moldpres.md, https://www.moldpres.md/eng/economy/railway-of-moldova-enterprise-announces-significant-progress-increased-revenues-reduced-debts-paid-salary-arrears

- **Transportation Demand**: There is demand to import crushed stone for road construction in Ukraine, as well as for transporting fuel to Ukraine. During test runs, the railway successfully transported a 3,000-ton freight train (equivalent to 100 trucks)[35].

② Social Impact

- **Reduction of Accidents and Traffic Congestion**: Around the Giurgiulesti Port, queues of trucks waiting to cross the Ukraine-Romania border have become a constant feature, leading to a deterioration in the living environment for residents and increasing the risk of traffic accidents—issues that have become significant social problems. Since a single train set can replace approximately 100 large trucks, this will have a decisive effect on reducing chronic truck congestion, particularly around the Giurgiulesti Port, and the associated risk of traffic accidents.
- **Infrastructure Preservation**: By shifting heavy construction materials (such as crushed stone) to rail transport, this initiative will prevent road deterioration in the southern region (such as Route 34). It will also help reduce road maintenance and repair costs.

d) Points to Note

- Today, no support from aid agencies is planned for the Western Line. At present, CFM is repairing the landslide-prone section in the Văleni district (completed in April 2026). It is also renovating and maintaining the entire route. Also, the company is eliminating the missing link between Fălciu and Prut 2. These measures must be implemented reliably to use this route (solved in April 2026).

2) Route 2: North-South Trunk Corridor (Valcinet – Bălți – Ungheni – Chișinău – Giurgiulesti)

This is a vital route serving as the nation's "backbone," traversing Moldova from the northern border with Ukraine to connect major economic cities with the Romanian border (Ungheni) and southern ports. It is also a key grain export route.

a) Detailed Route

- Starting Point (North): Valcinet / Oknytsia
  - ➢ This is the entry point from northern Ukraine (Mohyliv-Podilskyi) and the center of northern Moldova's grain-producing region.
- Stops (Central Region): Bălți – Ungheni – Chișinău
  - ➢ Connects Bălți, the second-largest city, with Ungheni—the main gateway to Romania (Iași)—and the capital, Chișinău.
- Terminus (South): Căinari – Giurgiulesti

[35] Railway section rehabilitated for import of crushed stone from Ukraine - logos-pres.md, https://logos-pres.md/en/news/railroad-section-rehabilitated-for-import-of-crushed-stone-from-ukraine/

- The route heads south from Chișinău to the southern ports. Currently, large-scale rehabilitation work is underway on parts of this entire section (approximately 446 km).

b) Rationale for the Modal Shift

- **Demand for Bulk Grain Transport:** Northern Moldova is a major producer of grains (wheat, corn, sunflowers), but due to the long distance to export ports (Giurgiulesti in the south and Constanta in Romania), rail—which excels at long-distance transport—is inherently advantageous for this route.
- **Connecting Major Economic Regions:** The line links the country's major industrial cities with consumption centers and export ports, creating two-way logistics needs for raw materials (imports) and finished products (exports).
- **Core of the EU's "Solidarity Lanes":** This corridor is considered crucial for the EU as a backup route for exporting Ukrainian grain and transporting supplies to Ukraine. It is the focus of international support and investment.

c) Expected Benefits

① Economic Viability

- **Construction Costs**: With support from the EBRD, EIB, and the EU, rehabilitation of the entire target section (Valcinet–Ungheni–Chișinău–Basarabeasca–Giurgiulesti) is either underway or has been confirmed.
- **Challenges**: As a result of recent increases in rail freight rates (7% to a maximum of 42%) for grain transport, there have been cases where truck transport has become cheaper (rail freight costs approximately 28–35 per ton), leading to a tendency to avoid using rail transport from an economic standpoint.

② Social Impact

- **Employment Preservation and Restructuring**: CFM is currently undergoing large-scale restructuring (reducing staff from approximately 6,000 to 4,000) to rebuild its operations; however, the modernization of rail lines and the recovery of transport volumes are essential to normalize the issue of unpaid wages (delays of 3–9 months) for the remaining staff and to preserve employment.

3) Conclusion

The transport of heavy cargo (fuel and construction materials) on the "Southern West Line" has excellent potential to shift to rail for economic and social benefits. On the other hand, regarding grain transport on the major "North-South Corridor," a shift from road transport is considered difficult without not only infrastructure upgrades but also soft improvements such as revising freight rates and streamlining the last mile.

Japan's provision of track maintenance equipment and railway personnel training through ODA is an effective assistance to help overcome these challenges (particularly infrastructure maintenance and operational efficiency), contributes to improving the operational stability and sustainability of Moldovan Railways, and enhances freight transport and environmental conditions in Moldova, while also aligning with EU policies.

5.9 External Factors Affecting the Promotion of Rail Freight Transport in Moldova

5.9.1 Impact of Russia's Invasion of Ukraine on Major Ukrainian Ports

Russia's invasion of Ukraine has had a complex impact on the country's major ports in three aspects: physical damage, economic impact, and geopolitical positioning.

On the physical front, sustained missile and drone attacks on the port complexes in Odesa on the Black Sea coast and ports along the Danube River damaged critical infrastructure essential to port operations, such as grain silos, fuel storage facilities, logistics warehouses, and port power facilities. Although the damage is significant, the ports are not 100% destroyed; rather, import and export activities have become unstable due to operational constraints resulting from reduced functionality.

Economically, the decline or stagnation of grain and steel exports, soaring international marine insurance premiums, and delays in customs clearance and transportation due to shipping route restrictions decreased foreign exchange earnings, directly impacting GDP. Particularly in Ukraine, which is highly dependent on international maritime transport, the decline in port functionality has had a direct impact on national income (macroeconomics).

From a geopolitical perspective, reliance on Black Sea shipping routes became uncertain, and with the expanded use of inland and Danube corridors via the EU Solidarity Lanes, the international transport system shifted to a dual structure combining Black Sea routes and EU corridors.

As a result, Ukraine's ports have been reclassified from mere domestic logistics hubs to strategic transport infrastructure that influences international food security, regional security, and European integration.

In summary, the impact of the Russian invasion on Ukraine's port sector and international maritime transport via the Black Sea extends beyond mere damage to facilities; it has brought about long-term changes that are leading to a restructuring of the regional economic structure and regional order. Moving forward, a comprehensive reconstruction of ports and international maritime transport infrastructure, while accounting for strengthening resilience and transport redundancy assurance, is essential when planning and implementing reconstruction assistance for Ukraine.

The following details are the physical damage, economic impacts, and geopolitical implications.

(1) Physical Damage

Russia's invasion of Ukraine has inflicted the most extensive physical damage on the country's port system since World War II. Port infrastructure is not merely a transport facility but the export foundation supporting the Ukrainian economy; a defining characteristic of the attacks is that they aimed to weaken national economic functions rather than targeting military objectives. Table 5-31 shows the physical damage caused by the invasion of Ukraine (major Ukrainian ports), and Table 5-30 shows news photo clippings of each port at the time of the attacks.

As shown in the table, damage to ports is concentrated in the Great Odesa port cluster (the ports of Odesa, Chornomorsk, and Pivdennyi) along the Black Sea coast. Before the invasion, these three ports handled the majority of exports, including grain, iron ore, and steel products, forming the backbone of the country's export volume. Since 2022, attacks using cruise missiles and UAVs have been continuously executed, causing extensive damage to outer harbour berths, grain silos, fuel facilities, port power infrastructure, and logistics warehouses. The total number of attacks across the three ports is approximately 75 to 105. These attacks were characterized not by the destruction of port capacity itself, but rather by functional paralysis aimed at halting export activities.

In the Odesa Port in particular, damage to grain-loading facilities and energy supply infrastructure was significant, resulting in a confirmed sharp decline in export capacity. At the Chornomorsk Port, repeated attacks on port railways and transshipment facilities disrupted logistical continuity. At the Pivdennyi Port as well, attacks on industrial bulk facilities have partially suspended its function as a deep-water port, impacting industrial exports.

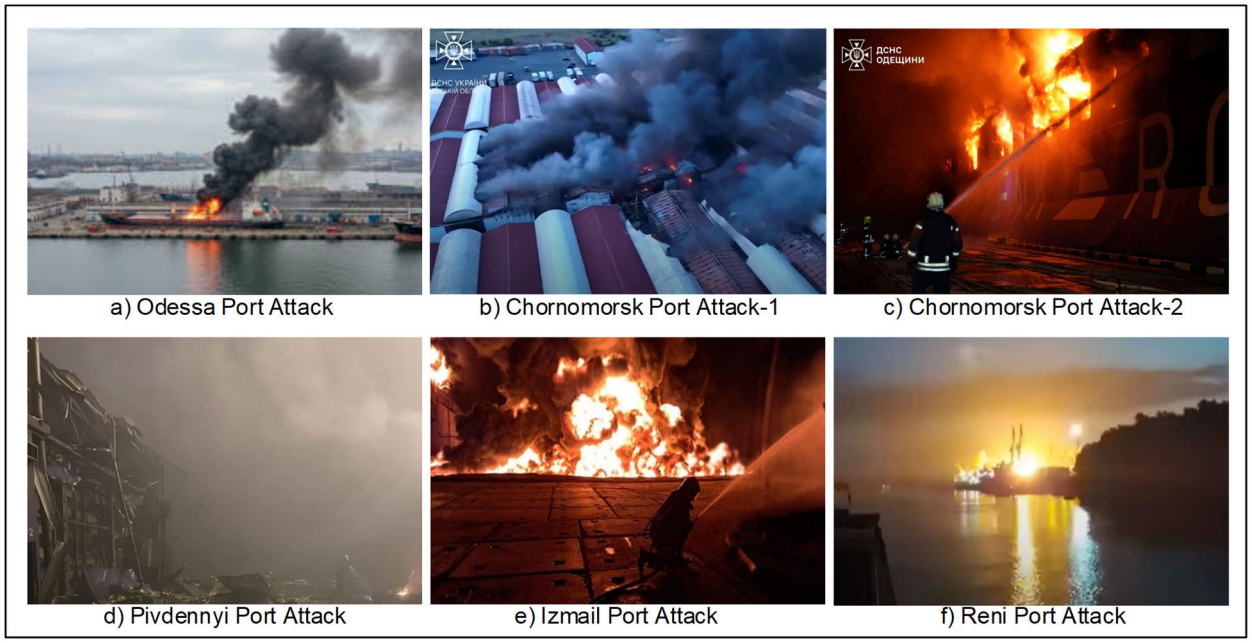
Table 5-31 Physical Damage Caused by the Invasion of Ukraine (Major Ukrainian Ports)

Port Cluster	Port	Period	Number of Attacks (Estimated)	Form of Damage	Location of Damaged Facilities	Main Targeted Facilities	Scale of Damage	Estimated Physical Damage	
								(mil.EUR)	(Bil.JPY)
Odesa Great port cluster	Odesa Port	February 2022–(Peak: February 2023)	35~45	Cruise missiles, UAVs, blast waves	Outer harbor, grain areas, fuel yards	Grain silos, logistics warehouses, berths, power infrastructure	Maximum damage, sharp decline in export capacity	350-450	58-74
	Chornomorsk Port	2022-2024	25~35	UAV attacks, bombing, fires	Container and bulk berths	Grain facilities, port railways, oil tanks	Repeated damage to transshipment facilities	250-350	41-58
	Pivdennyi Port	2022-2023	15~25	Missile attacks, fires	Industrial berths, logistics areas	Bulk facilities, logistics warehouses	Partially suspended its function as a deep-water port	200-300	33-50
Danube Great port cluster	Izmail Port	July 2023 -	20~30	UAV attacks, explosions, fires	Danube berths, fuel areas	Fuel facilities, grain silos, merchant ships	Concentrated attacks as an alternative transport hub	80-120	13-20
	Reni Port	2023-2024	10~15	UAV attacks, blast waves, physical damage	Oil areas, logistics yards	Oil terminals, logistics warehouses	Medium-scale damage	60-100	10-16.5
Total			**105~150**					**940-1320**	**155-218**

Source: Compiled by the investigation team based on Reuters, IMO/Black Sea Maritime Security Update, Maritime Executive, CEOBS, ABC News, CIR, WB&GoU/Ukraine Recovery Needs Assessment, EU/Port Rehabilitation Benchmarks, FAP&WB/Transport Damage Assessment, etc.

Meanwhile, the ports of Izmail and Reni along the Danube River, which had begun to function as alternative transport hubs for Black Sea ports, also became targets of attacks. Since 2023, these two ports, which have grown in importance as transport corridors to the EU, have been the focus of concentrated UAV attacks,

resulting in fires at fuel storage facilities and logistics yards, indicating that the Russian side did not merely attack port facilities but intended to cut off Ukraine's alternative transport routes themselves.



Source: Compiled by the research team based on news photos from Reuters, Maritime Executive, CEOBS, ABC News, and others

Figure 5-30 News Photos Showing the Attack Situation at Each Port

Table 5-31 shows that the cumulative number of attacks on the five targeted ports reached approximately 105 to 150, with estimated physical damage totalling approximately 940 million to 1.32 billion euros (approximately 155 to 218 billion yen). This damage is extremely significant to port infrastructure. The damage is notably concentrated in the nation's export hub. Approximately 80% of the total damage is concentrated in the Great Odesa port cluster, confirming that Black Sea ports remain the core of Ukraine's economy.

More importantly, the attacks have focused on operational functions—such as grain silos, fuel facilities, power supply, and logistics infrastructure—rather than wharf structures. This indicates that the attacks are not aimed at destroying the physical presence of the ports but rather serve as an "economic war of attrition" designed to destabilize export activities over the long term. Consequently, the damage to the ports has extended beyond mere infrastructure damage, spreading to the national economy through reduced foreign exchange earnings, soaring marine insurance premiums, and rising transportation costs.

Considering the above, attacks on Ukrainian ports are not merely facility destruction, but as part of a geopolitical competition for control over transport corridors. In the upcoming reconstruction phase, a comprehensive rebuilding strategy—including resilient port design that accounts for the risk of renewed attacks, securing alternative transport capacity, and ensuring the safety of international shipping routes—will be essential, rather than a simple return to the status quo.

(2) Economic Impact

Russia's invasion of Ukraine had a direct impact on the entire national economy through the port sector. Before the invasion, Ukraine relied on maritime transport for approximately 90% of its imports and exports. The decline in port functionality was not merely a logistical issue but structurally linked to foreign exchange earnings, industrial activity, and fiscal stability. Consequently, military pressure on ports functioned as a strategic means of targeting economic infrastructure.

Table 5-32, looking at the port sector, port throughput, which stood at approximately 157 million tons in 2021, plummeted to about 59 million tons in 2022, immediately following the invasion.

The Black Sea shipping lane blockade, minelaying, attacks on ports, and a sharp rise in marine insurance premiums created a situation that prevented transportation even though the ports physically existed. Transportation costs rose to approximately twice their pre-war levels, and as a result of a significant slowdown in grain and steel exports, foreign exchange earnings declined, causing the country's GDP to contract by approximately 10%.

Table 5-32 Economic Impact of the Invasion of Ukraine (All Ukrainian Ports and Major Ports)

Perspective	Port Sector as a Whole	Odesa Port	Port of Chornomorsk	Pivdennyi Port	Port of Izmail	Reni Port
Pre-war Economic Role (2021)	Maritime transport for approx. 90% of national exports	Symbolic hub for grain exports	Grain and container hub	Largest deep-water port for iron ore and industrial exports	Supplementary river port	Small-scale river port
Trends in port throughput	157 Mt → 59 Mt → approx. 97 Mt	Recovered after sharp decline	Sharp decline	Decline in industrial cargo	Adjusted after rapid increase	Decreased after rapid increase
Impact on Grain Exports	Temporarily halted by over 50%	Decline in loading capacity	Reliance on BSGI	Partially suspended	Increase in alternative exports	Increase in alternative exports
Steel and Ore Exports	Approx. 60-70% decrease (2022)	Limited resumption	Minor impact	Most severely impacted	Minor impact	Minor impact
Marine Insurance Premiums	Rose to three to five times pre-war levels	High risk leading to rise	High risk leading to rise	High risk leading to rise	Relatively low	Relatively low
Customs and Logistics Delays	Prolonged retention at EU borders	Navigation restrictions	Grain inspection delays	Stagnation of industrial logistics	River congestion	River congestion
Transportation Costs	Rose to approx. twice their pre-war levels	Increase in waiting vessels	Costs from grain inspection delays	Long-distance detours	Increase in inland transport	Increase in inland transport
Impact on Foreign Exchange Earnings	Contracted GDP by approx. 10%	Decline in grain revenues	Fluctuation in food exports	Decline in industrial foreign exchange	Contributed to maintaining foreign exchange	Contributed to maintaining foreign exchange
Employment and Regional Economy	Decrease in port-related employment	Unstable port operations	Increase in seasonal fluctuations	Impact on industrial areas	Regional revitalization	Temporary revitalization
Geopolitical Impact	Black Sea-centric to Black Sea + EU Corridor	Lifeline for national exports	Global food security hub	Port determining whether foreign currency is generated	An escape route to the EU	Emergency backup port
Overall Economic Impact	★★★★★ (National level)	★★★★★	★★★★☆	★★★★★	★★★☆☆	★★☆☆☆

Source: Compiled by the JICA survey team based on data and reports from the USPA; World Bank RDNA; UN BSGI; European Commission Solidarity Lanes; IMF; FAO; Reuters; IMO, etc.

Looking at major ports individually, the Great Odesa port cluster is at the center of economic impact. The Odesa Port is a symbolic hub for grain exports, and constraints on port operations immediately affected agricultural export revenues. The Chornomorsk Port, designated by the BSGI, held the key to resuming exports, but logistics delays became chronic due to inspection systems and navigation restrictions. At Pivdennyi Port, the stagnation of iron ore and industrial cargo exports was particularly pronounced, severely impacting production activities in the steel industry and related sectors. At these three ports, marine insurance premiums rose to three to five times pre-war levels, undermining export competitiveness.

Meanwhile, as the functionality of Black Sea ports declined, the ports of Izmail and Reni along the Danube rapidly gained importance as alternative transport hubs. The development of the EU-led Solidarity Lanes led to a significant increase in transport volumes via these river ports, serving as a safety valve to prevent

a complete halt of Ukrainian exports. However, river ports face constraints on water depth and cargo-handling capacity, making it difficult to replace large-scale transport by large vessels; consequently, a decline in transport efficiency and an increase in logistics costs were inevitable.

From an economic perspective, what is particularly significant is that the role of ports has undergone a structural shift caused by the invasion. Before the war, the transport structure was a "Black Sea-centric" model with an extremely high degree of dependence on Black Sea ports; however, following the invasion, it shifted to a dual structure utilizing both Black Sea ports and EU corridors. This shift is not merely a temporary measure, but the result of companies and logistics operators placing greater emphasis on risk diversification. It is highly likely to continue even after the war.

In summary, the economic impact on Ukraine's port sector can have three structural change categories: (1) a decline in foreign exchange earnings due to stagnation in grain and steel exports; (2) a loss of competitiveness due to rising marine insurance and transportation costs; and (3) a shift in the logistics focus on the EU corridor. Ports are not merely transportation infrastructure, but the backbone of the national economy, and their restoration and modernization are prerequisites for Ukraine's economic recovery. In the upcoming reconstruction phase, it will be essential not only to restore the functionality of existing ports but also to rebuild the port network to ensure transport redundancy.

(3) Geopolitical Impact

Russia's invasion of Ukraine has fundamentally altered the role of the country's ports. Before the invasion, ports were primarily economic infrastructure evaluated by transport efficiency and handling capacity; however, following the invasion, they have transformed into geopolitical infrastructure where national security, international politics, food security, and the legal order of trade intersect. This shift is reflected quantitatively by trends in port throughput and changes in the structure of transport routes.

Table 5-33, total port throughput across the entire sector plummeted from approximately 157 million tons in 2021 to about 59 million tons in 2022 due to the blockade of Black Sea ports and a sharp rise in navigation risks, creating a situation where port functionality was determined not by physical capacity but by "accessibility. "Subsequently, exports recovered through the operation of the BSGI and Ukraine's independent maritime corridor, returning to approximately 97 million tons in 2024, though they have not yet reached pre-war levels. This trend indicates a shift toward a structure where persistent security risks constrain port operations.

Looking at major ports individually, the Great Odesa port cluster—comprising the ports of Odesa, Chornomorsk, and Pivdennyi—remains the core of Ukraine's exports. These deep-water ports possess large-scale transport capacity and handle most grain and ore exports, but they are situated on the front lines of military tensions. The Odesa Port is a symbolic hub of the Black Sea shipping route, and its operational status determines the stability of the national economy.

As a port designated under the BSGI, Chornomorsk has become the focal point of political negotiations between the UN, Turkey, Russia, and Ukraine. Port operations are directly linked to international food

security issues. Pivdennyi, as one of the largest deep-water ports, serves as a key hub for foreign exchange earnings and has become a strategic port determining the potential for the recovery of industrial exports.

Meanwhile, the ports of Izmail and Reni along the Danube River saw their geopolitical significance and value rise sharply following the invasion. While these two ports had played only a supplementary role in 2021, the destabilization of the Black Sea shipping route transformed them into core hubs of the EU Solidarity Lanes, resulting in a several-fold increase in cargo volume. Although these ports cannot fully replace Black Sea ports, they function as a "safety valve" to prevent a complete halt in exports, irreversibly connecting Ukrainian trade to the EU economic sphere. While cargo volumes decreased in 2024 following the partial restoration of the Black Sea corridor, this fluctuation itself demonstrates the geopolitical nature of these two ports. In other words, the Danube ports are not the main ports in peacetime but are positioned as redundant infrastructure to sustain the national economy during crises.

Significant changes also occurred in the legal framework. Navigation restrictions and port attacks in the Black Sea created a tension between the principle of freedom of navigation under the United Nations Convention on the Law of the Sea (UNCLOS) and the laws of armed conflict, as grain export restrictions sparked international debate regarding their compatibility with World Trade Organization (WTO) trade principles. As a result, port access has come to be determined not solely by commercial considerations but by interpretations of international law, diplomatic negotiations, and security conditions.

Overall, port dynamics from 2021 to 2024 clearly demonstrate that the Ukrainian port system has reorganized into a dual structure consisting of "mass exports via deep-water Black Sea ports" and "security-oriented transport via EU connection corridors. "While the Great Odesa port cluster remains the core of economic recovery, the Danube port cluster has established itself as a complementary axis responsible for crisis resilience. This structural change is not a temporary wartime measure but an irreversible geopolitical shift with long-term implications for future investment in reconstruction, transport policy, and the EU integration process.

Table 5-33 Geopolitical Impacts of the Invasion of Ukraine (All Ukrainian Ports and Major Ports)

Perspective / Port	Port Sector as a Whole	Odesa Port	Chornomorsk Port	Pivdennyi Port	Izmail Port	Reni Port
2021–2024 Cargo Handling Volume Trends (Mt)	157 → 59 → 97 → 97	22.5 → 8.7 → 16.1 → 18.3	24.7 → 7.8 → 14.6 → 26.0	53.5 → 15.2 → 25.4 → 35.6	4.0 → 8.9 → 20.3 → 13.4	1.1 → 4.5 → 10.1 → 3.4
Change in Transport Route	Black Sea-only → Black Sea + EU Corridor	Reliance on the Black Sea	Reliance on the Black Sea	Dependence on the Black Sea	Danube-EU	Danube-EU
Military Use and Impact of Ports	Ports and shipping lanes are being quasi-militarized	Significant Attacks and Navigation Restrictions	Same as above	Same as above	Indirect	Indirect
BSGI effect	Cumulative total of approximately 33 Mt	Designated ports	Designated ports	Designated ports	-	-
Solidarity Lanes Effect	Total volume exceeds 100 million metric tons	Indirect	Indirect	Indirect	Direct	Direct
Naval blockade and traffic restrictions	Affects the entire Black Sea	Extreme	Extreme	Extreme	Minor	Minor
WTO / Legal Issues under the Law of the Sea	The intersection of freedom of navigation UNCLOS and the law of armed conflict (International Humanitarian Law: IHL); trade restrictions are in tension with WTO principles; legal uncertainty regarding port access has become the norm	Restrictions on Black Sea navigation and damage to merchant ships conflict with freedom of navigation under UNCLOS	Grain export restrictions are directly linked to the WTO (General Agreement on Tariffs and Trade: GATT) and food security issues	Ibid. (including exports of industrial goods and resources)	Issues related to the law of the sea are relatively minor; the focus is on intra-EU customs clearance and regulatory laws	Ibid.
Level of EU Coordination	Significant increase	Indirect	Indirect	Indirect	High	High
Shift to inland and border ports	Temporary increase	—	—	—	2021–2023: Rapid Increase	Surge in 2021–2023
Geopolitical Implications	Ports are shifting from “economic facilities” to “leverage in diplomatic and security negotiations”	Ports where national exports grind to a halt if they become inoperable	Ports directly linked to global food security	Ports that determine whether foreign currency is generated	An escape route to the EU in the event of a Black Sea blockade	The Last Remaining Emergency Exit

Source: Compiled by the JICA research team based on various materials and reports from the GMK Center, UN, Council of the EU, Reuters, EC, WB, IMF, IMO, FAO, PIANC, WTO, UNCLOS, and others

5.9.2 Other External Factors

Moldova's accession to the EU will have the greatest impact on the country's future rail transport. As noted in Section 5.7, a new Railway Business Law came into effect in February 2024. In May 2025, the Moldovan government announced the "2025–2029 National Program for the Accession of the Republic of Moldova to the European Union (NPA)." Following the victory of pro-EU accession forces in the general election of October 2025, the NPA is expected to proceed steadily. "Chapter 14 – Transport Policy (Ch. 14)" has been established under "Cluster 4 – Green Agenda and Sustainable Connectivity" of the NPA, and this chapter sets out the policy for the transport sector's accession to the EU.

Chapter 14 identifies the enactment of a new Railway Business Law as the first step toward EU accession for the railway sector. In addition to the government ownership of infrastructure, the entry of private companies (liberalization of fare setting), and the establishment of a Railway Commission—as mentioned in Section 5.7—the new Railway Business Act also provides for the establishment of a Railway Agency; multi-year contracts for railway facility repair work (previously limited to single-year contracts); the establishment of standard models for transport contracts (presumably referring to terms and conditions of carriage and individual contracts with customers); and government certification of locomotive engineers (previously handled through internal training by CFM). Furthermore, the Act stipulates that technical and operational standards must align with EU standards and that the government shall manage and supervise railway transport safety and operations.

Although the division of CFM into infrastructure and transport companies was announced in February 2026, this is merely the first step. Plans are in place to develop a framework for private-sector entry into rail transport and to facilitate such entry, resulting in the arrival of multiple rail operators in Moldova—similar to other EU countries—including not only train operators but also companies specializing in specific rail transport services such as station operations, rolling stock leasing, and rolling stock maintenance. The transport company spun off from CFM will have to compete not only with trucking companies but also with new private operators entering the market. In Romania, which is already an EU member, CFR Marfă—the freight division of CFR—has been unable to compete with new private entrants. Due to mounting losses, private sector management was introduced to restructure the company.

However, considering Moldova's rail transport sector, the entry of private companies focused on cost and service is expected to enhance rail competitiveness, leading to increasing freight volumes. Furthermore, with private companies owning rolling stock, stations, and maintenance depots, the facilities necessary for rail transport will be maintained and expanded without relying on government funds. On the other hand, CFM's infrastructure company will need to complete infrastructure improvements to comply with EU standards and meet government equipment and safety management standards. It will also face demands for infrastructure upgrades and improvements from private companies entering the rail business. The maintenance and improvement of infrastructure that is both outdated and built to Russian standards requires high costs and technical expertise. Major challenges include securing funding for railway infrastructure maintenance and improvement and discovering how CFM's infrastructure companies—which have downsized and face an aging workforce—will secure the necessary technical personnel.

Chapter 6 Customs in Moldova and the neighboring Countries: Ukraine and Romania

6.1 Locations of Major Customs Offices

6.1.1 Locations of Moldovan Customs Offices

The Moldovan Customs Service has a three-tier hierarchical structure consisting of a central headquarters responsible for national-level coordination, three regional customs offices overseeing broad areas, and customs posts handling on-site clearance operations. Following organizational restructuring in 2017, the number of customs offices was consolidated and optimized from seven to three regional offices covering the north, central, and southern regions.

The locations and functions of the main customs offices are below.

(1) Central Customs

The headquarters of the Moldovan Customs Service is located in Chișinău, where it coordinates customs activities, conducts oversight, and drafts regulatory proposals on a national level.

(2) Regional Customs Offices

Regional offices are responsible for ensuring compliance with customs regulations within their respective jurisdictions.

- Central Customs Office: Jurisdiction over Chișinău and the surrounding area
- Northern Customs Office: Jurisdiction over northern Moldova (including Bălți)
- Southern Customs Office: Jurisdiction over southern Moldova (including Cahul)

(3) Major Customs Offices

These are designated for modes of transport, such as road, rail, air, and water (rivers). The major border customs offices are as follows.

Table 6-1 Major Border Customs Offices in Moldova and Their Roles

Customs Office Name	Main Roles and Characteristics
Romanian Border	
Leuşeni	It is one of the main border customs offices under the Central Regional Customs Office and serves as the counterpart(C/P) to the Albița office on the Romanian side.
Sculeni	A major hub where facility modernization has progressed in recent years.
Ungheni	An important hub for rail transport.
Giurgiulesti	Located at Moldova's only international port (on the Danube River), it is linked to Galati in Romania and Reni in Ukraine.
Ukrainian border	
Criva	A northern road and rail customs post jointly managed with Mamaliha on the Ukrainian side.
Otaci	A road customs post located in northern Moldova.
Palanka	A major border customs post jointly managed with Ukraine.
Basarabeasca	A major hub for freight transport, featuring a railway inspection point jointly managed with Ukraine.

Source: JICA Survey Team

In addition, there are customs offices in the interior, located in major cities such as Chișinău, Bălți, and Cahul.

6.1.2 Location of Ukrainian Customs

The headquarters of the Ukrainian Customs Service is in Kyiv, and regional customs offices overseeing specific administrative areas (such as provinces) are under its supervision. The system consists of a three-tier structure comprising the central headquarters, regional customs offices (main customs offices) overseeing specific regions, and customs posts (such as border customs offices) that carry out on-site operations as subordinate units of the regional customs offices.

(1) Central Customs

The Central Customs Office is located in Kyiv and is responsible for implementing customs policies and ensuring compliance with laws and regulations. It also operates and maintains electronic customs clearance systems such as the Automated System for Customs Data (ASYCUDA) World and the New Computerized Transit System (NCTS), which the EU shares.

(2) Regional Customs Offices

There are 16 regional customs offices in Ukraine. The main customs offices and their primary roles are in Table 6-2.

Table 6-2 Major Customs Offices and Their Roles

Customs Office Name	Base City	Main Roles and Characteristics
Kyiv Customs	Kyiv	Responsible for customs clearance in the capital region. It serves as a hub for major economic activities and handles air cargo via Boryspil International Airport and other facilities.
Energy Authority	Kyiv	A specialized customs office with specific functions. It specializes in customs clearance for the import, export, and transit of natural gas and oil via pipelines, as well as electricity via power lines.
Coordination and Monitoring Office	Kyiv	Central support functions. Responsible for operating help desks for systems such as the NCTS, monitoring customs operations nationwide, and standardizing procedures.
Odesa Customs	Odesa	Oversees Ukraine's largest seaport. Plays a central role in maritime trade, container transport, and imports and exports via the Black Sea.
Transcarpathian Customs	Uzhhorod	The western gateway that borders Poland, Slovakia, Hungary, and Romania. Manages major land and rail checkpoints, like Uzhhorod and Chop.
Volyn Customs	Rymachi Village	Oversees the Yahodyn checkpoint on the Polish border and other facilities and is one of the most important hubs for land-based logistics with the EU.
Galicia Customs	Lviv	Oversees the Rava-Ruska checkpoint on the Polish border, among others. Supports the inflow of goods from Western Europe.
Bukovina Customs	Chernivtsi	Oversees the borders with Romania and Moldova. A key hub in the southwest where modernization efforts, such as at the Porubne checkpoint, are underway.
Dnipro Customs	Dnipro	A hub supporting customs clearance in the industrial region of central-eastern Ukraine.
Slobozhanskyi Customs	Kharkiv	Oversees Kharkiv Oblast, an industrial and economic hub in the northeast.
Northern Customs	Chernihiv	Responsible for customs operations in the northern border region.
Podolsk Customs	Vinnytsia	Responsible for customs clearance of agricultural and industrial products in the central region.
Polesye Customs	Rivne	Responsible for logistics and customs clearance in the northwestern region.

Source: JICA Survey Team

The Romanian Customs Authority is a subordinate agency of the Ministry of Public Finance. It has a three-tier hierarchical structure consisting of the Central Customs Office, regional customs offices with broad jurisdictions, and individual customs offices under them.

(3) Central Customs

The Central Customs Authority is in Bucharest and is responsible for managing customs operations throughout Romania, promoting digitization, implementing risk management, and coordinating the development of legislation in accordance with EU standards.

(4) Regional Customs Offices and Major Customs Offices

Regional Customs Offices are established in seven major regions across the country (Bucharest, Galati, Iași, Timisoara, Cluj, Brașov, and Craiova) and oversee the customs offices within their jurisdictions under the authority of the headquarters.

Customs offices are located at borders and inland and carry out actual customs clearance procedures and inspections under the supervision of regional customs offices.

A list of major regional customs offices and customs posts is available at Table 6-3.

Table 6-3 Major Border and Regional Customs Offices in Romania and Their Roles

Customs Office Name	Main Roles and Characteristics
Bucharest Regional Customs Office	It has jurisdiction over the capital region, supports headquarters functions, and manages customs clearance at major inland logistics hubs.
Constanta Sud Border Customs	Located at Romania's largest port hub, it serves as the core facility for cargo inspection in maritime trade.
Galati Regional Customs Office / Galati Border Customs	At the Galati-Giurgiulesti border-crossing with Moldova, the bureau implements joint border management with the Moldovan side. It reduces waiting times and stimulates logistics.
Iași Regional Customs Office / Sculeni Border Customs	Manages a key land border crossing with Moldova. The introduction of joint border management is underway.
Isaccea Border Customs	Located near the border with Ukraine, this office enhances border security. It also facilitates rapid customs clearance through measures such as the introduction of state-of-the-art X-ray inspection equipment.
Timisoara Regional Customs Office	Serves as the gateway to western Romania, overseeing trade and logistics with the neighboring countries such as Serbia.

Source: JICA Survey Team

6.2 Legal Systems and Regulations Concerning Customs and Clearance in Moldova and the neighboring Countries

6.2.1 Legal System, Regulations, and Operational Practices Regarding Customs and Clearance in Moldova

Moldova's legal framework and regulations regarding customs and clearance are currently harmonizing with EU standards. It is based on the AA and the Deep and Comprehensive Free Trade Area (DCFTA), which aim for integration with the EU. The status of the main legal framework, systems, and procedures is below.

The legal framework underpinning Moldova's customs administration is the new Customs Code (Codul Vamal al Republicii Moldova nr. 95/2021), which came into effect on January 1, 2024. This new law closely aligns with the EU Customs Code (Regulation No 952/2013) and represents a significant step toward bringing Moldova's legal system into line with EU standards. The new law is based on the principles of digitization, automation, and paperless processing for all customs procedures.

(1) Tax Rates and Methods of Assessment

The following taxes exist for imported goods based on the transaction price, i.e., the price actually paid.

- Customs duties: Levied on imported goods based on Moldova's tariff schedule.
- Value Added Tax (VAT): Levied on the amount obtained by adding customs duties and other charges to the customs value of imported goods. The standard rate is 20%, but reduced rates apply to certain items.
- Excise Tax: Imposed on specific items such as alcohol, tobacco, fuel, and luxury vehicles.

- Customs clearance fees: These fees must be paid to customs as a processing fee for customs procedures. (These are not taxes.)

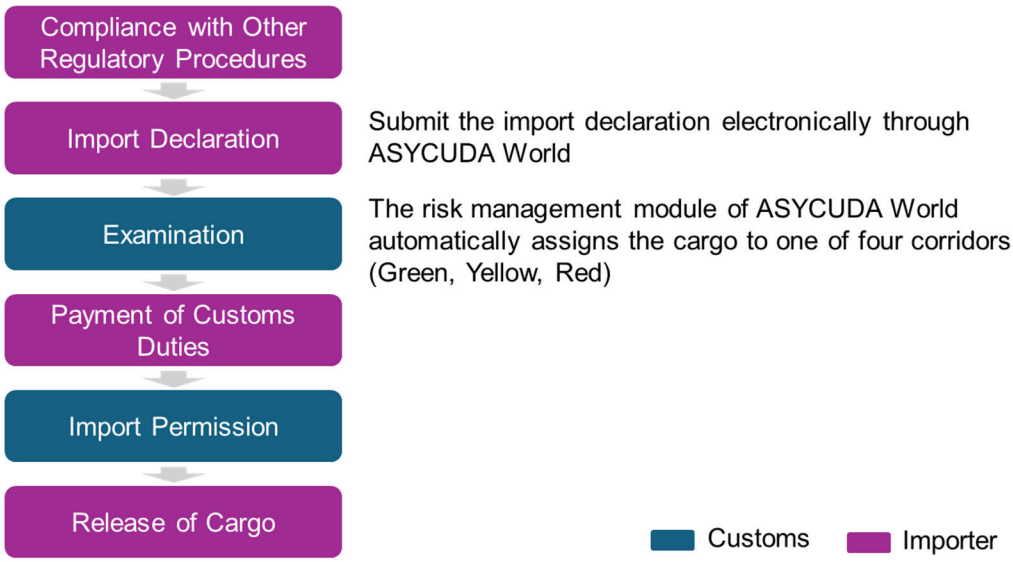
(2) Import and Export Restrictions

The following are the main import and export restrictions in Moldova.

- Security and Strategic Goods: Special permits are required for the import and export of weapons, ammunition, explosives, toxic substances, radioactive materials, and other items that might be useful in terrorist acts.
- Narcotics and Precursors: The import and export of narcotics and their precursors are prohibited.
- Waste: The import of hazardous waste that negatively impact the environment is restricted.
- Agricultural Products and Foodstuffs: Permission from the National Agency for Food Safety (Agenția Națională pentru Siguranța Alimentelor: ANSA) is required.
- Plants: A phytosanitary certificate is required for the import and export of plants and plant-derived products.

(3) Customs Clearance Procedure Flow

The import customs clearance procedure flow is shown in Figure 6-1.



Source: JICA Survey Team

Figure 6-1 Moldova Import Customs Clearance Procedure Flow

Moldova will officially accede to the CTC and begin operating the NCTS on November 1, 2025. As of September 30, 2025, when interviews were conducted with Moldovan customs authorities, operations had not yet commenced. Since the NCTS is a separate system from the ASYCUDA World customs clearance system, there is no interoperability between them; however, efforts are underway to ensure compliance with EU standards.

Currently, even for transit cargo, strict document inspections are conducted at the border, and there have been reports of container seals being opened and resealed. Additionally, customs authorities have set strict time limits for transit; there have been reports of cases where even legitimate breaks exceed the limit, resulting in fines. It is expected that the introduction of NCTS will resolve these bottlenecks hindering trade facilitation.

(4) Number and Types of Documents Required for Submission to Customs

The number and types of documents required for submission to Moldovan customs vary depending on the mode of transport, the type of goods, and the applicable customs procedures (import, export, transit, etc.). Examples of the types of documents required for import declarations are in Table 6-4.

Table 6-4 Documents Required for Import Declarations to Moldovan Customs

	Documents to be Submitted	Document Details
Documents Required for Import Declaration to Customs	Customs Documents	Submit the Single Administrative Document (SAD)[36] electronically via ASYCUDA World
	Transportation Documents	Truck Cargo: Convention relative au contrat de transport international de marchandises par route (CMR)[37], Transports Internationaux Routiers (TIR) Carnet[38] Rail freight: Railway Bill (Railway Bill/CIM)/SMGS consignment note Marine cargo: Bill of Lading (B/L) Air Freight: Air Waybill (AWB)
	Commercial documents	Invoices, packing lists, price lists, bank documents, etc.
	Contract Documents	Sales contracts, agency agreements, lease agreements, etc.
	Restrictions and Regulations-Related Documents	Import/export permits, licenses, quarantine certificates, etc.
	Certificate of Origin	Certificate of Origin

Source: JICA Survey Team

Furthermore, when companies in Transnistria export goods, de facto “double customs clearance” is required. That is, before undergoing internationally recognized Moldovan customs procedures, they must also complete procedures with the Transnistrian Republic’s own customs authorities.

[36] The primary form used for customs declarations of goods. It provides detailed information regarding the type, value, origin, and destination of the goods.

[37] An international consignment note issued under the Convention on the Contract for the International Carriage of Goods by Road, serving as the standard transport document for cross-border trucking.

[38] An international customs certificate that significantly simplifies customs duty payments and customs inspections in each country when transporting goods across borders (primarily via truck transport). It is commonly used for land transport within Europe.

6.2.2 Legal Framework, Regulations, and Operational Practices Regarding Customs and Clearance in Ukraine

Ukrainian customs is proceeding with harmonization with the UCC under EU law, and many special measures have been introduced, particularly for wartime situations (such as tax exemptions for humanitarian aid and defense-related goods).

Ukraine's legal framework for customs and clearance is based on the Customs Code of Ukraine (CCU), with a strong focus on harmonization with EU standards and international treaties (such as WCO recommendations). The CCU stipulates the basic principles of customs operations, the legal status of customs authorities, the customs territory, customs clearance procedures, the imposition of duties, and penalties for violations.

(1) Tax Rates and Methods of Assessment

The following taxes exist for imported goods (and certain exported goods) based on the transaction price, i.e., the price actually paid.

Types of Duties

- Import duties: Levied on imported goods based on Ukraine's tariff schedule.
- Export duties: Applied to the export of specific Ukrainian goods as defined by law.
- Seasonal duties: May be applied for a period of 60 to 120 days.
- Special duties: Anti-dumping duties, countervailing duties, safeguard duties, and additional import duties may be applied depending on the situation.

Taxes other than customs duties

- VAT: Imposed on imported goods. The standard rate is 20%, but 7% applies to certain items such as pharmaceuticals.
- Excise Tax: Imposed on specific items such as alcohol, tobacco, fuel, vehicles, and electricity.

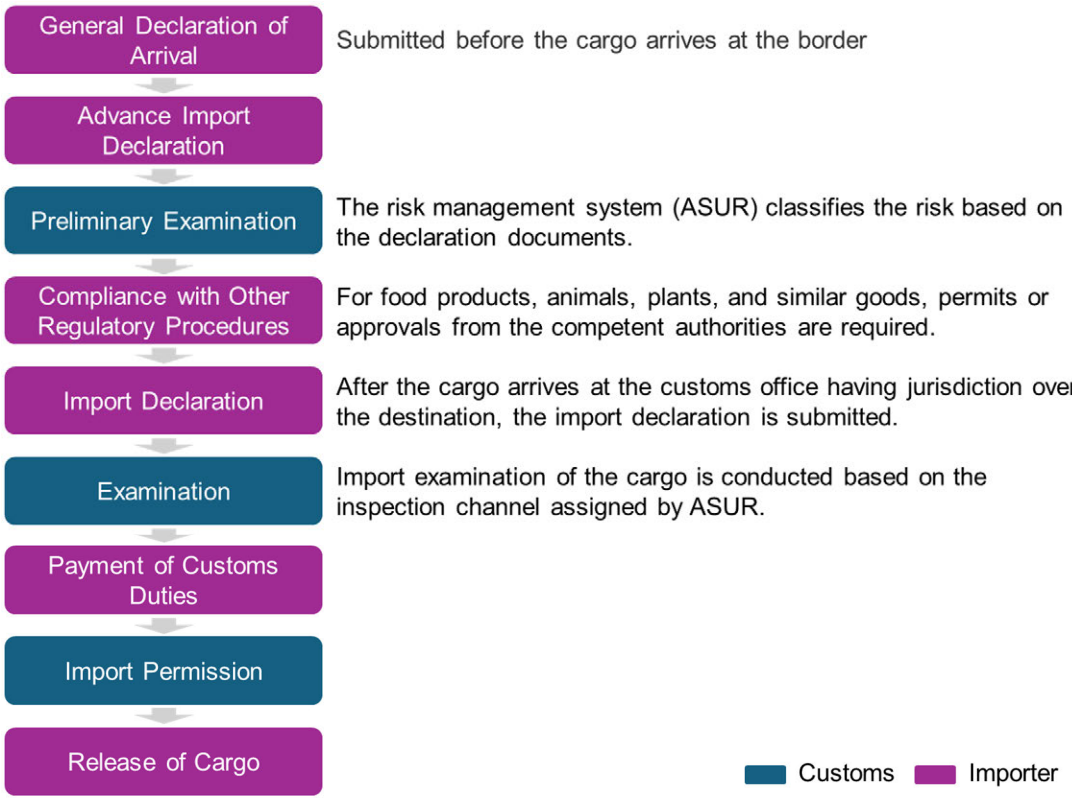
(2) Import and Export Restrictions

The import and export of certain goods require authorization from the State Service for Export Control of Ukraine (SSECU) or other agencies.

- Military Goods and Dual-Use Items: Import and export require authorization from the SSECU, among other requirements.
- Prohibited Items: The import and export of narcotics, psychotropic substances, weapons (without a license), hazardous waste, and goods infringing on intellectual property rights are prohibited or restricted.
- Items subject to sanctions against Russia: Goods originating in Russia or imported from that country are prohibited or restricted.
- Food, animals, plants, etc.: Permission or approval from the relevant government agency is required.

(3) Customs Clearance Procedure Flow

The import customs clearance procedure flow is Figure 6-2. The process is similar to EU standards, such as the requirement to submit cargo information to customs before the cargo arrives at the border.



Source: JICA Survey Team

Figure 6-2 Ukraine Import Customs Clearance Procedure Flow

In preparation for EU accession, Ukraine operates the NCTS based on the CTC to which it is a signatory. Procedures conducted through the NCTS are fully digitized.

(4) Preferential Measures

Under special wartime laws and various agreements, Ukraine applies numerous preferential measures to import and export customs clearance.

- Humanitarian Aid: Goods recognized as humanitarian aid are exempt from import duties and VAT. Simplified customs procedures apply, enabling rapid clearance.
- Defense-related goods: Military helmets, bulletproof vests, UAVs (drones), night vision devices, and thermal imaging devices are exempt from customs duties and VAT during wartime.
- IPs: As of 2025, 114 IPs are registered, and various preferential measures, such as customs duty exemptions, are in place.

(5) Number and Types of Documents Required for Customs

The number and types of documents required for submission to Ukrainian customs vary depending on the mode of transport, the type of goods, and the applicable customs procedures (import, export, transit, etc.). Table 6-5 provides examples of the types of documents required for import declarations.

Table 6-5 Documents Required for Import Declarations to Ukrainian Customs

	Logistics Category	Documents to be submitted	Document Details
Documents required for border crossing	Truck Cargo	Vehicle Documents	Registration Certificate, Nationality, etc.
		Transport Documents (CMR)	Shipper, Consignee, Weight, Number of Packages, CMR Number
		Commercial Documents	Carrier, country of origin, country of destination, names and addresses of shipper and consignee, quantity of cargo and type of packaging, description of goods, gross weight (kg) or volume (m^3)
	Marine and River Freight	General Declaration Form	Basic information about the vessel itself, such as the vessel name, registration details, flag state, captain's name, and agent's address
		Cargo Declaration	Port of departure, ports of call, port of discharge, list of bills of lading (B/L), number of cargo items, type of packaging, and description of goods
		B/L	Shipper, consignee, number of cargo items, weight, type of packaging, dangerous goods markings, etc.
		Commercial documents	Invoice, packing list, etc.
	Air cargo	General Declaration	Aircraft nationality code, registration number, flight number, route, number of crew members, etc.
		AWB	Shipper, consignee, number of packages, weight, type of packaging, dangerous goods markings, etc.
		Commercial Documents	Invoice, packing list, etc.
Documents required for import declaration to customs	All cargo	Customs documents	Import declaration, Authorized Economic Operator (AEO) certificate, etc.
		Transportation documents	CMR, B/L, AWB
		Commercial documents	Invoices, packing lists, price lists, bank documents, etc.
		Contract documents	Sales contracts, agency agreements, lease agreements, etc.
		Documents related to restrictions and regulations	Import/export permits, licenses, quarantine certificates, etc.
		Certificate of Origin	Certificate of Origin
		Documents related to tax exemptions and preferential treatment	Humanitarian Aid Decision, Investment Agreement, etc.

Source: JICA Survey Team

6.2.3 Legal Framework, Regulations, and Operational Practices Regarding Customs and Clearance in Romania

Romania's customs legal system is based on the common EU regulations as an EU member state, supplemented by domestic laws. The status of the major legal frameworks, systems, and procedures is below.

(1) Legal System

Romania joined the EU in 2007, and its customs legislation complies with the EU's Common Customs Code (UCC) and related regulations. The Common Customs Tariff (CCT) of the EU applies to goods imported from outside the EU.

(2) Tariff Rates and Methods of Taxation

Imported goods are classified based on the Integrated Tariff of the European Union (TARIC) and the Combined Nomenclature (CN) codes, and customs duties are calculated based on the transaction value.

- Customs Duties: Levied on imported goods based on TARIC.
- VAT: Levied on the amount obtained by adding customs duties and other charges to the customs value of imported goods. The current standard rate is 21%. A reduced rate of 9% applies to food and clothing, while a rate of 5% applies to books and similar items.
- Excise Tax: Imposed on specific items such as alcohol, tobacco, fuel, and electricity.
- Anti-dumping duties: If imports from a specific country are harming EU industries, anti-dumping duties or countervailing duties may be imposed in addition to standard customs duties.
- Fees: While generally included in customs duties, fees may apply for specific customs procedures or the use of temporary storage facilities.

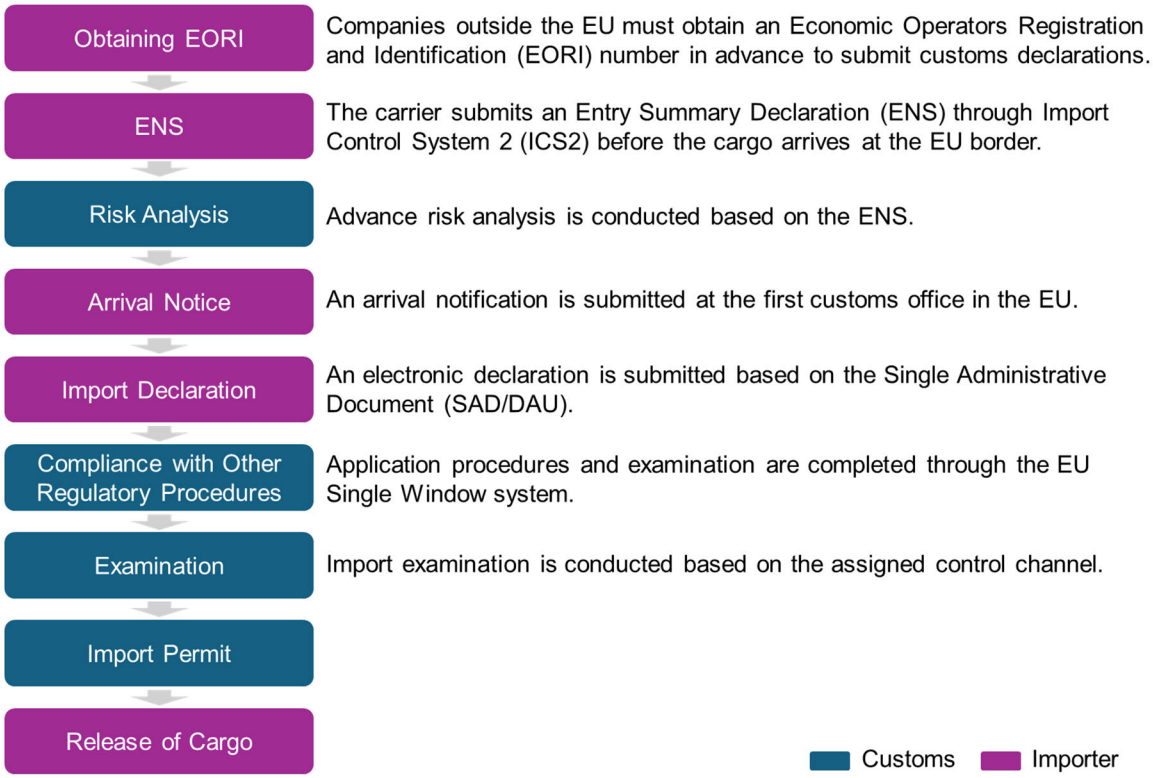
(3) Import and Export Restrictions

Romania's import and export restrictions generally comply with common EU regulations, but specific items may require separate permits or approvals under Romanian domestic law. Obtaining a permit or approval is mandatory for the trade of the following items:

- Items with potential military applications (dual-use items): Items that could be tools in the development or manufacture of nuclear, chemical, or biological weapons
- Military supplies and weapons: Weapons, ammunition, and related equipment
- Hazardous chemicals and waste: Hazardous chemicals, ozone-depleting substances, waste, etc.
- Cultural property: National heritage items of historical or artistic value, etc.
- Agricultural, Forestry, and Fishery Products: A license is required for the import and export of certain agricultural products (meat, grains, milk, vegetables and fruits, sugar, etc.)
- Timber (logs): Export of logs to countries outside the EU is prohibited for a period of 10 years starting in 2021
- Other: Radioactive materials, narcotics and psychotropic substances, endangered species (Convention on International Trade in Endangered Species of Wild Fauna and Flora: CITES), rough diamonds, etc.

(4) Customs Clearance Procedure Flow

Figure 6-3 shows the import procedure flow.



Source: JICA Survey Team

Figure 6-3 Import Procedure Flow for Cargo into Romania

If cargo is not cleared through customs in Romania but remains transported to another EU member state or destination, NCTS transit procedures are activated. In this case, a Movement Reference Number (MRN) is issued, and payment of customs duties is deferred until the cargo arrives at the customs office in its destination.

(5) Number and Types of Documents Required for Customs

The number and types of documents required for submission to Romanian Customs vary depending on the mode of transport, the type of goods, and the applicable customs procedure (import, export, transit, etc.). Examples of the types of documents required for import declarations are in Table 6-6 .

Table 6-6 Documents Required for Import Declarations to Romanian Customs

	Documents to be submitted	Document Details
Documents required for import declaration to customs	Customs Documents	Electronic submission of the SAD Entry Summary Declaration (ENS): Advance cargo information submitted electronically when the goods arrive in the first EU member state EU Economic Operators Registration and Identification number (EORI): Although not a document, this is required for non-EU companies to file customs declarations
	Transport Documents	Truck Cargo: CMR, TIR Carnet Rail Freight: Railway Bill (Railway Bill/CIM/SMGS consignment note) Marine cargo: B/L Air freight: AWB
	Commercial Documents	Invoices, packing lists, price lists, bank documents, etc.
	Contract Documents	Sales contracts, agency agreements, lease agreements, etc.
	Documents related to restrictions and regulations	Import/export permits, various licenses, quarantine certificates, organic inspection certificates, etc.
	Certificate of Origin	Certificate of Origin

Source: JICA Survey Team

(6) Digitalization and Customs Systems

As an EU member state, Romanian Customs is promoting the digitization, streamlining, and enhanced security of customs procedures in line with EU standards and operates the e-Customs electronic customs clearance system. It utilizes the EU-wide Automated Import System (AIS), AES, NCTS, and Import Control System (ICS)2 via its domestic portal, e-Customs. Details of the various customs-related systems are in Table 6-7. Romanian Customs also supports the Single Window system, which allows the processing of customs-related permits and authorizations through a single point of contact. Compared to Moldova and Ukraine, Romania operates a highly modernized customs system on par with that of other EU member states.

Table 6-7 List of Romanian Customs Systems

System Name	Details
ICS2	A system that collects and analyses ENS data for security and safety purposes before cargo arrives in the EU, phased for all modes of transport, including air, sea, land, and rail.
AIS	A system for electronically processing import and entry procedures.
AES	A system for the electronic processing of export and departure procedures.
NCTS	A system that electronically manages and monitors cargo transit procedures throughout the EU and among member states of the CTC. The transition to Phase 6 (NCTS-P6) is currently underway.
EU Single Window Certificate Exchange System (Customs Single Window - Certificates Exchange System: CSW-CERTEX)	An interface that links customs systems with systems responsible for non-tariff requirements, such as sanitary and phytosanitary controls (e.g., Trade Control and Expert System New Technology (TRACES NT)).
EORI	A system that manages the Unique Economic Operators Registration and Identification number (EORI) used to identify all economic operators engaged in customs activities within the EU.

Source: JICA Survey Team

(7) Authorized Economic Operator (AEO) System

Romanian Customs has introduced the Authorized Economic Operator (AEO) system, which is valid within the EU and follows EU standards. There are two types of AEO status. To be certified as an AEO, applicants undergo a rigorous review of various criteria, including compliance with customs regulations over the past three years and the existence of a management system that enables appropriate oversight and audits by customs authorities. Obtaining AEO status reduces the frequency of physical inspections and document reviews, allows businesses to undergo inspections at locations of their choosing, and grants similar preferential treatment in third countries with which the EU has mutual recognition agreements (such as Japan, the United States, and the United Kingdom). The main types of AEO are as follows.

- It becomes easier to obtain approval for customs simplifications (AEOC) (such as simplified declarations).
- Security and Safety (AEOS): Data requirements for security declarations (ENS / Exit Summary Declaration: EXS) submitted before cargo arrival or departure may be reduced. If the cargo is selected for inspection, the operator can receive notification before its arrival.
- Authorized Economic Operator - Full (AEOF): Meets the criteria for both AEOC and AEOS and can enjoy the benefits of both.

(8) Risk Management and Assessment Criteria

Romanian Customs' risk management and audit criteria operate within the Customs Risk Management Framework (CRMF), a common EU framework. It consists of the Common Risk Criteria (CRC), which apply across the entire EU, and Priority Control Areas (PCAs), which apply to specific periods or goods. Within the EU, risk information is shared in real time among member states through the Customs Risk Management System (CRMS). For example, risks newly identified by Romanian Customs are immediately shared with customs authorities in other member states and reflected in their inspection criteria.

In addition to EU standards, Romanian Customs has established its own inspection criteria based on its own intelligence and policies. As shown in Table 6-8, Romanian Customs conducts risk analysis in three stages.

Table 6-8 Romanian Customs Risk Analysis

Status	Target Information	Analysis Details	Remarks
Pre-arrival	ENS	A risk analysis is conducted based on the ENS data submitted before the cargo arrives in the first EU member state.	If the shipment is deemed high-risk, instructions, such as requests for additional information, screening, or loading prohibition, will be issued.
At Customs Clearance	Single Administrative Document (SAD)	A risk analysis is conducted regarding tariff classification, country of origin, value, and prohibited or restricted items (such as drugs, counterfeit goods, and endangered species).	If the risk is deemed high, a physical inspection is necessary.
After customs clearance	General Customs Clearance Information	Post-import follow-up investigations (audits) verify compliance by reviewing commercial records and accounting systems.	

Source: JICA Survey Team

Furthermore, AEOs pose a low risk, are assigned a low-risk score, and experience reduced physical inspections and document reviews.

6.3 Customs in Moldova and Ukraine

6.3.1 Overview of Moldova's Customs

(1) Supervising Authority and Scope of Operations of Moldovan Customs

The Customs Service of the Republic of Moldova is a subordinate agency of the Ministry of Finance of the Republic of Moldova. The main operations of the Moldovan Customs Service have three broad categories: customs clearance, enforcement (law enforcement), and trade facilitation.

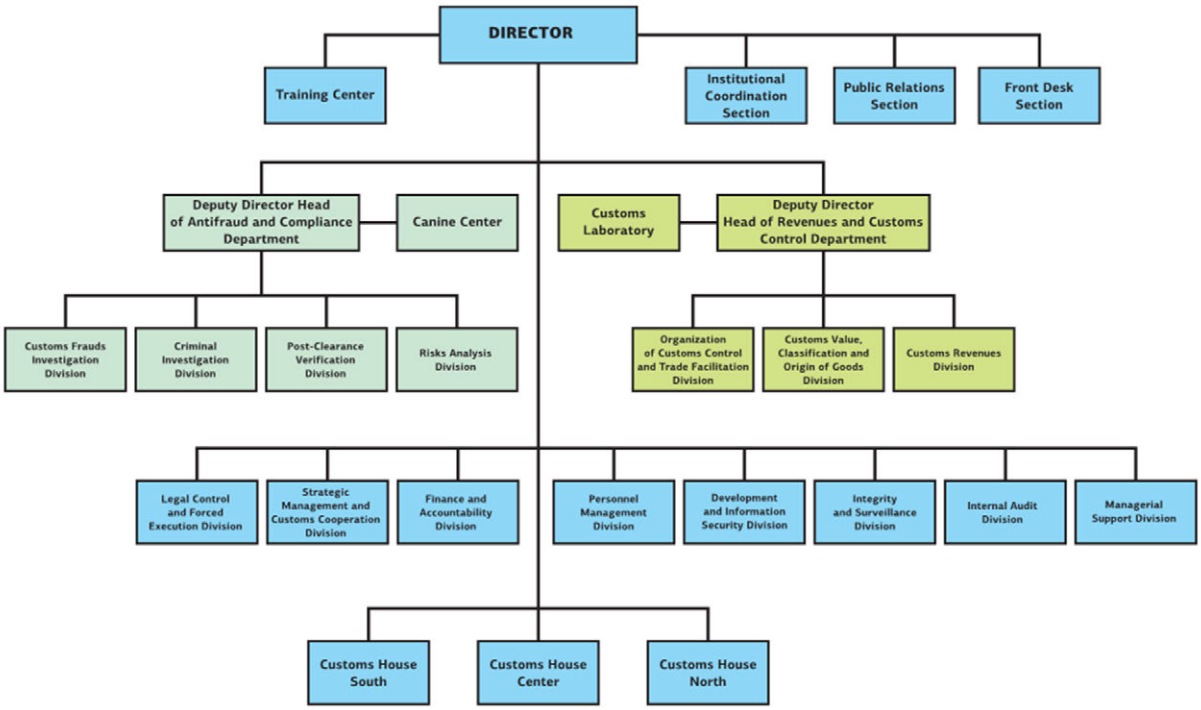
Customs clearance operations include the acceptance of customs documents, the implementation of customs procedures, the conduct of customs inspections, and the collection of customs duties and related taxes (such as VAT) for goods transported by road, rail, sea, and air, as well as postal items.

Law enforcement operations involve detecting and seizing at the border goods whose import is prohibited or restricted, such as illicit drugs, weapons, and goods infringing on intellectual property rights.

In the area of trade facilitation, the agency works to facilitate international trade and streamline procedures through the operation of the ASYCUDA World customs system, the promotion of digital customs procedures via the introduction of the NCTS (New Computerized Transit System) in accordance with the Common Transit Procedure, and the operation of the AEO system.

(2) Organizational Structure of the Moldovan Customs Service

The organizational chart of the Moldovan Customs Service is in Figure 6-4. The head of the Customs Service is the Director General (one person), assisted by one or more Deputy Director Generals. The government determines the number of Deputy Directors General based on a proposal from the Minister of Finance. As mentioned in "6.1.1," three regional customs offices—Central, Southern, and Northern—have been established under the supervision of the headquarters. As subordinate units of the regional customs offices, customs posts are established at BCPs, railway stations, airports, ports, and other locations. In addition, specialized agencies such as the Customs Research Institute, the Customs Training Institute, and the Narcotics Detection Dog Center now exist.



Source: Moldovan Customs

Figure 6-4 Organizational Chart of the Moldovan Customs Service

(3) Membership in the EU and International Treaties

To strengthen cooperation with EU member states and aim for the simplification and harmonization of customs procedures, the Moldovan Customs Service has acceded to the CTC, which regulates the simplification of trade procedures and the harmonization of customs procedures, and the Convention on the Simplification of Procedures in the Trade in Goods (commonly known as the SAD Convention).

On November 1, 2025, Moldova officially acceded to the Convention on a Common Transit Procedure and implemented the NCTS, enabling real-time data exchange with EU member states and common transit countries and allowing transit cargo to clear customs with a single electronic transit declaration. On the same day, Moldova also acceded to the Convention on the Simplification of Procedures in the Trade in Goods, and the Single Administrative Document (SAD) was introduced for imports, exports, and transit. Furthermore, by concluding the CTC and utilizing the NCTS, the country aims to simplify and harmonize transit customs procedures among the contracting parties. One of the benefits for the Moldovan Customs Service is the real-time data exchange among the customs authorities of the 37 contracting parties. At the same time, in the business environment, faster customs clearance and reduced costs associated with transit procedures are expected.

Regarding the TRS, as previously explained, preparations were underway with the goal of completion by January 2026; however, during a hearing on September 30, 2025, the project was confirmed incomplete. Although the TRS initially had support from USAID, which was later terminated. Currently, efforts are underway to identify a supporting organization to assist in the resumption and completion of the TRS.

(4) Digitization and Customs Systems

Moldovan Customs aims to digitize customs clearance procedures. Currently, ASYCUDA World, developed by the United Nations Conference on Trade and Development (UNCTAD), is used for processing customs declarations. This system electronically manages customs declarations, customs duty collection, and bonded operations. The system itself was introduced in 2005 and is becoming outdated. Maintenance costs are high, and while Customs is considering a replacement, budget constraints remain a challenge. Regarding certificates of origin, with support from the EBRD, efforts are underway to introduce an electronic issuance system for preferential certificates of origin and to digitize procedures for the ATA Carnet[39] used for the temporary admission of goods.

As mentioned earlier, the Moldovan Customs Service joined the CTC in November 2025 and officially launched the NCTS. With the introduction of the NCTS, transit cargo can now be transported from the point of departure to the destination using a single electronic declaration, reducing processing time and costs at the border. Additionally, real-time data exchange with EU member states is now possible, strengthening risk management.

Regarding the Single Window system, while the necessary legal framework is in place, implementation requires funding and specialized IT development; it is currently in the planning, design, and partial implementation stages. The Single Window system refers to the centralization of administrative procedures related to the import and export of goods and the entry and departure of vessels. Specifically, by interconnecting and coordinating the systems of relevant ministries and agencies, Single Window enables import/export and port-related procedures to be carried out with relevant administrative bodies through a single data entry and transmission.

Since NCTS and ASYCUDA World are not interoperable and functioning as separate systems, and the Single Window system is non-operational, Moldova lags Ukraine and Romania in the digitization of customs procedures and the introduction of trade facilitation measures.

(5) Authorized Economic Operator (AEO) System

Moldovan Customs has implemented the AEO system and achieved mutual recognition with the EU. Mutual recognition of AEOs between Moldova and the EU has been in effect since November 1, 2022. As a result, Moldovan AEO operators can receive preferential treatment at EU borders (such as dedicated lanes and exemption from physical inspections). Operators with AEO status benefit from simplified customs procedures, reduced waiting times at the border, and fewer physical and document inspections. As of 2024, there are 147 valid AEO certifications.

[39] The ATA Carnet is a customs document issued under an international system based on the "Convention on the ATA Carnet for the Temporary Admission of Goods" (ATA Convention), which has been concluded among major countries worldwide.

(6) Risk Management and Audit Criteria

Moldovan Customs uses a risk management system integrated with ASYCUDA World to assign cargo with the following inspection criteria based on risk level.

- Imports: Green (no inspection) 80%, Yellow (document inspection) 16%, Red (physical inspection) 4%.
- Exports: Green 96.5%, Yellow 0.8%, Red 2.6%

Source: Interview with Moldovan Customs (September 30, 2025)

(7) Border Control and Cooperation

Joint Control is in place at the borders with Ukraine and Romania. At the border with Romania (Leușeni-Albița, Giurgiulesti-Galati, etc.), Coordinated Control is implemented based on the "One-Stop" principle, whereby inspections are conducted only on the entry side (the Romanian side). Furthermore, at seven checkpoints along the border with Ukraine (including Palanca and Criva), protocols regarding joint control have been signed.

Railway operators in Moldova, Ukraine, and Romania agreed in 2023 to allow rail transport to pass through the Reni border crossing in Ukraine (near Giurgiulesti, Moldova) without stopping.

6.3.2 Overview of Ukrainian Customs

(1) Supervising Authority and Scope of Operations of the State Customs Service of Ukraine

The State Customs Service of Ukraine is a subordinate agency of the Ministry of Finance of Ukraine. The activities of the State Customs Service of Ukraine are directed and coordinated by the Cabinet of Ministers of Ukraine through the Minister of Finance. Based on the Customs Code and related laws and regulations, the State Customs Service of Ukraine carries out a wide range of duties, including customs clearance procedures, customs duty collection, enforcement, trade facilitation, statistics, and digitalization. Its main scope of operations is as follows.

- Customs Clearance

  The Service conducts risk analysis on imported and exported goods using a risk management system to carry out customs clearance procedures. The analysis also ensures proper application of and compliance with customs-related laws and regulations.

- Customs Duty Collection

  The agency collects customs duties, VAT, excise taxes, and other levies, contributing to the securing of stable revenue.

- Smuggling Enforcement

  The agency enforces export controls on military goods and dual-use items, and cracks down on the smuggling of illicit drugs, weapons, and goods that infringe on intellectual property rights.

- Trade Facilitation and Regulation

  The agency is working to improve border crossing procedures to facilitate trade and transit, while also enforcing regulations on prohibited and restricted items and overseeing the licensing and supervision of customs brokers, bonded warehouses, and AEO operators.

- Statistics and IT Infrastructure

  In addition to compiling trade statistics and exchanging data with foreign customs authorities, the agency is responsible for developing, implementing, and operating electronic systems, including the Single Window.

(2) Implementation Structure of the Ukrainian Customs Service

As described in "6.1.2 Location of Ukrainian Customs", the Ukrainian Customs Service consists of 16 regional customs offices, each overseeing specific administrative regions (such as provinces) under the supervision of the central headquarters. Customs posts exist at BCPs, railway stations, airports, ports, and other locations as subordinate units of regional customs offices. Additionally, specialized agencies such as the Customs Research Institute, the Narcotics Detection Dog Center, and the Customs University have been established.

(3) Accession to the EU and International Treaties

Ukraine is advancing legal reforms and digitalization in preparation for EU accession and, like the Moldovan Customs Service, has acceded to two international conventions (the CTC and the SAD Convention).

Ukraine's accession to the CTC on August 30, 2022, marked a major milestone in its efforts to align with EU standards. Following its accession to the convention, Ukrainian Customs has implemented the NCTS. NCTS Phase 5 has been operational since December 2023, and preparations are underway to transition to NCTS Phase 6 by June 2026. The NCTS is reportedly in use nationwide, including at border crossings. When cargo and the Transit Accompanying Document (TSD) are presented at a border customs office, the border crossing is registered immediately in the NCTS. The TSD is a document (electronic data under the NCTS) that must be always carried while transporting cargo. It records any "incidents" or "transshipments" that occur during transport.

Furthermore, Ukraine is implementing customs reforms in line with its obligations under the AA with the EU. The Ukrainian Customs Service's long-term national strategic plan is formulated based on the EU's MASP-C, and the development and implementation of IT systems are proceeding in accordance with EU standards.

(4) Digitalization and Customs Systems

The digitization of Ukrainian customs is proceeding with a strong focus on EU standards. Ukrainian customs operations are based on the Electronic Automated Information System (EAIS). At the core of this system is the Automated Customs Clearance System (ASMO). On ASMO, customs procedures such as the

receipt, registration, and risk analysis of Electronic Customs Declarations (EMD) are carried out. The EAIS also hosts the Electronic Transit System (ETS), which handles procedures outlined in the EU CTC. This system is designed specifically to manage transit cargo, enabling the processing of transit declarations and the exchange of electronic messages with CTC member states.

(5) Authorized Economic Operator (AEO) Scheme

The AEO system in Ukraine is designed in accordance with the standards of the EU's UCC and offers benefits such as simplified and expedited customs procedures to trustworthy operators. This system was introduced as part of Ukraine's EU integration process and is being developed to achieve mutual recognition with the EU's AEO system.

Eligible entities for AEO status include manufacturers, importers and exporters, customs brokers, carriers, freight forwarders, and warehouse operators located in Ukraine. There are two types of AEO authorization in Ukraine, and companies may obtain either one or both.

- AEO-C: Customs procedures are simplified.
- AEO-B: If a physical inspection is deemed necessary, it will be conducted on a priority basis.

Cargo managed by AEO-certified companies is low-risk, resulting in a reduced frequency of physical inspections and document reviews. In addition, these companies are eligible for preferential treatment. Security requirements might get a 50% or 30%. reduction. Exemptions from security requirements for transit procedures, as well as the ability to complete customs clearance while the cargo remains stored at their own facilities, might also be granted.

(6) Risk Management and Review Criteria

The Ukrainian Customs Service automatically performs risk analysis on all cargo using ASUR, which is part of the EAIS. ASUR classifies declarations into three risk levels, establishing criteria for the examining import and export declarations.

- Low Risk (Low Level): No review or inspection required. Clearance is granted automatically by the system.
- Medium Risk (Medium level): Document review is required, but physical inspection is not necessary.
- High Risk (High level): Physical inspection is required.

In 2024, a generative artificial intelligence (AI) and a business intelligence (BI) function were developed in-house by Customs. They were added to ASUR but were not reliable enough for risk management decision-making and were limited to issuing alerts. With the recent addition of the BI system, AI became capable of analysing information in line with reproducible and reliable rules, enabling its use in risk management. The system is currently in a trial phase, and if the trial results are favourable, a transition to permanent operation is planned.

(7) Border Management and Cooperation

With support from EUAM, Ukrainian Customs is strengthening joint border management with Moldova and Romania. The "Moldova-Ukraine-Romania Customs Working Group" was established in 2023, and in September 2025, the "Ukraine, Moldova, and Romania Customs Training Platform" was launched to enhance cooperation. The three countries are advancing data exchange using the SEED system to streamline customs procedures and improve transparency. Furthermore, in September 2025, a joint Ukraine-Moldova exercise was conducted at the Mamaliga-Criva border to enhance emergency response capabilities.

In June 2023, with support from the United Nations Economic and Social Commission for Asia and the Pacific (ESCAP), Ukraine and Romania conducted a data exchange pilot project using the SEED application at the Porubne-Siret BCP. This system enables customs officials on the departure side to enter and transmit data via a secure channel for verification and confirmation to the arrival side. This application avoids duplicate data entry and allows risk analysis of cargo before trucks arrive at the customs control zone, thereby reducing processing times and strengthening risk management. The three countries have agreed to expand this pilot project to other BCPs.

6.4 User Evaluations of Customs and Clearance Procedures in Moldova and the neighboring Countri

The JICA survey team conducted interviews with three Japanese companies to assess their satisfaction with customs and clearance procedures. The interviews revealed that all three companies unload their cargo at the Gdansk Port in Poland (on the Baltic Sea) rather than at the Constanta Port in Romania (on the Black Sea) and then transport it to Ukraine.

The reasons cited for transporting goods via Poland included: (1) the absence of Japanese expatriate staff in Romania; (2) the fact that using the Constanta Port would result in longer container transit times from Japan and a more complicated transport route; and (3) the availability of more transport options in Poland, as well as the presence of Japanese expatriate staff there. Regarding customs clearance procedures, the assessment was that no particular problems have arisen because procedures proceed in accordance with EU standards until arrival at the Ukrainian border. Furthermore, since customs clearance procedures after arrival at the Ukrainian border are entrusted to the importer, users reported having no challenges or inconveniences.

Users who imported emergency supplies related to ODA for Ukraine reported that, although customs duties and VAT should be exempt on the Ukrainian side, the exemption procedures were extremely unclear and cumbersome. Specifically, the procedures and required documents for obtaining the exemption were not clearly defined. Sometimes, it took up to two months to secure an exemption.

Furthermore, in interviews with Moldovan rail freight forwarders, the arbitrary interpretation of HS codes was cited as a challenge in customs clearance procedures at the Moldovan customs. When there is an inconsistency in the interpretation of HS codes, the classification of goods may vary for the customs officer,

potentially causing the number of duties to fluctuate with each import. This inconsistency not only makes it difficult for businesses to formulate their revenue and expenditure budgets but also carries the risk of unnecessarily high tariffs being imposed. It is a common challenge in customs procedures across many developing countries. Regarding the digitization of customs procedures, ASYCUDA World is utilized in Moldova, and the assessment was that, at present, no particular obstacles or adverse effects have arisen for users.

In summary, while Moldovan and Ukrainian customs authorities conduct smooth customs clearance procedures using electronic systems for goods handled regularly or those with clear commodity classifications, there is a possibility that cases involving goods with unclear classifications or non-standard goods, such as ODA-related shipments, may require individual negotiations with customs officials or result in prolonged clearance times.

Chapter 7 Prerequisites for Cooperation Projects and Programs

7.1 Transport Infrastructure and Services in Moldova Requiring Support

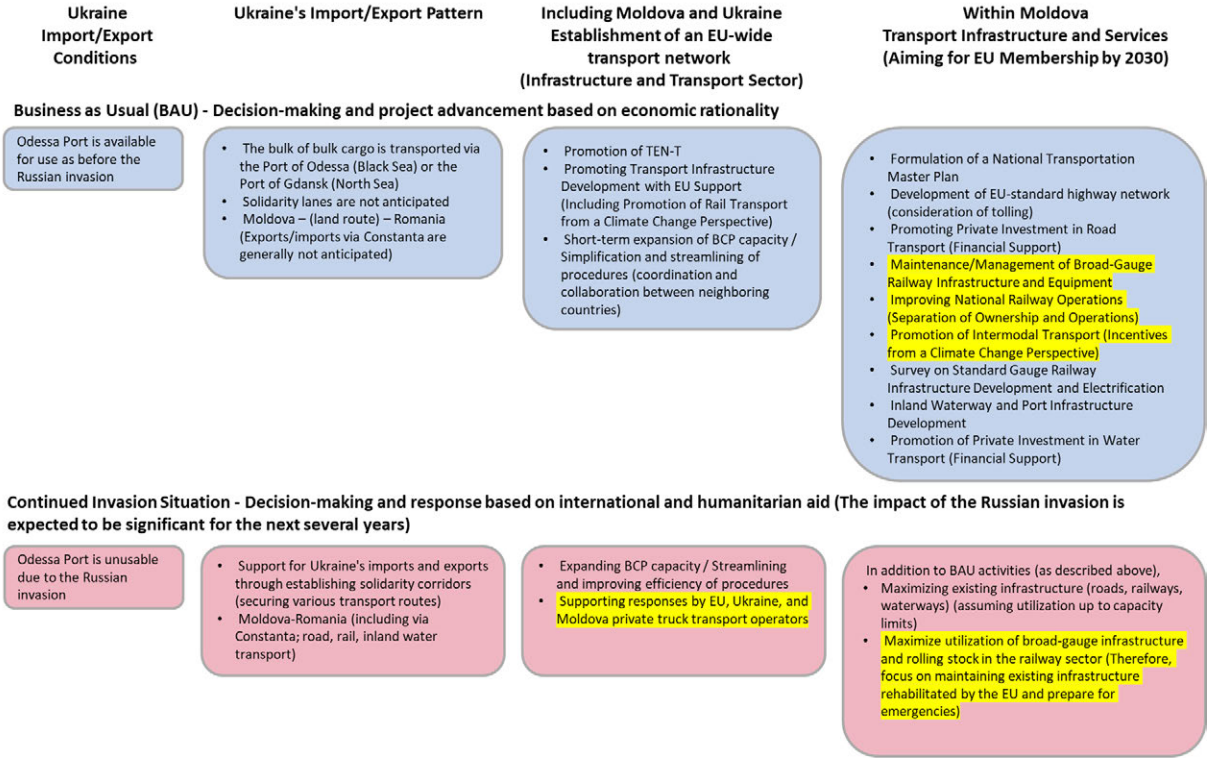
The primary goal in considering the scenario options, following Russia's invasion of Ukraine, is to "maintain Ukraine's imports and exports at pre-invasion levels, sustain supply chain relationships with Western nations, including Japan, and continue to fulfill its role in the global economy (excluding trade with Russia and Belarus)." Based on this, the scenarios are:

① BAU - A scenario in which the Odesa Port remains available as it was before the Russian invasion, allowing for decision-making and business operations based on economic rationality; and

② Continued Invasion Situation - A scenario in which the Odesa Port becomes unusable due to the Russian invasion, necessitating decision-making and responses based on international and humanitarian aid.

These two scenarios are not mutually exclusive; rather, they are coexisting hypothetical scenarios. However, the transportation infrastructure and services required to respond to each scenario are in the far-right column of the table below.

The items include infrastructure and services across various transport sectors, including those other than railways. However, the projects related to the renovation and effective utilization of existing railways are limited to three: "Maintenance, upkeep, and management of broad-gauge railways," "Operational improvements for the national railway (separation of operations and ownership, financial support)," and "Promotion of intermodal transport (incentives from the perspective of climate change mitigation)."Furthermore, in the event of a "Continued Invasion Situation"—that is, a prolonged state of emergency—the plan assumes full utilization of private trucking companies from the EU, Ukraine, Moldova, and other countries. It does not envisage the development or improvement of railway infrastructure specifically for emergencies (which would disregard economic rationality in peacetime).



Source: JICA Survey Team

Figure 7-1 Scenarios Following Russia's Invasion of Ukraine (Reprinted)

7.2 EU, EBRD, EIB, and AFD Guidelines for Supporting Moldova and Coordination/ Collaboration with JICA

The table below summarizes the support policies of the EU, EBRD, EIB, and AFD for Moldova, as well as the potential for coordination and collaboration with JICA, based on interviews with these organizations. The general outlines of the support policies are common across all institutions, focusing on Moldova's alignment with EU standards in preparation for EU accession, as well as support for the EU-promoted TEN-T and the strengthening of the Solidarity Lanes.

Table 7-1 Guidelines for Moldova Assistance by Major Donor Agencies and Coordination with JICA

Item	EU	EBRD	EIB	AFD
Support Guidelines	• Ensuring Compliance with EU Standards and Interoperability • Promotion of projects and financial support related to TEN-T and the EU-Ukraine Solidarity Lanes	• Support for Moldova's EU accession • Prioritizing the restoration of existing railway lines	• Including standard gauge conversion as a support measure, with compliance with EU standards and interoperability as long-term goals	• Exploring investment opportunities in railways • Awaiting the presentation of a comprehensive strategy by the new government

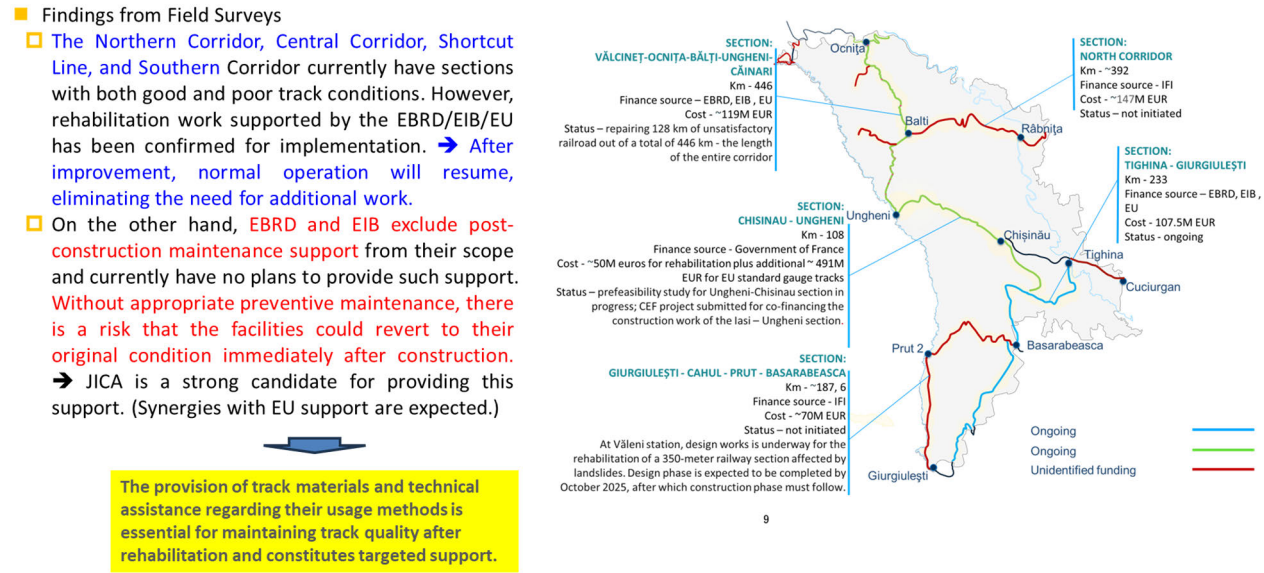
Item	EU	EBRD	EIB	AFD
Ongoing and planned support projects	Priorities: • Eliminating bottlenecks at BCPs • Short-term: Roads and border facilities • Long-term: Railway upgrades • Understand that surveys related to track gauge conversion are underway with EIB support	• Track rehabilitation on the Southern, Central, and Northern Corridors and spur lines • A study on the restructuring of the CFM (separation of operations and maintenance) is underway • Route rehabilitation in the Northern, Central, and Southern regions is also underway	• Track rehabilitation on the Southern, Central, and Northern Corridors and the Shortcut Line • A study on track gauge conversion is underway (results expected in late 2025/early 2026) • Construction of an intermodal transport terminal is underway in Chișinău	• A study on the Central Corridor Railway was conducted in the past (2022) • Based on the results of the business model and cash flow analysis, the Central Corridor project has been set aside
Measures to strengthen TEN-T/Solidarity Lanes	• Solidarity Lanes (multiple routes) serve as backup routes for Ukrainian exports (contingency plan in case of a Russian invasion) • Intend to strengthen Solidarity Lanes via Moldova	• The track rehabilitation project is part of efforts to strengthen TEN-T and establish Solidarity Lanes • Strategic importance has increased due to the Russian invasion	• TEN-T has been expanded to include Moldova's main transport network • Last year, the TEN-T route in Moldova was updated to bypass Transnistria • Solidarity Lanes are currently under construction	
Prospects for EU membership application	• The Moldovan government's project development capacity remains a challenge	• Railway sector restructuring (supported by the EBRD) is a requirement for EU accession • Support is currently being provided to align Moldovan domestic law with EU directives	• Meeting the EU's railway restructuring requirement (separation of infrastructure and operations) is difficult due to Moldova's lack of capacity and funding	
Challenges Faced in Providing Support	• Lack of project development capacity	• Mismatch between the ministry leadership's priorities and the needs of the railway sector	• Lack of capacity and retention of skilled personnel • Lack of independent planning and design capabilities	• Difficulties in project implementation • Feasibility studies (F/S) require resources from counterpart (C/P) organizations
Cooperation and coordination with JICA	• JICA's support in the O&M sector is "highly appropriate" • Fostering a strategic maintenance cycle is important.	• Support for maintenance work (provision of equipment/training) • Establishment of an engineering training academy • Introduction of an asset management system	• Track maintenance technology and capacity building • Support for employee retention • (Since the EIB does not have a similar support scheme)	

Source: JICA Survey Team

The EU's priorities for implementing these policies are: (1) BCP improvements, (2) road reinforcement, and (3) railway rehabilitation. However, regarding railway rehabilitation projects within the context of TEN-T and the Solidarity Lanes, rehabilitation is either currently being implemented or has been approved (with L/A agreements already signed) for all major corridors (Southern, Central, and Northern Corridors).

Once these rehabilitation projects are complete, trains will be able to operate at the intended speeds on all major corridors. On the other hand, railway infrastructure (particularly the tracks) requires regular and systematic track maintenance (track maintenance). If trains continue to run without proper track maintenance, track displacement will progress, and track damage will worsen, eventually reverting the tracks to pre-rehabilitation conditions. Therefore, ensuring proper maintenance after rehabilitation is complete is essential for realizing the project's intended benefits. However, the JICA survey team has confirmed that the EU and others—partly because the EIB lacks a maintenance support scheme—take the stance that post-construction maintenance is a matter for the Moldovan government to manage independently and have no plans to provide specific support.

On the other hand, during discussions with the EU and other parties about coordination and collaboration with JICA, all agencies expressed their expectation that JICA would provide support for track maintenance work. Based on the above, JICA's provision of support for track maintenance is considered extremely important and welcome. It will enhance cooperation with Western countries, such as the EU, and generate synergies with rehabilitation currently being carried out by the EU.



Source: JICA Survey Team

Figure 7-2 The Appropriateness of Support for Track Maintenance

7.3 Areas Requiring Support for the Moldovan State Railways (CFM) (Short- and Medium-Term)

7.3.1 Significance of Track Maintenance Support

(1) Benefits for Moldova: Extending Infrastructure Lifespan and Improving Speed

Although large-scale rehabilitation work on the North-South Corridor (Tighina-Giurgiulesti, etc.) is currently underway with funding from the EBRD and the EU, funding and equipment for "maintenance" after completion have not been secured.

- **Preservation of Investment**: Without proper preventive maintenance, the rehabilitated sections—which required massive investment—will deteriorate again within a few years. Japan's provision of track maintenance equipment to fill the maintenance gap left by EBRD/EU support (rehabilitation) will significantly extend the infrastructure's lifespan and ensure the sustainability of railway operations.
- **Speed Improvements**: If mechanized track maintenance improves track conditions, speed restrictions can be lifted, leading to higher scheduled speeds, improved freight car turnover rates, and enhanced transportation service levels.

(2) Benefits for Ukraine: Strengthening Energy Supply Routes

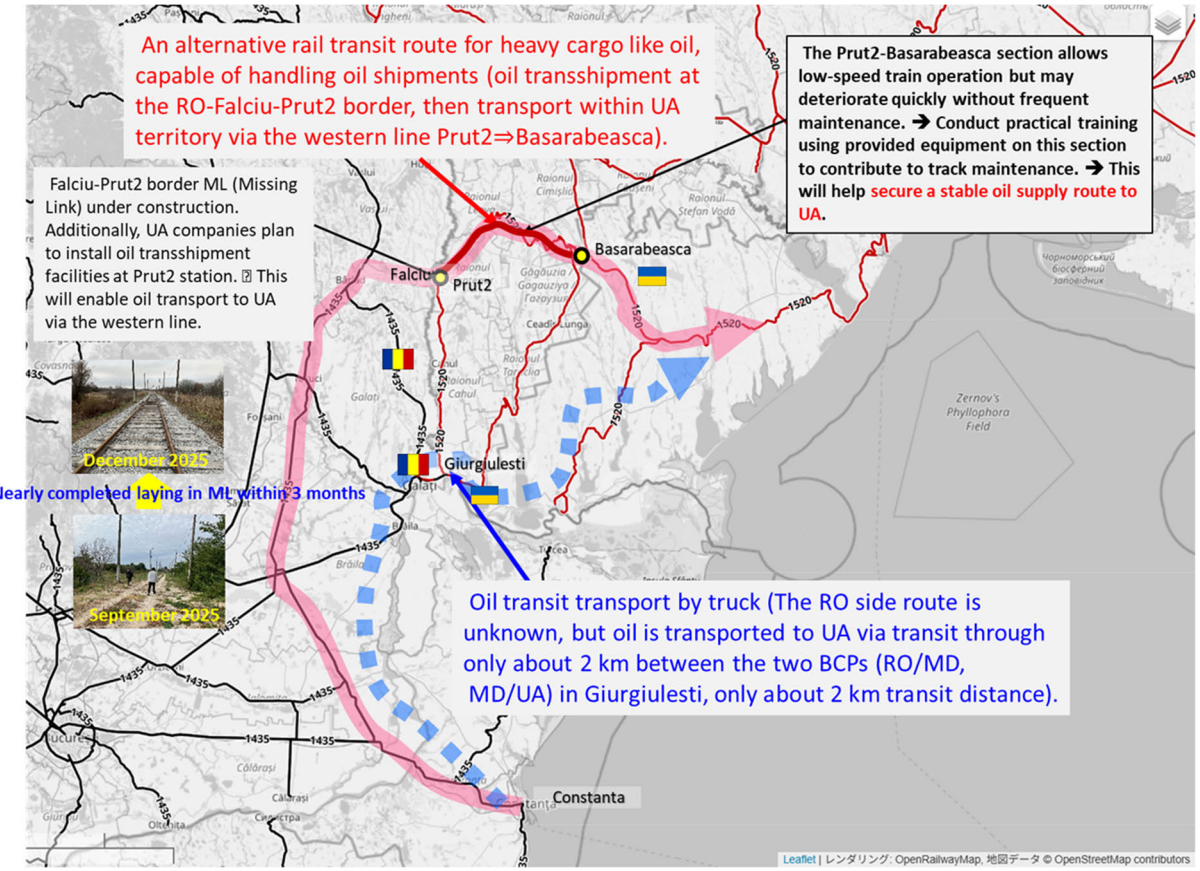
The objective of support for track maintenance is to ensure that proper maintenance and management can be carried out across the entire length of the main corridors rehabilitated by the EU and others. Since it is anticipated that there will be overlap between rehabilitation projects carried out by the EU and other entities and Japan's future support projects in the track maintenance sector (as the EU's rehabilitation projects have not yet been fully completed), Japan's support for track maintenance (which may include quality improvements, such as repairs to certain sections) is expected to focus on specific sections within Moldova in the short to medium term.

The section in question is the Western Line (Giurgiulesti–Cahul–Prut 2–Basarabeasca), with a particular focus on the Prut 2–Basarabeasca segment; this is also effective in the context of support for Ukraine for the following reasons.

- **Key to fuel transport**: This section is expected to serve as a strategic rail route for transporting fuel from Romania to Ukraine, and the Moldovan government is currently using its own funds to eliminate the approximately 2 km-long missing link at the border. Once this section is connected, it will contribute to the creation of a new transport corridor linking "Constanta Port–Prut2–Basarabeasca–Odesa," as shown in the diagram Figure 7-3. While trucks transport much of the fuel from Constanta Port to the Odesa area, the development of this section is expected to improve the fuel supply situation in southwestern Ukraine. Strengthening the Prut 2–Basarabeasca section, where trains currently operate at low speeds, will directly support a stable energy supply to Ukraine.
- **Securing an alternative route**: Should the Odesa Port come under attack again, this railway line will provide a vital backup to support Ukraine's imports and exports.

Equipment provision and technical cooperation are vital for supporting Ukraine

- **Current Issue:** Truck fuel transit to Ukraine via Giurgiulesti lacks capacity and causes severe border congestion
- **Rail Shift:** The 2km RO/MD rail missing link (Falciu-Prut2) is almost restored to enable heavy fuel transit
- **Infrastructure Risk:** The connecting Prut2-Basarabeasca section is severely degraded and risks becoming impassable without frequent maintenance
- **Project Impact:** Providing equipment and practical training for this fragile section will secure a stable fuel supply route to Ukraine



Source: JICA Survey Team

Figure 7-3 Railway Route Connecting Romania and the Odesa Area via the Western Moldovan Line

7.3.2 Other Items Requiring Support

(1) Improving Connectivity with Ukraine and Romania (Enhancing Border Management Capacity)

1) Support for Trade Facilitation and Customs

As shown in Table 7-2, EU assistance places the highest priority on eliminating bottlenecks at BCPs. Under this policy, comprehensive support for customs is being provided through the introduction of the NCTS[40] and through the EUBAM. Therefore, building on the existing support provided by the EU, complementary assistance aimed at maximizing its effectiveness may be considered. Applicable support proposals are listed in the table below.

Table 7-2 Potential Support Measures for Trade Facilitation and Customs

Option	1. Strengthening border surveillance equipment and monitoring systems	2. Customs capacity development (human resource development)
Issues	Insufficient and aging equipment to detect drugs and weapons at borders, limiting effective control.	Limited operational capacity to effectively utilize EU-supported systems and equipment, reducing investment impact.
Support Measures	Provision of inspection equipment and support for operational setup (e.g., container X-ray scanners, X-ray for cargo/baggage, mobile X-ray, CCTV, ion scanners).	Training and materials for border officers on customs regulations, EU standards, and practical operations. Joint training and working groups for border agencies and customs brokers.
Expected Effects	Increased detection of drugs/weapons and reduced clearance time through fewer physical inspections.	Facilitated border procedures, reduced clearance time, lower trader burden, and improved use of EU-supported systems.
Considerations	• Provide training on X-ray image interpretation and operational procedures. • Include maintenance capacity development. • Confirm budget for maintenance and repair costs. • Verify local agent and maintenance availability. • Confirm installation requirements (power, network, climate). • Ensure interoperability with EU-led digital systems.	• Leverage Japan's experience in customs support. • Ensure alignment with EU standards and frameworks. • Design sustainable capacity building not dependent on individuals.

Note: Since feasibility has not been confirmed, a preliminary assessment of feasibility is required before proceeding with consideration.

Source: JICA Survey Team

2) Support for Improving Transit Procedures

In international rail transport, in addition to customs clearance procedures, through-transport procedures[41] are required. In the countries of the former Soviet Union (CIS), a system called ASOUP has been introduced for these through-transport procedures. However, the ASOUP currently operating in Moldova is connected only to Moldova, Ukraine, and the three Baltic states, and is isolated from other CIS countries, including Russia. Consequently, an update to the existing system is unlikely, while the system may be unable to respond in the event of a failure. Furthermore, with Romania, where ASOUP has not been introduced, the data required for through transport is exchanged via paper documents or email. UZ is already working on improving ASOUP; however, due to wartime restrictions on information disclosure, there are currently no plans to provide CFM with UZ's new system. CFM is gathering information on the ASOUP improvement plans being considered in Kazakhstan and the Baltic States. If CFM is unable to obtain an improved version of ASOUP from other countries, it may be possible to

[40] NCTS is the EU Customs "integrated system," and the customs IT systems of member states must strictly comply with EU-wide specifications (EUCDM/UCC). Furthermore, the European Commission (DG TAXUD) oversees the specifications, standard messages, and operational rules, making it institutionally difficult for Japanese companies to enter the market. (In Japan, the National Automated Cargo Clearance System (NACCS) is used as the equivalent of NCTS within the EU.)

[41] What is the through-transport procedure? It is a process in which the railway operator receiving the cargo receives information from the railway operator sending the cargo regarding the details of the transported goods and the details of the vehicles crossing the border. In the case of rolling stock crossing the border, the system also handles the movement management and settlement processing of the rolling stock. Information exchanged regarding cargo includes the "shipper," "consignee," "item description," "weight," "tare weight," and "transport route," among others. Information exchanged regarding rolling stock crossing the border includes the "rolling stock number," "owner," and "type," among others.

support improved cross-border interoperability by "renewing the ASOUP systems of Moldova and Ukraine."

Table 7-3 Proposal for Support to Improve Transport Procedures (ASOUP System Update and Enhancement of Digital Interoperability)

Overview	By upgrading the ASOUP system, which is currently operated independently in Moldova, Ukraine, and the three Baltic states, and incorporating the data exchange protocols specified in the EU Railway Package, the ASOUP system will enable the exchange of Direct transport information with EU member states.
Key points	● Although this project will be implemented with Moldova as its base, it will be available to Ukraine and the three Baltic states upon completion. ● For this reason, consultations with Ukraine will take place from the planning stage. The renewal approach and system specifications will be coordinated with Ukraine. In particular, Ukraine is independently considering an update to its ASOUP system, but details have not been disclosed due to the ongoing conflict. Information exchange will proceed with due consideration of the situation. ● In the EU Railway Package, it has defined only basic common specifications such as communication protocols for direct transportation. Consequently, no direct transportation system suitable for use across the entire EU has been developed.
Expected effects	● This will enable the stable operation of the direct transport system between Moldova and Ukraine ● By incorporating the functions necessary for exchanging direct transportation data with the EU, it can be expected to improve efficiency, speed, and data accuracy in international rail transport operations with EU member states ● These benefits will help strengthen the competitiveness of rail transport

Source: JICA Survey Team

(2) Improving CFM's Organization and Capabilities

With an eye toward EU accession, CFM is currently undergoing organizational restructuring, and the transition to a vertically separated structure (divided into an infrastructure-owning entity and an operating entity) is scheduled to be completed within this year (2026). At the same time, CFM is proceeding with staff reductions as part of its management improvement and cost-reduction efforts. Amid these measures, railway services are deteriorating, and the company is required to implement organizational restructuring and functional improvements while simultaneously reducing personnel. In this context, technical support for organizational restructuring and the introduction of new technologies, including digitalization, is necessary. Furthermore, even in a labor-saving environment, highly skilled technical personnel are required to maintain CFM's functions, and support for education and human resource development is also necessary.

Furthermore, as part of the support to address these challenges under this survey, key officials from the Moldovan government and CFM, who are responsible for organizational and capacity building at CFM, were invited to Japan. The purpose of this invitation was to provide useful references for their discussions on the railway restructuring plan. During the program, through meetings with Japanese government agencies and site visits to railway operators, introductions were made regarding the roles and mechanisms of Japan's railway administration, railway business management, the history of the division and privatization of the Japanese National Railways, and initiatives in affiliated businesses, alongside an exchange of views. The details of this program are provided in the appendix.

7.4 Draft Short- and Medium-Term Program Roadmap

The proposed short- and medium-term program roadmap is shown in Table 7-5. The key considerations regarding the support programs proposed in this roadmap, including several prerequisites from the Moldovan side for the proposed support to achieve the intended results, are shown in Table 7-4.

Table 7-4 Prerequisites for the Implementation of Short- and Medium-Term Programs

Prerequisites	Condition Details	Necessity	Risks
Completion of CFM's organizational restructuring (separation of infrastructure and operations)	It has been announced that CFM will be split and reorganized into an infrastructure holding company and a transportation operating company (cargo and passenger) in 2026.	Organizational transparency is essential to ensure that support equipment and funds are properly managed and utilized. If the accounting for the unprofitable passenger division and the freight division remains intermingled, there is a risk that freight revenue will not be allocated to infrastructure investment but will instead be used to cover deficits.	There are concerns that the reorganization may face resistance from labor unions and cause temporary operational disruptions. If the reorganization is implemented without resolving unpaid wages, there is a risk of large-scale strikes and logistics paralysis.
Shift to a Competitive Freight Rate Policy	CFM must adopt a flexible and strategic pricing policy that considers prevailing market conditions, including trucking rates.	No matter how much infrastructure is improved, shippers will not return if freight rates remain higher than for trucking. Learning from the failures of 2025, sales efforts, such as reinstating volume incentives and long-term contract discounts, are required. Support from experts in Japan and elsewhere to develop an appropriate freight rate model would also be effective.	
Ensuring Stability around the Giurgiulesti Port	Access to the Giurgiulesti Port and the Ukrainian border (Reni)—key hubs for rail freight—must continue to be secured both physically and in terms of security.	The value of the Southern Corridor lies in its connection to the Giurgiulesti Port and the Ukrainian Reni Port. Risks remain, including low water levels in the Danube River and the risk of Russian attacks on port facilities. Risk management measures to address these external factors—such as securing alternative routes—are a prerequisite.	

Source: JICA Survey Team

Table 7-5 Roadmap for Short- and Medium-Term Programs

Moldova Railway Sector: Short- and Medium-Term Program (Draft)

No.	Purpose	Program Name	Program Overview	Individual Project	Project Overview	Expected Schedule 2026	2027	2028	2029	2030	Remarks
1	Maintain the condition of existing railways (Russian gauge) after rehabilitation supported by the EU, EBRD, and EIB, ensuring they can withstand long-term operation.	Track Maintenance and Management Capacity Enhancement Program	Provide equipment and materials to maintain the Northern, Central, and Southern Corridors rehabilitated with EBRD/EIB support in good condition for a long period after construction, while also enhancing track maintenance management and the capabilities of technical staff.	Track Maintenance Equipment Provision Project	Promptly provide maintenance equipment and technical guidance to perform track maintenance						
				CFM Track Maintenance Capacity Enhancement Project	① Revise CFM's track maintenance operational framework to establish an economically rational maintenance cycle. ② Acquire proper usage methods for newly introduced track maintenance equipment, thereby maintaining the track condition of partially opened rehabilitated sections in good order.						
				Project for Providing Large-Scale Track Maintenance Equipment and Training in Its Use	With EBRD/EIB support, provide the necessary number of large-scale machines, such as multiple tampers, to maintain the long-term good condition of the track on all sections scheduled for rehabilitation and to achieve labor savings through mechanization. Concurrently, provide instruction on their use to enable mechanized and labor-saving track maintenance operations.						
2	Functional and Capability Enhancement of Moldovan Railways (CFM) Organization and Personnel	Moldova Railways Organizational Improvement and Operational Efficiency Program	In preparation for EU accession, Moldova's national railway (CFM) is scheduled to be split into an infrastructure holding entity and an operational entity. Prior to this, CFM is proceeding with workforce reductions from a management improvement (cost reduction) perspective. Amidst this, CFM's railway services are deteriorating, necessitating organizational restructuring and functional enhancement concurrently with workforce reductions. Consulting services for this organizational transformation and the introduction of new technologies (digitalization) are required.Furthermore, even with reduced staffing, highly skilled technical personnel are essential to maintain CFM's functions. Therefore, an education and training institution will be established for this purpose.	Moldova Railways Operational Efficiency Project	Aims to improve CFM's operations and enhance its railway business management capabilities. Supports the digitization and shared assetization of vast amounts of data currently managed manually on paper.						
				Railway Training School Project	CFM has a railway school, but it currently has no students and is effectively closed. To enhance staff capabilities, human resource development and technical skill improvement are essential; support the reopening of the railway school.						
3	TEN-T Enhancement / Promotion of Intermodal Transport (Incentives from a Climate Change Perspective)	Program to Strengthen Connections at Broad Gauge-Standard Gauge Junction Points		Standard Gauge Replacement Locomotive Grant Project	Ungheni Station, the border station with Romania, has both Moldovan broad gauge tracks and Romanian standard gauge tracks laid. In addition to broad gauge locomotives, shunting locomotives for standard gauge are needed within the station. However, CFM currently lacks sufficient standard gauge shunting locomotives, making it difficult to perform coupling/uncoupling operations on the standard gauge lines within the station. To resolve this difficulty, standard gauge shunting locomotives (high-quality Japanese-made diesel locomotives) will be provided. This aims to enhance transport handling capacity at the junction while reducing CO2 emissions.						
				Renewal of the "ASOUP" Intermodal Transport Procedure System between UA-MD Railway Operators and Support for EU Protocol Compliance	Ukrainian Railways and Moldovan Railways require intermodal transport procedures for international train operations and freight information sharing. Currently, they interconnect using the outdated Soviet-era system "ASOUP." However, exchanges with Romania, which does not use ASOUP, rely on inefficient paper and email methods.With future EU accession in mind, EU protocol compliance is essential for both railways. Support will be provided for developing the necessary system, which will subsequently be deployed in Ukraine. Equipping the system with EU data interoperability functions is expected to enhance the efficiency, speed, and information accuracy of international rail transport, thereby strengthening the competitiveness of rail freight.						
		UA-MD-RO Corridor Strengthening Program		Western Line Rehabilitation Project	This project rehabilitates the currently suspended Western Line connecting Basarabeasca–Prut2–Giurgiulesti, strengthening the rail connection between Ukraine's Odessa region and the Port of Giurgiulesti. Currently, rail connections between Odessa and Giurgiulesti within Moldova use the Southern Corridor. However, the Southern Corridor crosses Ukrainian territory multiple times, leading to issues such as higher insurance premiums due to disaster risk exposure. Users of the Port of Giurgiulesti have expressed a desire to reopen the Western Line, which avoids Ukrainian territory.						
		Transport Capacity Enhancement Program	Providing locomotives and freight cars to increase transport capacity.	Locomotive and Freight Car Provision Project	At CFM, the operational rates for both locomotives and freight cars have significantly declined. To meet customer demand for transportation, additional freight cars must be purchased. This reinforcement is also necessary to secure alternative route functionality in emergencies, so additional freight cars will be purchased based on demand.						

Source: JICA Survey Team

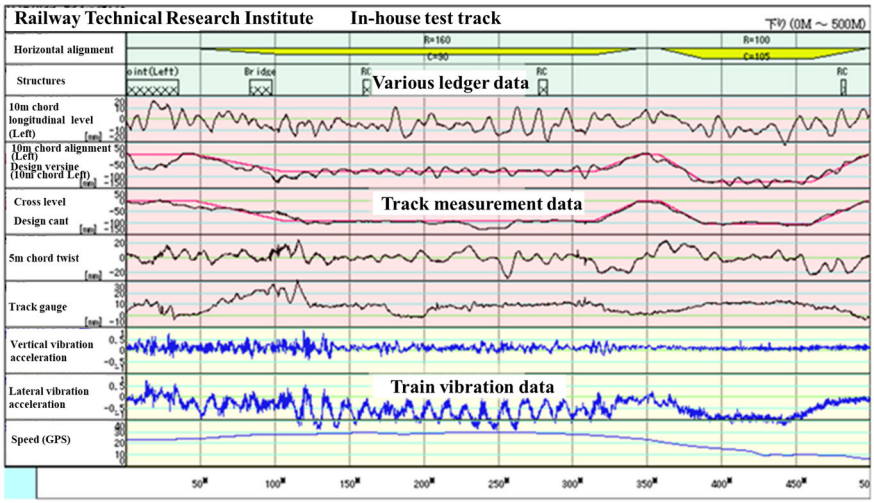
Project Profile (1)

Project Name (Implementation Scheme)	**Project for the Provision of Equipment and Materials for Track Maintenance (Economic and Social Development Plan (Grant Aid))**
Project Background	Currently, track maintenance work on CFM is predominantly carried out using outdated, labor-intensive methods, including manual work with shovels. With support from the EU, EBRD, and EIB now secured, rehabilitation of the Northern and Central Corridors is underway. However, if the current routine maintenance system remains in place, there is a significant risk that the rehabilitated infrastructure will deteriorate within a few years, undermining the long-term benefits of the investment and compromising the reliability of train operations. Establishing a maintenance system capable of sustaining good track conditions and withstanding long-term use is an urgent priority.
Current Challenges and Solutions	CFM's maintenance operations have become inefficient due to the aging of skilled workers, a decline in personnel, and a shortage of necessary equipment, making it difficult to pass on technical skills to younger staff. To address these challenges, it is imperative to replace obsolete track maintenance machinery and equipment to transition to efficient track maintenance operations. There is an urgent need to deploy digital measuring instruments capable of quantifying track conditions, large-scale maintenance machinery such as track tampers and railroad power shovels, and lightweight, highly maneuverable handheld maintenance equipment, like hand tie tampers, to the necessary maintenance sections, thereby establishing a flexible repair system.
Project Overview	Provide digital measuring instruments, large-scale track maintenance machinery, and small-scale maintenance equipment (such as hand tie tampers), along with technical guidance. This will enable more precise monitoring of track maintenance activities and improve work efficiency on rehabilitated sections in service, thereby supporting proper track maintenance and management. Furthermore, in coordination with "Project 2: Project to Improve CFM's Maintenance Management Capabilities (Technical Project)," we will provide support in developing preventive maintenance plans based on measurement data and establishing an economical maintenance cycle for track conditions.
Estimated Project Cost	Equipment costs: 500 million yen Transportation and other expenses: 200 million yen Total Project Cost: 700 million yen
Schedule	Preliminary Survey: 2026–2027 Exchange of Notes (E/N), Grant Agreement (G/A): 2027 Detailed Design and Bidding: 2027 Construction and Installation: 2028
Implementing Agency	CFM (Organization inheriting ground infrastructure)
Related Projects	Track Rehabilitation Project by the EBRD/EIB
Expected Outcomes	(1) Extension of track service life, (2) Prevention of derailment accidents, (3) Maintenance of transport speed
Challenges Related to Implementation	Impact of organizational restructuring of the maintenance division following the privatization (separation of operations and infrastructure) of CFM
Target Area Related Diagram	  [4-Wheel Tractor]   [Rail-Road Power Shovel]

Source: JICA Survey Team

Project Profile (2)

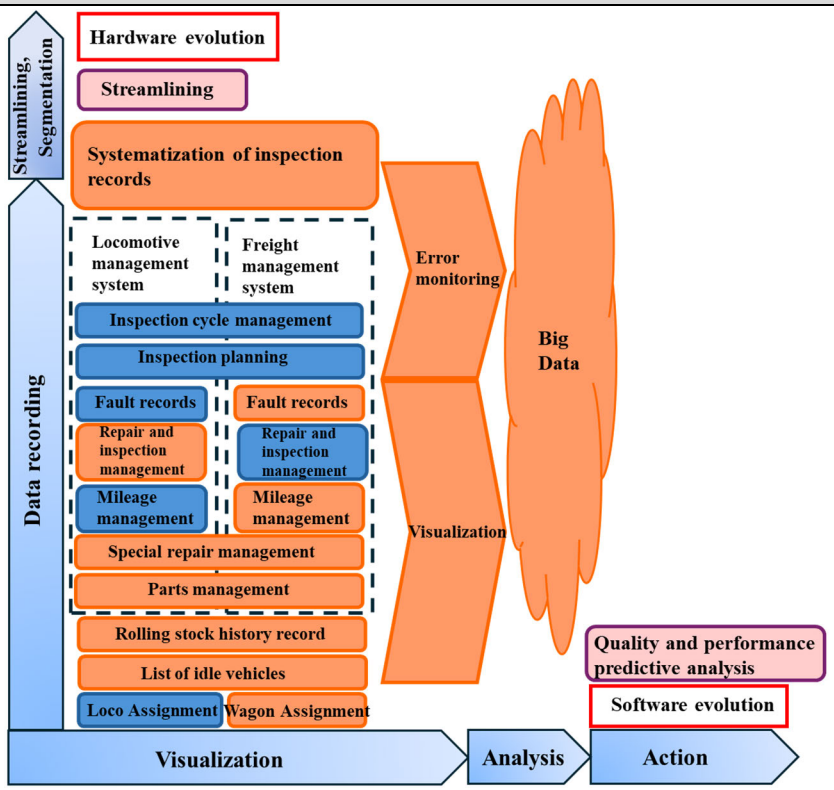
Project Name (Implementation Scheme)	Project to Improve CFM's Maintenance and Management Capabilities (Technical Project)
Project Background	Traditionally, CFM has relied primarily on so-called breakdown maintenance methods, resulting in frequent disruptions (stops) in train operations due to track defects. To consistently maintain tracks in good condition and ensure stable train operations, it is essential to shift to a preventive maintenance system based on measurement data to improve track reliability. While the provision of track maintenance equipment through "Project 1: Track Maintenance Equipment Grant Project (Grant Aid)" will yield benefits on its own, further synergistic effects are expected by improving the skills of the organizations and individuals operating this equipment. Therefore, it is important to enhance track maintenance technical capabilities using small-scale equipment owned by CFM (with additional equipment provided by the Technical Project) while simultaneously introducing and strengthening track condition management methods based on measurement data and track maintenance work planning management methods to achieve efficient preventive maintenance in conjunction with "Project 1." This will raise the staff's technical proficiency, ensuring full utilization of the equipment.
Current Challenges and Solutions	To address challenges such as a shortage of track maintenance equipment, unstable track conditions due to reactive maintenance, and a lack of know-how regarding efficient track maintenance operations using new equipment, we will introduce small-scale track maintenance equipment and a track asset management system, and provide know-how transfer and technical guidance on planning for efficient track maintenance operations and preventive maintenance using the latest equipment.
Project Overview	Provide small-scale track maintenance equipment to help staff master the basics of track maintenance, ensuring that track conditions can be properly maintained following rehabilitation works currently being carried out with EBRD/EIB/EU funding. Additionally, before the completion of these rehabilitation works, we will conduct on-site training in track maintenance and repair on the Prut 2–Basarabeasca section, which is expected to become one of the fuel transport corridors between Ukraine and Romania. If timing permits, the project will also include training in the use of measuring instruments and large-scale track-maintenance machinery, as provided under "Project 1: Provision of Track Maintenance Equipment and Materials (Grant Aid)." This will establish a comprehensive workflow (condition measurement and verification → repair and maintenance using large machinery → correction and adjustment using small equipment), and provide operational guidance and technical support for the efficient and effective implementation of track maintenance operations that combine various types of machinery and equipment. Furthermore, introducing a simple track asset management system (such as a software package) to enable preventive maintenance, we will transfer know-how about the efficient management of measurement data and provide technical guidance on formulating preventive maintenance plans based on management data.
Estimated Project Cost	Total Project Cost: 300 million yen
Schedule	Detailed planning survey: 2026 Signing of Record of Discussions (R/D) and Consultant Bidding: 2026–2027 Implementation: 2027–2029
Implementing Agency	CFM
Related Projects	EBRD Study on CFM Restructuring
Expected Outcomes	(1) Technology transfer and knowledge retention by Japanese engineers and others; (2) Improvement in the quality of infrastructure maintenance and management; (3) Optimization of maintenance and management costs; (4) Realization of stable transportation through the introduction of preventive maintenance
Challenges in Implementation	Ensuring the retention of skilled personnel and preventing their departure.

Project Name (Implementation Scheme)	Project to Improve CFM's Maintenance and Management Capabilities (Technical Project)
Target Areas Related Diagrams	   [Hand Tie Tamper] [Rail Cutting Machine]

Source: Yamazaki Gear Manufacturing Co., Ltd., Track Maintenance Management Database System, Railway Technical Research Institute

Project Profile (3)

Project Name (Implementation Scheme)	CFM Operational Efficiency Project (Technical Project)
Project Background	At CFM, the systems for transportation and sales operations were developed during the Soviet era. Even though they are now outdated, the company continues to use those systems for its operations. On the other hand, for back-office functions such as asset management, facility maintenance (track maintenance, signal maintenance, etc.), rolling stock inspection and repair, and human resources, vast amounts of data are still managed on paper, requiring significant effort and time despite a shortage of staff. As part of its preparations for EU accession, CFM will be divided into two companies: "Infrastructure Maintenance" and "Railway Services." Both companies are required to implement digitalization and improve their business processes to continue operations despite labor shortages.
Current Challenges and Solutions	As mentioned above, back-office operations are managed using paper-based analog systems, which consume significant time and effort, lead to information leaks and errors, and make it difficult to ensure accurate information management. To resolve this issue, we will advance the digitization of various operational management functions (asset management, facility maintenance management, rolling stock inspection and repair management, and human resources management) to build efficient operational systems. Additionally, we will establish an information platform to share data across these systems and prevent duplicate data entry and redundant management. In conjunction with the review of business system modernization, it is necessary to analyze current operations and revise workflows to improve efficiency. Through these initiatives, we will streamline back-office operations and ensure that tasks will go smoothly with a reduced workforce.
Project Overview	Technical and know-how support for streamlining the workflows of back-office operations (asset management*, facility maintenance management*, rolling stock inspection and maintenance management, and human resources management); support for the digitization of each operational system (including consideration of implementing existing packaged software); and technical and know-how support for building an information-sharing platform. *Regarding track maintenance facilities within asset management and facility maintenance management, digitalization support will be provided under "Project 2: Project to Improve CFM's Maintenance Management Capabilities (Technical Project)," and these facilities are excluded from the scope of this project.
Estimated Project Cost	Total Project Cost: 500 million yen (including costs for packaged software to be introduced as business systems and system modification costs to apply the software to CFM operations)
Schedule	Detailed Planning Survey: 2027 R&D Contract Signing and Consultant Bidding: 2028 Implementation: 2028–2029
Implementing Agency	CFM
Related Projects	Various forms of support regarding domestic laws and regulations for EU accession
Expected Outcomes	(1) Reduction in the cost and time required for back-office operations; (2) Accurate and rapid assessment of assets and their maintenance status; (3) Acceleration of management decision-making; (4) Ensuring transparency
Challenges in Implementation	Resistance among staff to digital transformation and resistance to changing familiar work processes

Project Name (Implementation Scheme)	CFM Operational Efficiency Project (Technical Project)
Target Areas Related Diagram	 [Vision for the Rolling Stock Inspection and Maintenance Management System at JR Freight]

Source: Japan Railway Rolling Stock and Machinery Technology Association Journal R&M, March 2019 issue, paper titled "Development of a New Rolling Stock Management System"

Project Profile (4)

Project Name (Implementation Scheme)	Railway School Reopening Support Project (Technical Project)
Project Background	CFM owns a railway school, but it is effectively closed, halting the training of the next generation of engineers. To continuously develop highly skilled technical personnel, the reopening of these underutilized schools is both effective and essential. Given the serious brain drain of young people from Moldova, there is an urgent need for "human resource development" that establishes an attractive vocational training environment (featuring practical training using the latest simulators and actual equipment) to cultivate and retain highly skilled engineers who can work domestically.
Current Challenges and Solutions	At CFM, the technical transfer through on-the-job training (OJT) has become difficult due to hiring strikes caused by financial deficits, as well as the resignation of young employees driven by low wages and delayed pay. Therefore, it is necessary to enhance railway schools to have operational knowledge and skills. However, these schools are currently closed, and if this situation continues, the knowledge and skills possessed by veteran staff will be lost. Therefore, by combining the knowledge and experience CFM has cultivated to date with the latest technologies and training equipment, we will fuse "know-how derived from experience" with "cutting-edge technology." This will enable the transfer of technical skills for railway operations (including driving, facility maintenance, rolling stock inspection and repair, and safety management) and the adoption of new technologies, thereby maintaining safe and stable railway operations. Furthermore, by incorporating a curriculum that complies with EU safety standards and operating regulations following Moldova's accession to the EU, we will promote aligning the railway system with EU standards.
Project Overview	To reopen the railway school, we will gather and systematically organize CFM's existing technical expertise and know-how through interviews with veteran staff. Also support the development of a new educational curriculum by incorporating the latest technologies and management methods from Japan and other advanced railway nations, as well as EU-standard safety criteria and operational regulations. Furthermore, we will support the introduction of training equipment aligned with the newly developed curriculum.
Estimated Project Cost	Total Project Cost
Schedule	Detailed Planning Study: 2028 R&D Contract Signing and Consultant Bidding: 2028 Implementation: 2029–2031
Implementing Agency	CFM
Related Projects	–
Expected Outcomes	(1) Transfer of railway technology, (2) Maintenance of safe and stable railway transportation, (3) Promotion of compliance with EU standards for railways
Challenges in Implementation	Securing trained personnel (concerns about brain drain to other countries), ensuring the alignment of existing technology and know-how with the latest technologies and EU standards
Target Region Related Diagram	Basarabeasca

Source: JICA Survey Team

Project Profile (5)

Project Name (Implementation Scheme)	**Project to Provide Standard-Gauge Shunting Locomotives for Ungheni Station (Grant Assistance)**
Project Background	Ungheni Station serves as a junction between Moldova (broad gauge, 1,520 mm) and Romania (standard gauge, 1,435 mm). However, the dedicated locomotives required to handle standard-gauge freight cars from the Romanian side are aging and insufficient in number, resulting in bottlenecks at the border.
Current Challenges and Solutions	With an eye toward EU accession, there is a need to introduce standard-gauge, environmentally friendly diesel locomotives (equipped with hybrid or Euro Stage V-compliant engines).
Project Overview	Provision of standard-gauge shunting locomotives
Estimated Project Cost	Equipment: 500 million yen (including transportation costs) Consulting fees: 100 million yen Total Project Cost: 600 million yen
Schedule	Preliminary Survey: 2027 E/N and G/A: 2027 Detailed Design and Bidding: 2028 Construction and Installation: 2029
Implementing Agency	CFM
Related Projects	EIB Study on Standard Gauge Conversion
Expected Benefits	(1) Reduction in border crossing time; (2) Reduction in CO_2 emissions
Challenges in Implementation	Operational coordination with Romanian railway authorities
Target Area Related Diagram	 [Hybrid Shunting Locomotive]

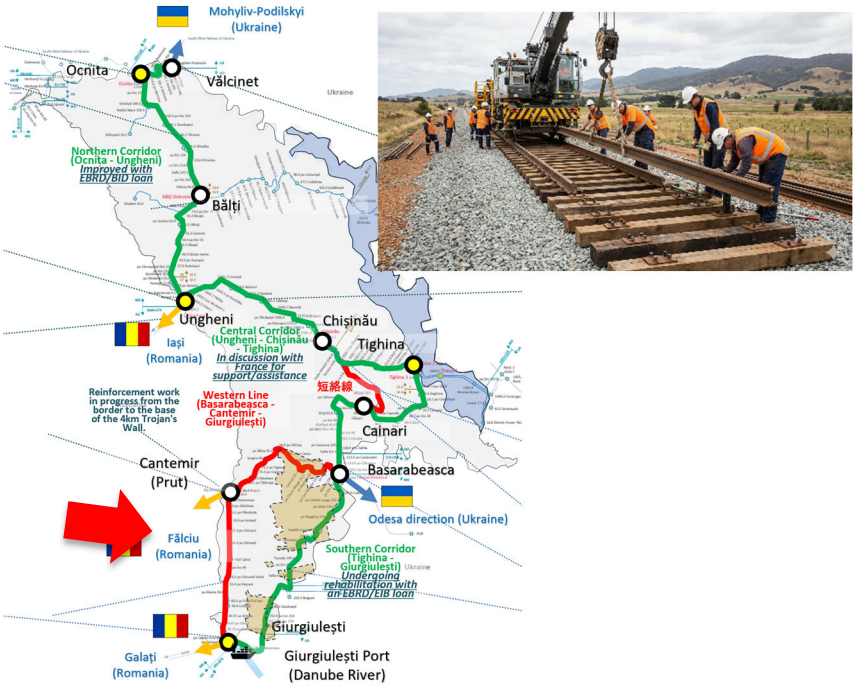
Source: JR Freight Co., Ltd. / Kyushu Logistics

Project Profile (6)

Project Name (Implementation Scheme)	**Ungheni Container Yard Improvement Project (Grant Aid)**
Project Background	Given the situation in Ukraine, Black Sea logistics have become unstable, and railways are now expected to transport not only fuel and ore but also general cargo. Since containers are well-suited for general cargo transport, this project aims to establish Ungheni Station as an inland logistics hub (dry port) and, by promoting a modal shift from truck transport to environmentally friendly rail transport, thereby addressing global environmental issues.
Current Challenges and Solutions	The gantry crane used for container transshipment is currently out of service, making international rail transport of containers impossible. Consequently, we are unable to meet the demand for international rail transport or general cargo. To address this, a new container transshipment facility (transshipment yard) will be constructed at Ungheni Station. This will enable rail container transport between Romania, Moldova, and Ukraine, thereby expanding the Black Sea logistics route via rail and attracting new customers (container cargo) for CFM.
Project Overview	By developing a container transshipment yard at Ungheni Station and introducing new container-handling equipment (gantry cranes, reach stackers, etc.), we will establish Ungheni Station as a hub for international container transport among Romania, Moldova, and Ukraine.
Estimated Project Cost	Equipment Costs: 400 million yen Construction costs: 200 million yen Consulting fees: 100 million yen Total Project Cost: 700 million yen
Schedule	Preliminary Survey: 2028 E/N and G/A: 2028 Detailed Design and Bidding: 2029 Construction and Installation: 2029
Implementing Agency	CFM
Related Projects	EU-Ukraine Solidarity Lanes
Expected Outcomes	(1) Promotion of intermodal rail transport between Romania and Moldova & Ukraine; (2) Expansion of the share of rail freight transport (incorporation of general cargo)
Challenges Related to Implementation	(1) Since this project would become unnecessary if the Bereşti Container Terminal near Ungheni—which USAID surveyed (and remains unbuilt due to USAID's withdrawal)—becomes operational, it is crucial to formally confirm that the Bereşti Container Terminal will not be operational during the planning phase. (2) Confirmation of freight demand; (3) Coordination with Romanian authorities.
Target Area Related Diagram	 [Reach Stacker]  [Gantry Crane]

Source: Suzuyo Motor Transport, Suzuyo Container Engineering Co., Ltd. website

Project Profile (7)

Project Name (Implementation Scheme)	**West Line (Basarabeasca–Giurgiulesti) Rehabilitation Project (Yen Loan)**
Project Background	The Southern Corridor route currently in operation passes through part of Ukrainian territory, resulting in security risks, including tolls and cumbersome customs procedures. The restoration of the Western Route, which runs entirely within Moldova's own territory and provides direct access to the Giurgiulesti Port, which holds rights of access to the Danube River, is a high priority for the country's economic security.
Current Challenges and Solutions	The currently suspended "Basarabeasca–Prut 2– Giurgiulesti" section will be rehabilitated to serve as a bypass.
Project Overview	Track Renovation and Rehabilitation Work on the Western Line
Estimated Project Cost	Construction Cost: 12 billion yen Consulting fees: 1 billion yen Total Project Cost: 13 billion yen
Schedule	Preliminary Study: 2030 E/N and Loan Agreement (L/A): 2031 Detailed Design and Bidding: 2032 Construction: 2032–2033
Implementing Agency	CFM
Related Projects	Expansion Plan for Giurgiulesti Port
Expected Benefits	(1) Securing alternative routes, (2) Strengthening support for Ukrainian imports and exports
Challenges Related to Implementation	The project involves a large investment scale, requiring a thorough examination of its economic viability.
Target Area Related Diagram	

Source: Prepared by the JICA Survey Team

Project Profile (8)

Project Name (Implementation Scheme)	**Project for the Provision of Locomotives and Freight Cars to Enhance Freight Transport Capacity (Grant Aid / Yen Loan)**
Project Background	As part of the "Solidarity Lanes" initiative in response to the situation in Ukraine, securing export routes for Ukrainian grain has become critical; however, there is a shortage of grain freight cars and other rolling stock. Furthermore, the low utilization rate of mainline locomotives capable of hauling heavy freight is creating a bottleneck in efforts to expand transport capacity.
Current Challenges and Solutions	There is a need to secure transport capacity as an alternative route in the event of an emergency. The project aims to increase the number of freight cars capable of handling bulk cargo such as grain and oil, thereby ensuring the means to provide stable transport services.
Project Overview	Provision of Freight Cars and Locomotives
Estimated Project Cost	Equipment costs: Varies depending on the number of units purchased. Consulting fees: Total Project Cost: Varies depending on the number of units purchased.
Schedule	Preliminary Survey: 2030 E/N, G/A, or L/A: 2031 Basic Design and Bidding: 2032 Design and Procurement: 2032–2035
Implementing Agency	CFM
Related Projects	EBRD-funded track rehabilitation of the Southern, Central, and Northern Corridors
Expected Outcomes	(1) Increased freight volume; (2) Improved CFM profitability
Challenges in Implementation	Daily vehicle inspections; establishment and maintenance of a parts procurement system
Target Areas Related Diagram	 [Diesel Locomotives]  [Hopper Cars]  [Tank Cars]

Source: Hokuriku Heavy Industries, Kawasaki Freight Station, Nagoya Freight Terminal

Observations on Implementation Results of the Invitation Program in Japan

A. Evaluation of the Curriculum and Points for Improvement

This program was designed to comprehensively provide Japan's expertise and know-how—spanning railway administration, operations, track maintenance technology, and business diversification—to support the rehabilitation of railways in both Moldova and Ukraine, as well as the stabilization of the international railway network. It can be evaluated as a program highly advanced and of significant practical value.

1. Railway Administration and Organizational Reform (Privatization and Separation of Infrastructure and Operations)

The lecture by the Railway Bureau of the Ministry of Land, Infrastructure, Transport and Tourism (MLIT) on the overview, management, and oversight functions of the Railway Business Act served as a highly useful reference for the Moldovan side, which is currently in the stage of formulating the specific operational duties of its newly established Railway Agency. In addition, the lecture by Japan International Consultants for Transportation Co., Ltd. (JIC) on the reform and privatization of Japanese National Railways (JNR) shared firsthand experiences from the instructor regarding the process of overcoming past challenges, including restructuring the transport system to escape massive deficits and navigating intense labor union negotiations. These insights are highly valuable references for Moldovan Railways (CFM) in formulating policies and transition plans for the separation of infrastructure and operations, as well as market opening. Furthermore, visits to the employee training centers of JR Shikoku and JR West strongly reinforced the importance of staff education and training for CFM, whose own training center functions are currently suspended.

2. Modernization and Efficiency Enhancement of Track Maintenance

While Moldovan Railways (operating length: 1,232 km; approx. 5,000 employees) and JR Shikoku (operating length: 853 km; approx. 2,000 employees) are similar in route scale, there is a significant difference in staffing density. Against this background, demonstrating efficient operations utilizing mechanization and digitalization at the JR Shikoku Training Center made a strong impact regarding the future vision for improving labor productivity. Furthermore, considering Moldova's current shortage of large machinery, arranging a visit to JR Freight's Kanto Maintenance Technology Center to showcase a flexible inspection and repair system using compact equipment (such as the Track Master) was a highly appropriate approach for presenting realistic, phased steps toward modernization and efficiency.

3. Freight Terminal Operations and Logistics

Given the growing importance of rail transport in international logistics for both countries, visits were arranged to both Japan's largest facility, Tokyo Freight Terminal Station, and a medium-sized facility, Koshigaya Freight Terminal Station. This drew high interest, particularly from the Moldovan delegation, which is actively strengthening its international container transport capabilities. Presenting container handling volumes, yard layouts, and actual operations at both stations provided practical insights directly

applicable to the future construction and management of container yards in anticipation of increased container demand in both nations.

4. Safety Management, Passenger Station Development, and Related Businesses

The introduction of lessons learned from past major accidents and systematic safety management initiatives at JR West's "Safety Promotion Hall" provided invaluable references for establishing safety measures in both countries. Additionally, the visit to Takamatsu Station, conducted with a view toward future recovery and passenger transport restoration, offered a concrete vision for passenger station development and renovation. Furthermore, showcasing the management methods of the station-adjacent commercial facility (Takamatsu Orne) served as an excellent example of diversifying business operations to simultaneously enhance customer convenience and increase revenues for entities operating under a separated infrastructure/operation model.

B. Evaluations from the Participants

All four participants from Moldova and Ukraine expressed extremely high satisfaction with both the program content and its operational management. The main evaluations received were as follows:

1. Highly Effective Program Design and Smooth Operations

Despite a tight and intensive schedule, the selection of site visits seamlessly covering both passenger and freight facilities was highly appropriate, allowing participants to fully achieve the objectives of their visit. Furthermore, the meticulous operational management and attentive staff support—extending from travel arrangements to overall assistance during their stay—were exceptionally well received.

2. High Praise for Experts' Knowledge Sharing and Hospitality

Participants expressed deep appreciation for the dedication and passion of the personnel at the host organizations (such as the JR companies), as well as their open and generous sharing of advanced technology and operational know-how. In addition, gaining insight into the legal frameworks and operational standards underlying Japan's high-quality railway services provided them with invaluable, practical learning.

3. Clear Perspective for Future Project Promotion

The insights and best practices gained through this program will be brought back by the participants to be utilized in technical training for local railway specialists and shared across relevant divisions (infrastructure, freight, and passenger transport). This visit successfully established new professional networks and clarified future directions for cooperation. Demonstrating a strong commitment to ongoing collaboration, the participants expressed their willingness to provide necessary data and support the continued implementation of future projects that will contribute significantly to the development of railway infrastructure between Moldova and Ukraine.

C. Other Observations (Logistical Arrangements and Overall Invitation Program)

1. Consistency and Control in Logistical Arrangements

Selecting "JR Hotel Clement Takamatsu" for accommodation in the regional area (Takamatsu) went beyond merely ensuring convenience for travel; it was a deliberate choice allowing participants to personally experience one of the core elements of the curriculum—business diversification into hotel operations by railway operators. This demonstrated clear intent and consistency throughout the logistical arrangements. Furthermore, seamless and precise travel management was executed according to plan across a wide geographic range—including Tokyo, Takamatsu, and Osaka—utilizing flights and Shinkansen services.

2. Strategic Design and Achievements of the Overall Program

By combining site visits with different scales and approaches—mainline track maintenance utilizing large machinery versus freight yard track maintenance employing compact equipment—the program successfully presented both a "future ideal vision" and an "immediately applicable practical solution." Furthermore, a well-balanced itinerary was achieved by combining courtesy calls and administrative lectures at government bodies (JICA, Ministry of Foreign Affairs, and MLIT) with embassy meetings, site visits to JR companies (JR Freight, JR Shikoku, JR West), and technical lectures by JIC. This effectively conveyed Japan’s unified public-private commitment to providing robust support and technical cooperation.