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Module «EU Transport Policy»
Еразмус + Programme: Jean Monnet Actions

National Aviation University

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EU TRANSPORT POLICY STRATEGIES

Tutorial: training

КОНДОР

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CONTENT

PREFACE

Transport represents a crucial sector of the EU economy, its lifeblood. The study of the state and prospects of modern economic development, integration processes in Europe and Ukraine's participation in these processes allows to consider certain conclusions on the development and implementation of the transport policy.

The **purpose of the training "EU Transport Policy Strategies"** as an integral part of the Module "EU Transport Policy" is to master the theoretical, scientific-methodical knowledge, analytical and practical skills to study trends, features, challenges and prospects of transport system development in conditions of deepening of European integration processes.

Objectives of the training are as following:

- introduction to the main characteristics of the EU Single Market and features of the integrated EU transport system;
- revealing the essence, goals and stages of the EU transport policy evolution, the peculiarities of implementing the common EU transport strategy;
- identification of features and prospects of the Trans-European Transport Network (TEN-T) development;
- introduction to the main documents regulating the EU transport sector operation;
- studying the directions of transport infrastructure development in the context of the EU transport strategy implementation and ensuring sustainable development;
- identification of strategic development priorities, current challenges and areas for improvement of the EU transport sector;
- acquaintance with the economic consequences of the impact from the spread of COVID-19 on EU transport sector and relevant adaptive measures;
- analyzing peculiarities of the road, maritime and rail transport strategies of the EU and Aviation Strategy for Europe;
- studying features of the formation and ensuring the effectiveness of European transport and logistics clusters;
- analyzing prospects and issues of implementing EU transport strategies within the concept of Transport of the Future;
- defining strategies for integration of domestic transport enterprises into the EU markets.

The Tutorial: training was prepared as part of the Module "EU Transport Policy" №619652-EPP-1-2020-1-UA-EPPJMO-MODULE in the framework of Erasmus+ Programme: Jean Monnet Actions at the National Aviation University.

It is written considering the implementation of tasks and activities aimed at creating, disseminating and acquiring additional knowledge of students on transport policy and strategies of the European Union, as well as conducting researches related to studying the conditions and features of integration of Ukraine's and the EU transport systems.

The tutorial include the necessary materials for mastering basic training and for organizing comprehensive self-study of the student.

The main purpose of the theoretical part of training is a systematic presentation of the most important theoretical material on the experience of the EU transport policy implementation.

The main purpose of the practical part of training is in-depth learning of the most complex issues in the EU transport strategies' implementation by higher education seekers, involving them in creative discussions about relevant issues of the EU transport integration, mastering skills in solving problems in the transport enterprises' operation and its improvement on the basis of successful European practices.

The Tutorial: training is intended for teachers, graduate students, students, as well as specialists of transport companies, organizations, firms.

At the National Aviation University, students of the Faculty of Transport, Management and Logistics by Specialties 073 "Management" and 275 "Transport Technologies (by mode of transport)" will be provided with additional knowledge and practical skills on transport policy and transport strategies of the European Union and integration of Ukraine's and the EU transport systems in the conditions of implementing the European Union – Ukraine Association Agreement.

According to the authors, the proposed tutorial provides in-depth knowledge of the EU transport networks, policy and strategies' development, as well as the main relevant trends in the transport and logistics sectors, taking into account the peculiarities of economic development of particular countries.

1. TRANSPORT POLICY AS ONE OF THE KEY FACTORS OF THE EU SINGLE MARKET SUSTAINABLE DEVELOPMENT

Theoretical material

1.1. The EU single market basic features

At present, the **European Union (EU)** is the most developed integration union of states in the world. The formation of the EU was caused by the need to create a single space with the intertwining of economic systems for mutually beneficial joint development. After going through a number of evolution stages, starting with the free trade area, the EU has become a full-fledged economic union. The strong common market was created.

The EU single market can be called as a core of everything in the union.

The EU Single Market	The economic space consisting of 27 EU member states without internal barriers, in which the free movement of goods, people, services and capital is ensured.

The Single market or Common market of the European Union is referred to the provision of four freedoms resulted in the increase of competition and economies of scale, deepening of specialization, as well as improvement of the efficiency of resources' allocation.

The EU single market has not only inward-looking but also international aspect since the union has strong relations with Iceland, Liechtenstein and Norway (the Agreement on the European Economic Area), Switzerland (bilateral treaties) and the UK (new agreements after the Brexit).

There were such *main achievements and improvements in the EU Single market development* from 1993 till present:

- single space for products and services, as well as production factors mobility;
- single market digitalization;
- improving the EU industrial competitiveness and financing for SMEs;
- cohesion and single market rules.

Interesting fact	Economic benefits of the single market accounts for approximately 8.5% of the EU's GDP.

1.2. The role of transport in the sustainable development of the EU Single Market

There is a need to determine a role of transport in the sustainable development of the EU Single Market with indication of the basic impacts and key levers of development.

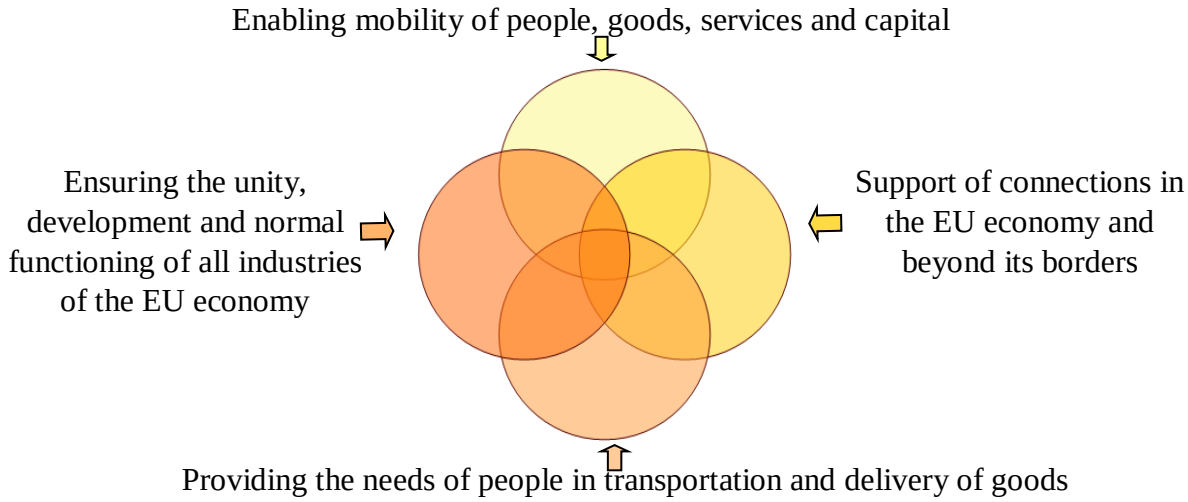


Fig. 1.1. Dimensions of the transport importance for the EU economy

Interesting fact	The EU countries (Germany, Sweden, Belgium, Austria, Netherlands, Denmark and Finland) occupy 7 of the top 10 spots in a ranking of how well countries organize the movement of goods worldwide. Many European companies are world leaders in infrastructure, logistics, manufacturing of transport equipment and traffic management systems.

Transport represents a crucial sector of the EU economy, its lifeblood. Transport is a cornerstone of deepening the European integration process and supporting the creation and completion of the EU single market, promoting jobs and economic growth.

It enables mobility of people, goods, services and capital, supports of connections in the EU economy and beyond its borders, provides the needs of people in transportation and delivery of goods and ensures the unity, development and normal functioning of all industries of the EU economy.

Transport is really important in creating jobs in the EU since 1 out of 20 jobs is in the transport sector. More than half of transport service employees work in land transport (road, rail and pipelines).

Inputs are sufficient in the EU transport system development. The **goal of the EU transport system improvement** is creating a crisis-proof and resilient transport system through the input in the development of Trans-European Transport Network (TEN-T).

In 2020 the EU invested €2.2 billion in 140 key transport projects (building missing transport links, ensuring sustainable transport and creating jobs) for capacity increase, better multimodal connections, cutting emissions, etc.

Interesting fact	In 2014-2020 infrastructure projects accounted for €24 billion which can be considered as approximately €47 per EU citizen.

Over two last decades there were some fluctuations in the dynamics of basic EU transport indicators but mostly a constant growth can be seen.

1.3. The EU integrated transport system

The EU aims to build a modern integrated transport system that strengthens the EU's global competitiveness and is able to meet the challenges linked to sustainable, smart and inclusive growth.

Herewith, ensuring a well-functioning infrastructure able to transport people and goods efficiently, safely and sustainably is a starting point.

The EU transport can be considered through maritime, air, rail, road transport and inland waterways.

Key indicators by transport modes are given in Table 1.1.

Table 1.1

The EU transport: key figures by transport modes

Modes	Key characteristics
Maritime	Includes 329 key seaports. Control around 1/3 of the world's merchant fleet. 75% of European external trade transits through the EU ports.
Air	More than 100 scheduled airlines, a network of more than 400 airports and 60 air navigation service providers. Aviation supported close to 5 million jobs and contributed €300 billion (2.1%) to European GDP.
Rail	Rail transport accounted for over 18% of the EU total. Rail transports around 4% of the EU's external trade by volume; 50,762 km of railways are in the basic EU transport network.
Inland waterways	Consist of more than 37,000 kilometres of waterways connecting hundreds of cities and industrial regions. 12,880 km of inland waterways are in the basic EU transport network.
Road	Road transport accounted for three-quarters (75.3 %) of the total inland freight transport in tonne-kilometres performed. 34,401 km of highways are in the basic EU transport network.

1.4. The EU Transport Policy: the essence, goals and milestones

The **EU transport policy** focuses on integrating national systems of roads, railways, airports, waterways into a fully connected and smoothly-running network: the Single European Transport Area.

EU transport policy	A set of goals, principles and norms that guide the EU in its activities to ensure, maintain and develop a single transport complex to meet the needs of the population in high-quality transportation services on all transport modes.

EU transport policy was developed to establish common rules for the movement of international transport, the route of which begins or ends on the territory of the Member States or crosses it. Also it sets out the conditions under which non-resident carriers may provide services in the EU countries, and provides for measures to improve transport safety.

Long term EU transport strategy is to create a sustainable EU transport network by 2050.

Key goals of the EU transport policy:

- ensure efficient, safe, environmentally friendly, free and smooth movement of goods and people throughout the EU by means of integrated networks using all modes of transport (road, rail, water and air);

- create a common market for transportation services, previously opening national transportation markets.

There were milestones characterizing the EU Common Transport Policy evolution (Fig. 1.2).

Barriers in the transport sector preventing single transport market completion are as following:

- excessive bureaucracy and administration;
- technical incompatibilities;
- differences in technical and administrative standards;
- bottlenecks and missing links.

Important fact	Guaranteeing open, fair and non-discriminatory competition is essential so that everyone can compete under equal conditions in the EU single market.

1985 - White Paper: Completing the Internal Market including transport
1992 - White Paper on the future development of the common transport policy
1994 - Nomination of 14 TEN-T specific projects
1995 - First regulation on TEN-T's financial support
1996 - Adoption of first TEN-T guidelines
2001 - White Paper: European Transport Policy for 2010: time to decide
2004 - Revision of guidelines, increase to 30 priority projects
2009 - Public consultations on Green Paper
2010 - EU 2020 Strategy launch, Green Paper follow up, review of TEN-T programme
2011 - White paper 2011: Roadmap to a Single European Transport Area
2013 - EU Regulation on guidelines for the TEN-T development; general rules for providing EU financial support for the TEN-T projects

Fig. 1.2. Milestones of the EU Common Transport Policy evolution

1.5. Trans-European Transport Network (TEN-T): features and perspectives of the implementation

The EU Common Transport Policy implementation aimed at designing the **Trans-European Transport Network (TEN-T)**.

TEN-T policy	Provides the implementation and development of a Europe-wide network of railway lines, roads, inland waterways, maritime shipping routes, ports, airports and railroad terminals.

There are such **TEN-T ultimate objectives**:

- to close gaps, remove bottlenecks and technical barriers;
- to strengthen social, economic and territorial cohesion in the EU.

Important fact	Nine corridors represent key European transport flows (main trade gateways) that will link together major junctions (cities, ports, airports and other transport terminals). Each corridor must include at least three different modes of transport, three EU countries and two cross-border sections. *By 2030:* a single TEN-T core network. *By 2050: a* TEN-T comprehensive network to ensure accessibility.

Through the Trans-European Transport Network policy, the EU aims to build an effective EU-wide transport infrastructure network.

The EU funding programmes and initiatives making available financial support to projects implementing the TEN-T are as following:

1. Connecting Europe Facility (CEF) – financial support for strategic investment in transport, energy and digital infrastructure.

2. European Fund for Strategic Investment (EFSI) – supports investment in key sectors through financial guarantees.

3. Horizon 2020 – provides funding for research and development projects with the aim of transferring great ideas from the lab to the market.

4. European Structural and Investment Funds (ESIFs), including notably:

- Cohesion Fund (CF) – supports projects reducing economic and social disparities and promoting sustainable development in 15 cohesion Member States.

- European Regional Development Fund (ERDF) – aims to strengthen economic and social cohesion in the European Union by correcting imbalances between its regions.

1.6. White paper 2011: Roadmap to a Single European Transport Area

The basic step in the implementation of the EU Common Transport Policy was approval of the White paper 2011: Roadmap to a Single European Transport Area. Toward a competitive and resource efficient transport system.

There are **10 strategic goals and benchmarks (EU Transport by 2050)**, among them the main ones are:

Goal 1: To halve the use of 'conventionally fuelled' cars in urban transport by 2030; phase them out of cities by 2050; achieve CO_2-free city logistics in major urban centres by 2030.

Goal 3: 30% of road freight over 300 km should shift to other modes such as rail or waterborne transport by 2030, and more than 50 % by 2050, facilitated by efficient and green freight corridors. To meet this goal the appropriate infrastructure should be developed.

Goal 4: By 2050, complete a European high-speed rail network. Triple the length of the existing high-speed rail network by 2030 and maintain a dense railway network in all Member States. By 2050 the majority of medium-distance passenger transport should use rail.

Goal 8: By 2020, establish the framework for a European multimodal transport information, management and payment system.

The creation of the *Single European Transport Area* should be supported by internal market shifts (removal of barriers between transport modes and national systems), innovations (comprehensive R&D and systematic improvements), infrastructural improvements (optimal use of resource potential and eliminating of missing links and bottlenecks in the transport infrastructure to ensure seamlessness), international partnership development (Table 1.2).

Table 1.2

Dimensions of creating creation of the Single European Transport Area

Dimensions	Characteristics
Internal market	Create a genuine Single European Transport Area by eliminating all residual barriers between modes and national systems.
Innovation	The EU research needs to address the full cycle of research, innovation and deployment in an integrated way.
Infrastructure	The EU transport infrastructure policy needs a common vision and sufficient resources. The costs of transport should be reflected in its price in an undistorted way.
International aspect	Opening up third country markets in transport services, products and investments continues to have high priority.

Practical tasks

Case study №1 "Issues in creating Single European Transport Area connected with the EU enlargement"

TEN-T policy aims to create a Single European Transport Area. To ensure stepwise implementation of it fulfilment of national plans and programmes of member states is necessary. Also checking them regarding their coherence and alignment towards the general goal is needed.

There are some relevant issues in creating Single European Transport Area connected with the EU enlargement:

I. Creation of fair conditions for competition both within and between modes of transport for a highly functioning single European Transport Area requires supportive actions for the opening and liberalisation of the internal transport market.

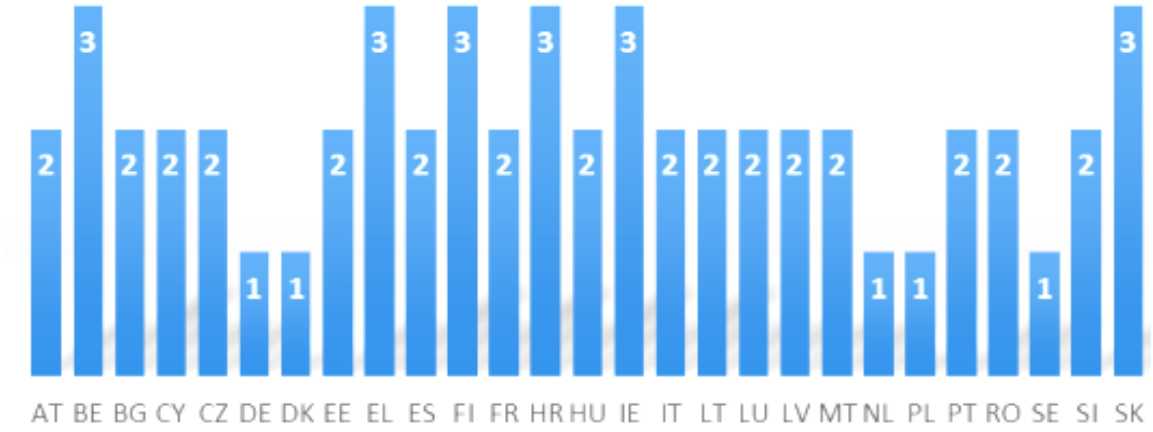
II. Issues in the rail sector: freight market has been open to competition since 2007 and international passenger transport was liberalised in 2010.

Existing problems: uneven market liberalisation of railways across the member states, new entrants still face discrimination in obtaining access to rail infrastructure and essential service facilities.

III. Issues in the air traffic management: air traffic has traditionally been managed nationally and in a fragmented and monopolistic environment that led to higher air traffic management costs. Launching the Single European Sky (SES) and Single European Sky 2+ was the main achievement.

Existing problems: European airspace management remains fragmented.

Each member country has particular features and results in step-by-step implementing the TEN-T policy. The main compliance issues criteria for the TEN-T policy implementation by the member state are given in Table 1.3.



Level 1 - High compatibility between MS and TEN-T approach (> 4 points)
Level 2 - Medium compatibility between MS and TEN-T approach (3-4 points)
Level 3 - Low compatibility between MS and TEN-T approach (≤ 2 points)

Fig. 1.3. Compatibility scoring of Member States' plans and programmes with TEN-T approach

Germany, Denmark, the Netherlands, Poland and Sweden have better alignment with the TEN-T approach comparing with other countries. Denmark, despite not having a Transport Masterplan (TMP), has quite a detailed investment plan, which includes the period up until 2030.

For the creation of the Single European Transport Area Core Network Completion must be done by 2030 and Comprehensive Network must be completed by 2050.

Table 1.3

Compliance issues criteria for the TEN-T policy implementation by the member state

Criteria	Description of the criteria	Existing results of the implementation
Specific TEN-T objective	Alignment with specific TEN-T objectives: ▪ Bottleneck removal ▪ Missing Links ▪ Modal Shift ▪ Cross border projects ▪ Integration with urban nodes ▪ Connectivity of peripheral and outermost regions ▪ Telematic Applications (ERTMS - rail, RIS - iww, VTMIS - maritime, SESAR - air) ▪ Reduction of travel times and congestion ▪ Connectivity to neighbouring/third countries	…
Transport Policy Objectives	Alignment with transport policy objectives: ▪ Reduction of transport emissions ▪ Decarbonisation ▪ Address alternative fuels options ▪ All transport modes ▪ Sustainability ▪ Digitalisation ▪ Passenger Rights	…
Requirements for Core Completion - Rail	Rail requirements for completion of the core network: ▪ Full electrification ▪ Full ERTMS deployment ▪ 740 m train length ▪ 100km/h speed and 22.5 t axle load (freight lines) ▪ 1435 mm/variable track gauge	…
Requirements for Core Completion - iww	Addresses iww transport requirements for completion of the core network: availability of clean fuels	…
Requirements for Core Completion - Road	Addresses road requirements for completion of the core network: availability of clean fuels, rest areas on motorways	…
Requirements for Core Completion - Air	Addresses air transport requirements for completion of the core network: availability of clean fuels	…
Requirements for Core Completion - Rail-road Terminals	Focus on projects concerning rail-road terminals of the core network.	…
Requirements for Core Completion - Ports	Focus on projects concerning maritime ports of the core network, and their respective requirements: connection with railway and road and iww transport infrastructure where possible	…
Requirements for Core Completion - Airports	Focus on projects concerning airports of the core network, and their respective requirements: connection with high-speed rail network	…

However, there are problems for the TEN-T completion from the strategic point of view. General transport development plans of some EU countries have deadlines till 2023 or 2025 or even not clearly defined (for instance, Austria, Slovenia and the Czech Republic respectively), part of member states has outdated plans (as Cyprus) or with irrelevant actions and insufficient budget (Bulgaria and Romania).

TASKS:

1. Analyse the importance of solving the above-mentioned issues to ensure the successful implementation of the TEN-T policy for the creation of a Single European Transport Area. Identify the main problems related to the gap in the transport networks development between the member states of the EU last enlargements and other members.

2. Explain why is it necessary to check periodically compatibility scoring of Member States' plans and programmes with TEN-T approach and why the establishment of a single national plan by each member state is very much needed.

3. Select the particular EU member state and fill in the column "Existing results of the implementation" in Table 1.3. For this use data from official reports of the European Commission (for example, Support study for the TEN-T policy review, concerning relevant national plans and programs in Member States).

4. Study the issues in the TEN-T policy implementation due to modern trends and challenges (including the spread of COVID-19).

5. Explain why sustainability and decarbonisation issues, financial support and leadership approach are keys for the successful implementation of the TEN-T policy.

Case study №2 "European companies addressing top trends in logistics and supply chain management"

To ensure long-term development and maintaining competitive advantages, EU transport and logistics enterprises take into account modern trends and are ready to innovate and implement up-to-date solutions.

1. Due to the rapid growth of e-commerce, postal companies form different countries, including the EU, have been forced to look for new ways to improve traditional business models of mail delivery.

Postal companies from Switzerland, Germany, France conducted tests of unmanned aircraft, as they check the feasibility and profitability of UAV (unmanned aerial vehicle) services, namely drones.

The **Swiss Post** is involved in drone development and deployment for logistics (140 million parcels are sent per year). It transports special healthcare consignments, namely laboratory samples, in cooperation with a range of partners in various regions: EOC hospital group, Lugano; Zurich Central Laboratory; University Hospital Zurich and others. It can be considered as fast and ecological transport. Application of drones makes transporting more flexible, more eco-friendly and not so dependent on the traffic situation.

However, it doesn't mean that drones will replace traditional parcel delivery in the future, this sphere will be just complement area. But there is good commercial use of drones for delivering parcels in some remote areas or for urgent special consignments.

2. Heyworld is a 100% subsidiary of Lufthansa Cargo, a digital start-up within the global Lufthansa Aviation Group, Germany. Founded in 2019, it focuses on cross-border ecommerce logistic solutions interacting with forwarders, freight companies, digital marketplaces and online traders. The company has 5 hubs in Europe and offers first and last-mile delivery, customs clearance, return solutions, and air transportation through the Lufthansa Group network (Fig. 1.4). Since 2019 it shipped more than 1 million packages. On average, Heyworld ships approximately 3,000 parcels per day for customers.

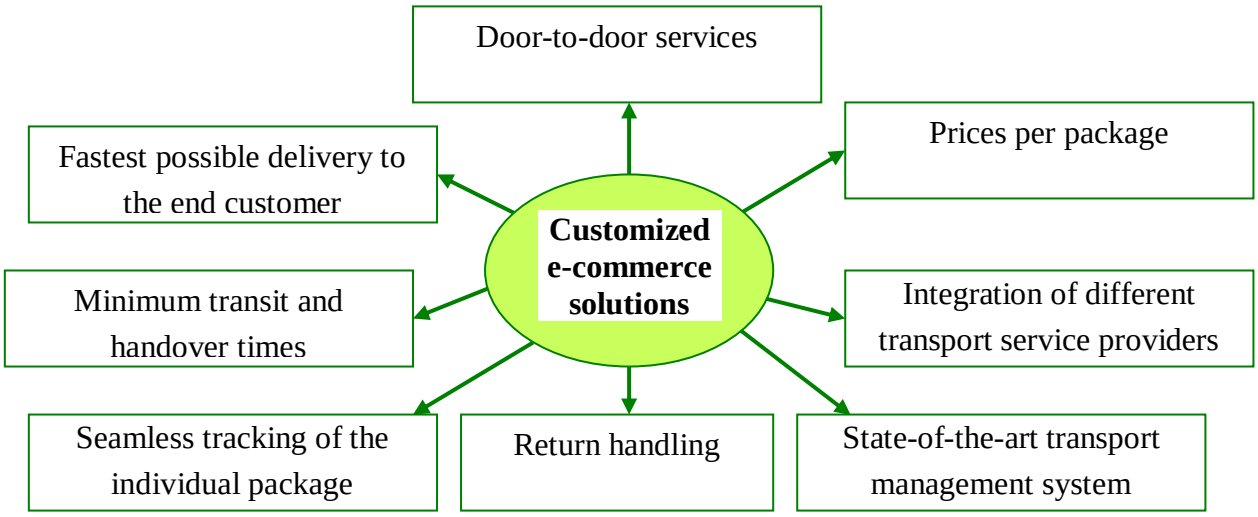


Fig. 1.4. Heyworld's customized eCommerce solutions

All processes in the company's logistics chain and for each individual package are well coordinated to meet the requirements of modern e-commerce.

3. At present last-mile delivery, the last stage of the supply chain, from the warehouse or distribution centre to the client, is often inefficient and not cost-consuming in the total cost to deliver goods. So, first-mile delivery and last-mile delivery are extremely important parts of logistics since there is a direct relation to with the customer satisfaction. In modern conditions last-mile delivery faces various problems including delays due to traffic congestion, customer issues, state regulations, delivery density and increase in costs due to shifts caused by COVID-19.

Poland is one of the rapidly growing markets with increasing number of access points. **PUDOs** are located in Germany (57,000 points), France (45,000 points) and Italy (36,000 points). The out-of-home network with the highest density is in Finland where parcels are mostly delivered using this method.

Smartmile was created based on capital from Germany, the Netherlands, and Finland. The company's software connects the digital and physical spaces to enable innovation solutions eliminating the industry's environmental footprint.

Main benefits of using smart lockers: remove issues with door-to-door delivery, eliminate theft cases, save fuel and maintenance expenses, reduce traffic and CO_2 emissions.

TASKS:

1. Analyse the feasibility and profitability of using drones in modern delivery services. Can it compete with traditional delivery services?

2. What are the main advantages of using drones in delivering healthcare consignments by the Swiss Post comparing with using other alternatives? What are the possible risks of it?

3. Assess the potential of Ukrainian drone manufacturers and their ability to compete in the UAV market.

4. Study perspectives of digitalisation in transport and logistics sector. Explain it on the example of the Heyworld software startup. Give other examples.

5. Identify main solutions to solve the problem of the last-mile delivery (namely, smart lockers, automated delivery, personal delivery).

6. Determine perspective transport and logistics solutions that can be facilitating forces in the Trans-European Transport Network development.

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2. STRATEGIES, PRIORITIES, CHALLENGES AND SOLUTIONS IN THE EU TRANSPORT SECTOR

Theoretical material

2.1. Sustainable development and the EU transport. The EU transport strategy

Sustainable development can be considered in economic, environmental and social dimensions.

EU Sustainable Development Strategy	A complex plan for the long-term development on the basis of smart economic growth with the priorities of a low-carbon, energy and resource-saving, and socially oriented economy.

Single highly efficient transport system provides coordinated transportation in domestic and international traffic, support for performing trade operations and integration into the international market of transport services.

The **EU transport strategy** is oriented on establishing a sustainable transport system meeting economic, social and environmental needs of society, and contributes to a fully integrated and highly competitive EU in the long term perspective.

Creating an optimal combination of regulatory and market forces in order to mitigate the aggravation of economic and social contradictions in the market of transport services, as well as to provide progressive development of the industry.

Optimal transport infrastructure is basis in this issue.

2.2. Transport infrastructure development in context of the EU transport strategy

High-quality, advanced and well-functioning transport infrastructure is essential for the efficient and sustainable functioning of the EU internal market (Fig. 2.1).

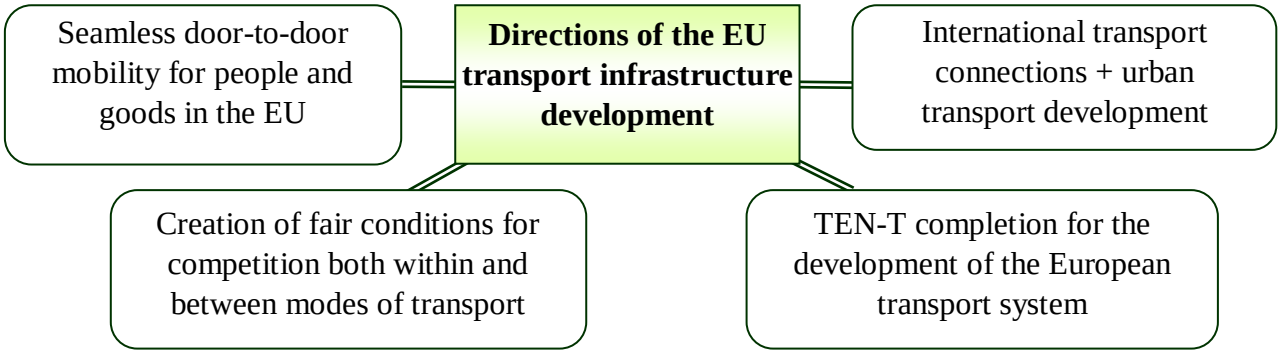

Fig. 2.1. Main directions of the EU transport infrastructure development for sustainable operation

EU transport infrastructure	An economically balanced complex of the EU transport networks, rolling stock, controlling tools and communications ensuring the operation of all transport modes and satisfying needs of the population and production in the transportation of passengers and goods.

Characteristics of the EU transport networks are presented in Table 2.1.

The Trans-European transport network (TEN-T) is as a key aspect in the EU transport strategy implementation.

TEN-T aims to contribute to two major EU objectives:

1. The smooth functioning of the internal market.

2. The strengthening of economic and social cohesion.

Specific **TEN-T objectives:**

– sustainable mobility of persons and goods across the EU;

– high-quality infrastructure;

– effective coverage of the whole territory of the EU, by linking island, landlocked and peripheral regions to the central regions as well as interlinking the major conurbations and regions of the EU;

– interoperability and intermodality within and between different transport modes;

– optimal use of existing capacities;

– economic viability of the network;

– connection of the network to the member countries of the European Free Trade Association (EFTA), the countries of Central and Eastern Europe, and the Mediterranean countries.

Table 2.1

Characteristics of the EU transport networks

Network	Characteristics
Road	Motorways and high-quality roads, as well as infrastructure for traffic management, user information, dealing with incidents and electronic fee collection. This network should guarantee its users a high, uniform and continuous level of services, comfort and safety, not least through active cooperation between traffic management systems at European, national and regional level and providers of travel and traffic information and value added services.
Rail	High-speed and conventional rail networks, as well as facilities that enable the integration of rail and road and, where appropriate, maritime services and air transport services. Technical harmonisation and the gradual implementation of the European Rail Traffic Management System (ERTMS) harmonised command and control system ensures the interoperability of national networks. The users should benefit from a high level of quality and safety, thanks to continuity and interoperability.
Inland waterway	Rivers, canals, and inland ports. The network also includes traffic management infrastructure, and in particular an interoperable, intelligent traffic and transport system (River Information Services), intended to optimise the existing capacity and safety of the inland waterway network as well as improve its interoperability with other modes of transport.
Motorways of the sea	Flows of freight on sea-based logistical routes so as to improve existing maritime links and establishes new viable, regular and frequent links for the transport of goods between EU countries.
Airport	Airports situated within the EU which are open to commercial air traffic and which comply with certain criteria as set out in Annex II of this decision. They should permit the development of air links, both within the EU and between the EU and the rest of the world, as well as the interconnection with other modes of transport.
Combined transport	Railways and inland waterways that permit long-distance combined transport of goods between all EU countries. It also comprises intermodal terminals equipped with installations allowing transhipment between the different transport networks.
Shipping management and information	Coastal and port shipping management systems, vessel positioning systems, reporting systems for vessels transporting dangerous goods and communication systems for distress and safety at sea.
Air traffic management	Air space reserved for general aviation, airways, air navigation aids, the traffic planning and management systems and the air traffic control systems, necessary to ensure safe and efficient aviation in European airspace.
Positioning and navigation	Satellite positioning and navigation systems and the systems that will be defined in the future European Radio Navigation Plan. These systems are intended to provide a reliable and efficient positioning and navigation service which could be used by all modes of transport.

Relevant aspects of the EU transport infrastructure improvement are shown in Fig. 2.2. The EU's enlargement from 15 to 27 member states required changes to logistics chains and geographical patterns of trade, and raised the structural challenge of rapidly developing transport infrastructure.

There are still implications for quality, safety, efficiency and sustainability due to inadequate development and maintenance of existing road, rail, river and airport infrastructure in EU-27.

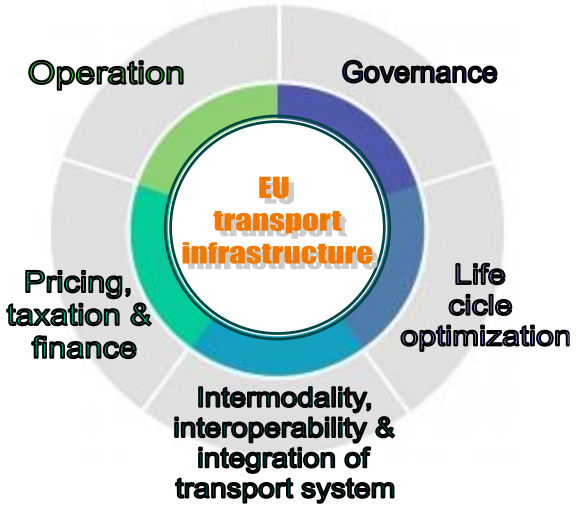

Fig. 2.2. Relevant aspects of the EU transport infrastructure improvement

EU guidelines for the TEN-T development reflected in the implementation of **priority projects** – projects of common European interest that meet the following criteria:

- are intended to eliminate a bottleneck or complete a missing link on a major route of the trans-European network;
- are on such a scale that long-term planning at European level contributes significant added value;
- present potential socio-economic benefits;
- significantly improve the mobility of goods and persons between EU countries;
- contribute to enhancing the territorial cohesion of the EU by integrating the networks of the new EU states;
- contribute to the sustainable development of transport.

Main EU Transport Funding includes:

⇨ *The European Regional Development Fund (ERDF):* funding activity for the support to SMEs, ICT, Low Carbon and research and innovation.

⇨ *The Cohesion Fund:* funding for environmental and trans-European network projects in the member states whose Gross National Income (GNI) per inhabitant is less than 90% of the EU average.

⇨ *The Marco Polo Programme:* the EU funding programme for projects which shift freight from the road to sea, rail and inland waterways.

⇨ *The Connecting Europe Facility (CEF) for Transport:* funding instrument to realise EU transport infrastructure policy.

⇨ *Framework Programme (FP7-Transport):* funding of projects to develop safer, "greener" and "smarter" European transport.

⇨ *Horizon 2020-Transport:* funding projects aimed at the increasing mobility of people, with low-carbon technologies, clean vehicles, smart mobility systems and integrated services for passengers and freight.

Important fact	EU transport budget allocations accounted for €94.5 billion for 2007-2013 and €98.9 billion for 2014-2020 (€193.4 billion in total).

European Regional Development Fund and Cohesion Fund budget allocations by transport sectors are given in Table 2.2.

Table 2.2

European Regional Development Fund (ERDF) and Cohesion Fund budget allocations for 2007-2020, € billion

Sector		2007-2013	% of total		2014-2020	% of total
Road	42,6		52 %	30,0		44 %
Rail	23,1		28 %	18,6		27 %
Urban transport	8,2		10 %	12,5		18 %
Ports	3,1		4 %	2,0		3 %
Multimodal transport	1,8		2 %	2,2		3 %
Intelligent transport systems (ITS)	1,0		1 %	2,1		3 %
Inland waterways	0,4		1 %	0,7		1 %
Air	1,6		2 %	0,4		1 %
Total transport	**81,8**		**100 %**	**68,5**		**100 %**

Source: ECA, based on data provided by the Commission

So, European Regional Development Fund (ERDF) and Cohesion Fund budget allocations account for 76.05% or €114.3 billion of funding for the EU road and rail transport as of the highest priority.

2.3. Priorities in the development of the EU transport sector

There are a number of factors that determine the dominance of certain areas of development of the EU transport sector.

Priorities in the development of the EU transport sector are as following:

– holistic approach;
– quality transport that is safe and secure;
– a well maintained and fully integrated network;

– more environmentally sustainable transport;

– keeping the EU at the forefront of transport services and technologies;

– protecting transport workers and their rights as well as simultaneously developing the human capital to improve the efficiency and competitiveness of the EU economy;

– better price signals to improve economic efficiency by providing economic incentives to, for example, use the road in off-peak hours or use more environmentally friendly means of transport;

– improving accessibility.

Societal trends can challenge the EU transport sector (Fig. 2.3).

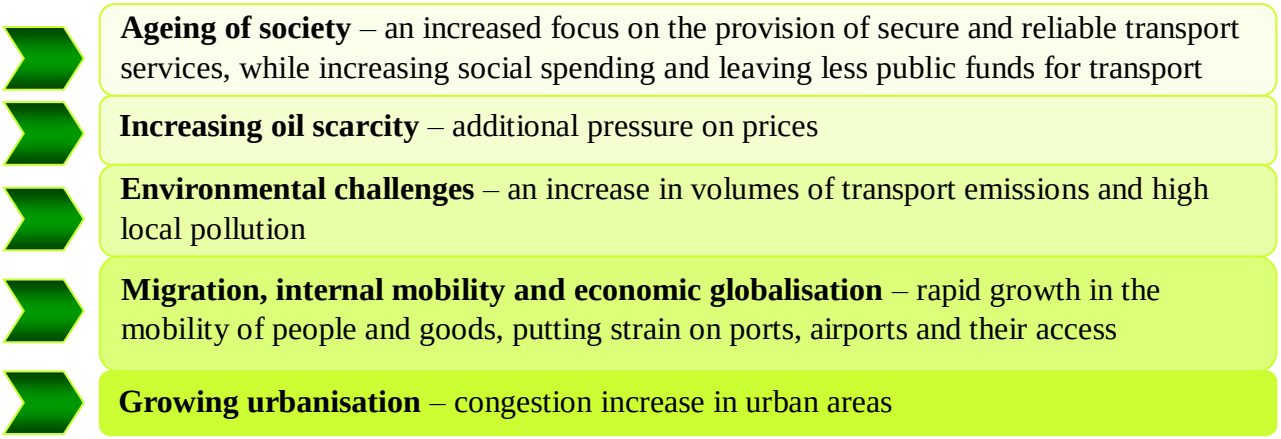

Fig. 2.3. Societal trends challenging the EU transport sector development

The EU enlargement led to the emergence of issues in creating Single European Transport Area, mostly connected with fragmentation whereas the unity of transport networks is needed.

2.4. Recent challenges: COVID-19 economic impacts on the EU transport. Key challenges influencing the EU transport development in the strategic perspective

Recent challenges were connected with COVID-19 economic impacts on the EU transport causing some concerns:

– direct impacts on transport and mobility;

– changes in personal mobility patterns;

– impact on innovation, redirection of investments;

– introduction of additional health and safety measures;
– shifts in EU transport policy.

Important facts	According to the results of 2020, the global volume of cargo traffic decreased by 36%. During the pandemic in the EU countries, the 90% cancellation of flights was recorded, there was a decrease in volumes of transportations: passenger road traffic – by 60-90%, public transport – by 50%. *The aviation sector:* -70% decrease in passenger traffic (in revenue passenger km) in 2020. The most significantly affected *maritime transport sectors:* cruise ships, passenger ships, refrigerated cargo ships and vehicle carriers. The most affected countries: Cyprus, Finland, Latvia, and Portugal. *EU road freight transport* turnover impact was - €64 billion (decrease by 17%), *EU road passenger transport* turnover impact was - €81 billion or -57%. Most impacted countries: Bulgaria, Spain and Sweden.

COVID-19 caused sufficient shifts in all transport sectors, the greatest losses were in the aviation sector. Europe in 2021 is expected to be the worst-hit global region in terms of airline losses (-$11.9 billion) and EBIT margin (-9.5%). Among specific measures to overcome negative effects were: easing the financial pressure on aviation operators and ground handlers, preventing “ghost flights” and ensuring flexibility for airlines (in using slots).

To reduce the negative consequences, comprehensive measures have been implemented to reduce the risk of transmission of COVID-19 and to restore the operation of enterprises in the transport sector.

There are also key challenges influencing the EU transport development in the strategic perspective (Fig. 2.4).

They are connected with the stepwise implementation of the sustainable development concept.

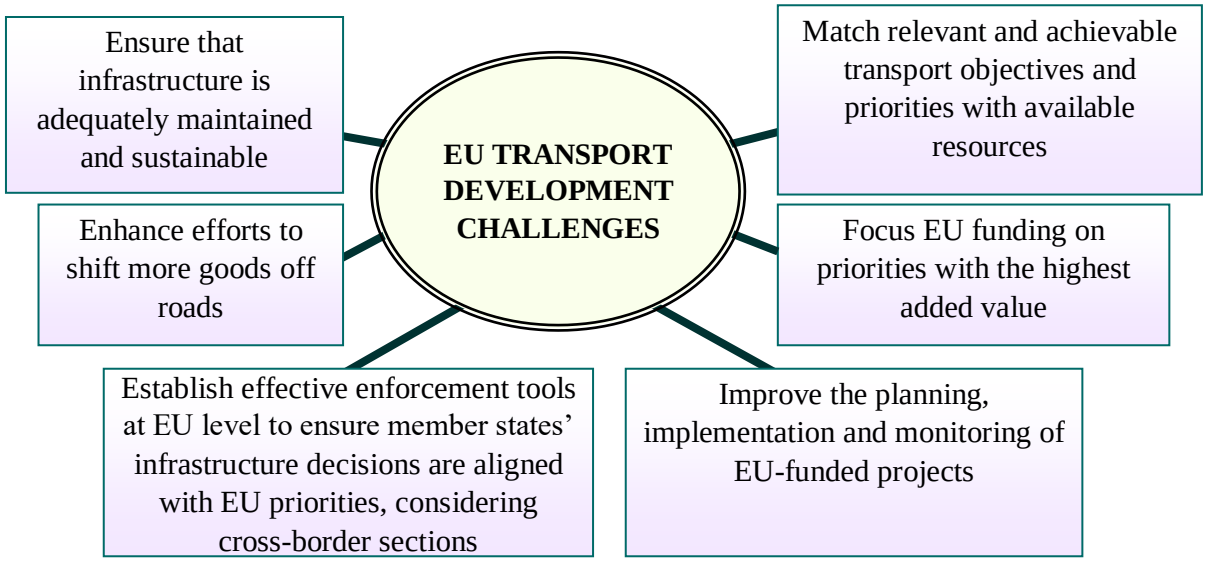

Fig. 2.4. Key challenges influencing the EU transport development in the strategic perspective

There is a need in continuous improvements aimed at higher level of integrity of the EU transport system and optimal interaction of individual components (Table 2.3).

Table 2.3

Solutions in facing strategic development challenges for the EU transport development

Challenges	Description of negative effects	Solutions
1	**2**	**3**
Ensure that transport infrastructure is adequately maintained and sustainable	Implications for quality, safety, efficiency and sustainability	Stakeholders' inputs in building of new infrastructure, as well as maintenance and renewal of existing insufficient infrastructure components.
More effort to shift goods off roads to other transport	Large transport emissions, mainly concentrated in the road sector	Shifting goods from roads to other more environmentally friendly transport modes (rail and maritime/inland waterways) could help reduce transport emissions, which are mainly concentrated in the road sector.
Establish effective enforcement tools to ensure member states' infrastructure decisions are linked with EU priorities	Obstacles to completion of the EU single transport market due to lack in interconnection between Union's and member state's priorities, issues in coordination	Focus on highest-priority projects with high added value for the EU due to limited resources (core network corridors: better links between single lines and the core network, with cross-border sections, prioritisation of core ports and waterways for stepwise elimination of bottlenecks).

Match relevant and achievable transport objectives and priorities with available resources	National infrastructure decisions that don't support the TEN-T core network and the EU policy implementation (example: not building high-speed lines if they were not considered a national priority, even if situated on a transnational corridor and part of the core network)	The long-term planning for building the missing links for the TEN-T core network, closer alignment of national infrastructure decisions with EU policy priorities ensuring on-time, coordinated and economically efficient actions).
Focus EU funding on priorities with the highest EU added value	Non-effective investments in irrelevant projects (example: an unreliable analysis, which led to over-sized and not fully used airport infrastructures funded by the EU; building of high speed lines with limited chance of viability from the social cost-benefit perspective; the funding of similar port infrastructure at neighbouring ports)	Regular monitoring, reliable overall cost management matching by available financial resources, and a particular focus on cross-border sections in the TEN-T core network development.
Improve the planning, implementation and monitoring of EU-funded projects	Unnecessary costs, existing administrative and regulatory barriers in the implementing of infrastructure projects, some EU-funded projects don't deliver sustainable results and impacts and don't contribute to the EU's transport objectives	- Better coordinating and targeting of EU funding - Improve project management and enhance project monitoring - Plan better by performing a thorough upfront costs - benefits analysis - Simplify rules for implementing infrastructure projects

2.5. The EU Road, Rail and Maritime Transport Strategies. Aviation Strategy for Europe

For each transport sector of the EU particular strategies were developed.

The EU Road Transport Strategy to achieve is to promote mobility that is efficient, safe, secure and environmentally friendly.

EU common rules and regulations in the sphere of providing road transport services are as following:

– rules on access to the profession and to the market;

– minimal standards for working time, driving time and rest periods (including for professional road transport);

– minimum annual vehicle taxes;

– common rules for tolls and user charges for heavy goods vehicles.

– harmonisation of the maximum weights and dimensions of road vehicles.

According to the **Rail Transport Strategy** for developing a strong and competitive rail transport industry and well-functioning Single European Railway Area such key areas are significant:

- opening the rail transport market to competition;
- improving the interoperability and safety of national networks ;
- developing rail transport infrastructure.

The 4th Railway Package (2016), a set of 6 legislative texts for completing the Single European Railway Area targeted at revitalising the EU rail sector and make it more competitive comparing with other transport modes, includes two pillars – market and technical.

Basic directions of implementing the *technical pillar* are given in Fig. 2.5.

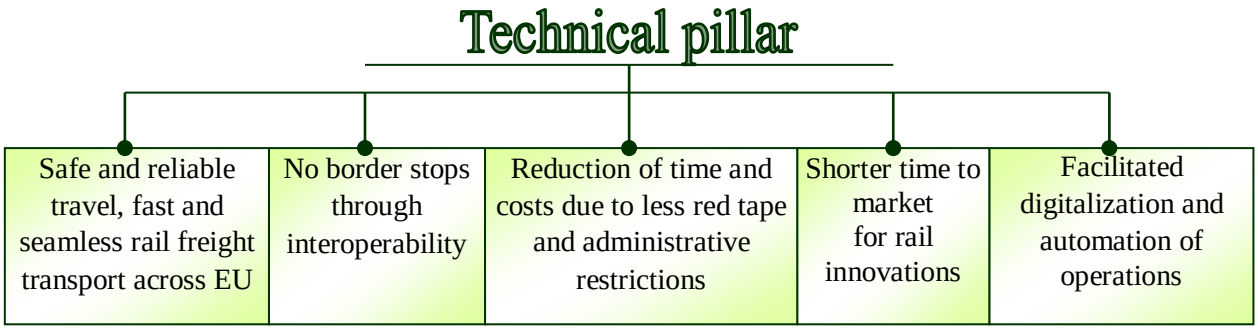

Fig. 2.5. Components of the 4th Railway Package technical pillar

The *market pillar* aimed at completing the process of gradual market opening: the general right for railway undertakings established in one member state to operate all types of passenger services everywhere in the EU, rules aimed at improving impartiality in the governance of railway infrastructure and preventing discrimination and introduces the principle of mandatory tendering for public service contracts.

Within the **EU Maritime Transport Strategy** the following areas of improvement were outlined:

– EU Shipping: A stronger global player (The Green Shipping Guarantee Programme – financial guarantee through EU funds for financing sustainable marine technologies);

– Maritime Safety and Security (legislative framework covering the entire chain meeting the regulations of the International Maritime Organisation, technical solutions for effective maritime monitoring and surveillance activities);

– Environmental Sustainability and Decarbonisation (alternative fuels and efficient engines; collecting waste and handling it in Port Reception Facilities; and recycling ships);

– Raising the Profile and Qualifications of Seafarers and Maritime Professions (programmes for the development of skills, investing in Waterborne R&I);

– Digitalisation and Administrative Simplification (introduction of the vessel traffic monitoring and information system SafeSeaNet, The EU Maritime Single Window environment simplifying administrative formalities in shipping operations).

In the EU aviation sphere there were such milestones as:

1992 – creation of the EU's Internal Market for Aviation.

2004 – adopting Single European Sky (SES).

2009 – implementation of the Single European Sky II (changing focus from capacity to performance).

The common EU aviation policy aims at making Europe the safest air space in the world. Desired result is to generate growth for European business, foster innovation and let passengers profit from safer, cleaner and cheaper flights.

Important facts	Increase in the overall efficiency and competitiveness of the Air Traffic Management in Europe through the implementation of the Single European Sky: ×3 airspace capacity; -50% air traffic management costs; ×10 safety level improvement; -10% CO_2.

There are such **regulative bodies in the EU air transport environment** as:

- *The European Union Aviation Safety Agency (EASA)* – an agency of the EU with responsibility for civil aviation safety.
- *Single European Sky ATM Research (SESAR)* – a collaborative project to completely overhaul European airspace and its air traffic management (ATM).
- *Eurocontrol (the European Organisation for the Safety of Air Navigation)* – international organisation working to achieve safe and seamless air traffic management across Europe.

The EU is the first area in the world where passengers have guaranteed rights across all transport modes. Key principles are non-discrimination; accurate, timely and accessible information; immediate and proportionate assistance.

2.6. Solutions in the EU transport sector

Such solutions as automation, digitalisation, shared mobility and removing barriers to cross-border transport and logistic services highlight emerging trends in the EU transport sector development (Fig. 2.6).

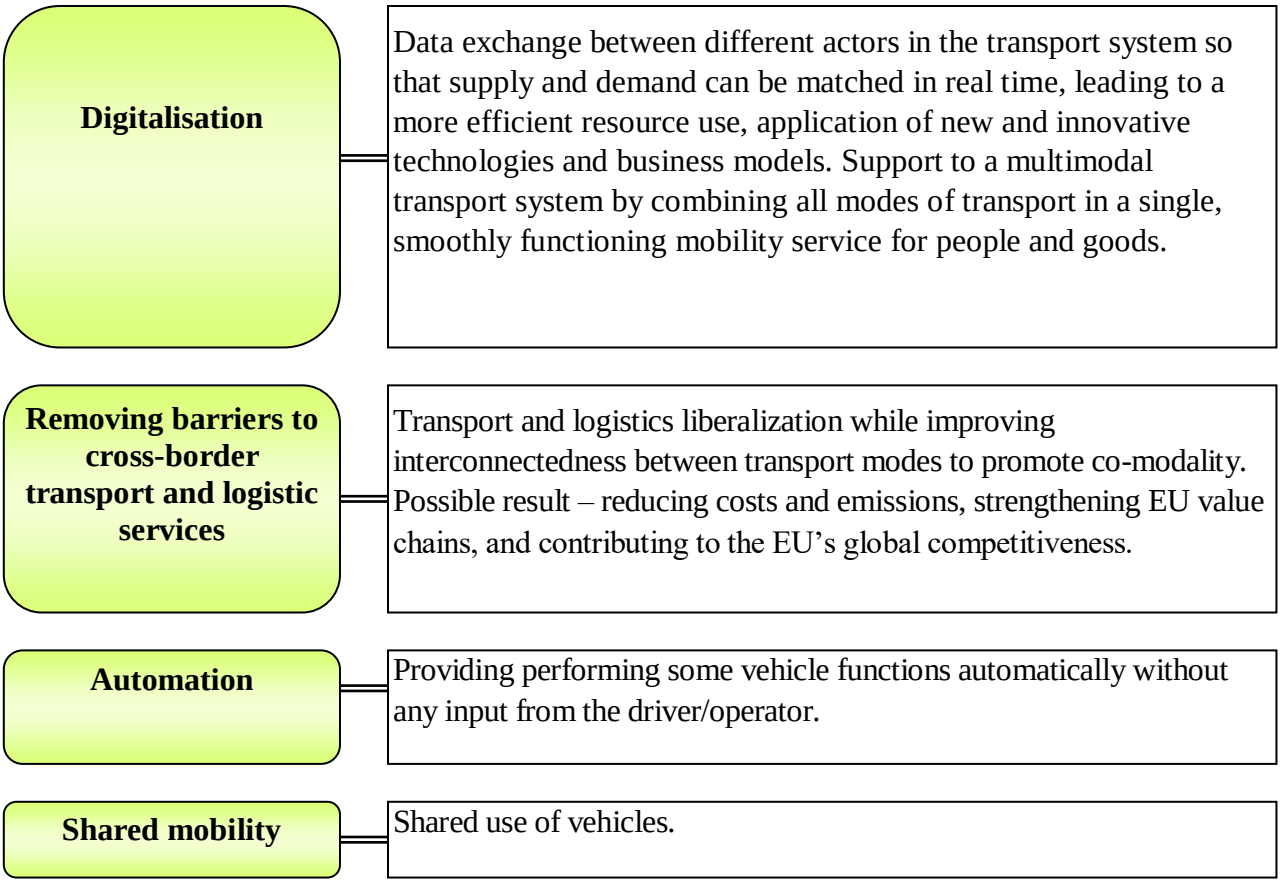

Fig. 2.6. Solutions facing emerging trends in the EU transport sector

The most promising areas are digitalisation and co-modality which will help provide better transport connections, optimize the use of resources and create a seamless unified system in line with the EU's transport sector development strategy. This also meets the modern needs of the market and consumers.

It is important for the EU transport sector to respond comprehensively to the challenges, gradually reducing fragmentation and supporting sustainable development.

Practical tasks

Case study №1 "Impact of COVID-19 on the EU air transport sector and response to it"

The transport industry, being a significant area of the global economy, has not escaped the large-scale negative effects associated with the spread of COVID-19 in the world. International passenger traffic, the major share of which was provided by air transport, has experienced an unprecedented reduction due to the closure of state borders and the imposition of other restrictive measures by governments that have made it impossible for airlines to operate on a regular basis. This has led not only to financial losses for air carriers themselves, but also to a serious reduction in jobs in the sector with further socio-economic consequences.

The impact of the pandemic on freight transport was largely indirect and manifested itself mainly in a reduction in demand for the services of transport companies due to the slowdown in global economic activity. Those air carriers that transported cargo by passenger aircraft were affected in the first place. Problems have also become more complicated due to the disparity of transport capacities, the need to restructure supply chains, the shortage of containers for transportation, etc.

In pandemic conditions transport companies perform an important task to ensure the delivery of medical supplies, individual protective equipment and other vital goods in the face of a shortage.

The current situation led to the growth of demand for alternative freight options, which were previously insufficiently used for economic reasons, but now are gaining new opportunities for development.

The development of measures to restore the transport sector after COVID-19 and address the effects of the crisis may affect the evolution of the transport sector and the emergence of the need to improve transport management and the development of innovative ideas became even more relevant. The need to stimulate innovations in mobile applications and services, introduction of digitalisation, AI and robotics solutions will increase.

For the EU, aviation is a strategically important sector. In pre-COVID period it contributed €300 billion or approximately 2.1% of GDP to the EU economy and supported employment of around 5 million jobs. So, it was important to support it.

In connection with the pandemic, the European Commission has presented a new guide to the implementation of "green corridors" for freight transport at the EU borders. In order to ensure the support of supply chains in the European Union, Member States must identify all relevant internal border crossing points ("green corridors") along the Trans-European Transport Network (TEN-T). Crossing points of the "green corridor" should be open to all vehicles, regardless of the transported goods. Crossing the border, including any inspections and periodic medical examinations, should take no more than 15 minutes.

To alleviate the effects of the pandemic, the European Union has decided to temporarily release airlines from the obligation to use at least 80% of their allocated slots at airports. In addition, the EU Regulation was adopted, which allows to extend the validity of certain certificates, licenses and other permits in the field of transport. The European Commission has proposed allowing a simplified extension of contracts to avoid complicated tendering procedures and to prevent airports from being blocked in the event of company bankruptcies.

In 2020 the European Commission launched the Re-open EU web platform promoting the safe resumption of free movement and tourism in Europe. To help people plan their trips and vacations with confidence, the platform provides an interactive map of information on opening borders, available vehicles, travel restrictions, public health and safety measures such as physical distance or wearing masks, and other practical information for travellers.

Airlines, for their part, have also implemented some measures to reduce damage from losses in COVID-19 and post-pandemic periods.

TASKS. Select airlines originating from EU countries and use the Internet sources to search for information on changes in operating conditions under the influence of COVID-19 and introduced measures. Answer the following questions:

1. What managerial actions were undertaken by the management of the airline company to survive in a pandemic period?

2. What are the air carrier's plans for stabilizing performance and adjusting its activity in the period after overcoming the pandemic situation?

3. On the basis of the constructed matrices carry out benchmarking of the best practices of the airline companies' activity in COVID-19 and post-pandemic periods.

4. Carry out a comparative analysis of the activities of airlines in the EU, North America and Asian regions connected with overcoming in COVID-19 impacts.

5. Perform forecasting of airline companies' development scenarios in the post-crisis period.

Template for performing the task

To perform the tasks use the Tables 2.4-2.6.

Table 2.4

Influence of COVID-19 on performance of the EU air carriers

Indicators	Lufthansa	Swiss International Air Lines	Austrian Airlines	Air France	KLM Royal Dutch Airlines	British Airways	Wizz Air	Ryanair	LOT	…
Reduction of passenger traffic										
Reducing the number of employees										
Reduction of revenues										
Reduction of the number of flights										
…….										

Table 2.5

Changes in operating conditions during the COVID-19 period

Actions of airlines in response to:	Lufthansa	Swiss International Air Lines	Austrian Airlines	Air France	KLM Royal Dutch Airlines	British Airways	Wizz Air	Ryanair	LOT	…
Reduction of flights across Europe	+	+	+	+	+	+	+	+	+	
The need to comply with sanitary requirements										
Falling energy prices										
Impossibility or restriction of transportation of goods by passenger aircraft										
Disparity of transport capacities										
Disrupted supply chains										
Shortage of containers for transportation										
Increase of air tariffs										
…										

Table 2.6

Air carriers' plans for stabilizing performance and adjusting its activity in the period after overcoming the pandemic situation

Actions of air carriers	Lufthansa	Swiss International Air Lines	Austrian Airlines	Air France	KLM Royal Dutch Airlines	British Airways	Wizz Air	Ryanair	LOT	…
…….										

Make a conclusion on future changes in European aviation, including the air travel sector, caused by COVID-19 impact.

Case study №2 "Development of the EU freight road transportations"

Bulgaria, Romania, Poland, Hungary, Slovakia and the Czech Republic, which can be considered as rather new members of the EU comparing with others, received an increasing share of road transport at the interstate level in the EU last years. These countries have already surpassed Spain in terms of their economic potential, and are approaching France's figures.

Exports from the European Union to other countries from the beginning of the lockdown decreased by 9.4% compared to 2019, and imports by 11.6%. EU domestic trade fell by 7.5%. The transport and logistics industry has also changed. The crisis following the change in demand, the closure of industrial enterprises and the imposition of restrictions has led to an imbalance in freight flows.

Due to the pandemic situation special COVID-19 restrictions and facilitation measures in the EU road transport were implemented (Fig. 2.6).

But, for example, the state of German logistics for the first time since 2019 has returned to the green zone. As *Germany* makes up the largest part of Europe's economy, it is expected that this trend will soon spread to other EU countries.

Europe is gradually recovering from the effects of the COVID pandemic. According to Eurostat, in the 2nd quarter of 2020, the EU economy had a slight decline of 13.9% (compared to the same period in 2019), but the situation with the Euro area is slightly worse – there was a reduction of 14.7%.

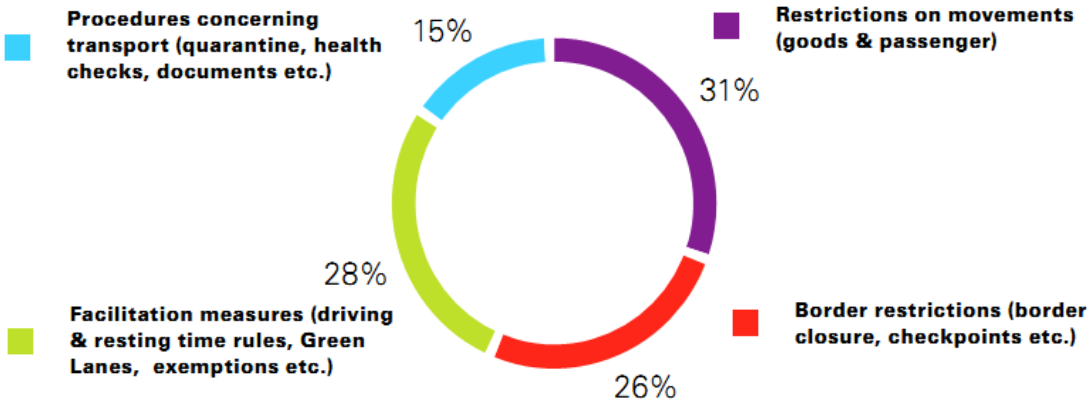

Fig. 2.6. COVID-19 restrictions and facilitation measures in the EU road transport

Spain suffered the most losses, with a decline in GDP by 22.1%. But *Ireland* felt most confident with 3.7%.

Among all European countries, *Poland* showed remarkable stability with a rate of 7.9%. The volume of cargo transportation by Polish cars has increased more than 6 times since 2017. In 2018, export traffic accounted for 72% and import 45%. About 64% of Polish freight traffic is on international routes. In addition, e-CMR has been actively tested in Poland since September 2020.

The freight market in *France* is in a slightly better position than at the beginning of the pandemic. Carriers of dangerous goods (a decrease of 70%) and owners of motor vehicles (a decrease of 76%) had the greatest negative impact. Currently, 89% of goods are still transported by trucks.

Nowadays there is a trend of shifting goods from roads to other more environmentally friendly transport modes (rail and maritime/inland waterways) that could help reduce transport emissions, which are mainly concentrated in the road sector. Also initiatives on the transportation using automated vehicles are relevant.

Hungary has additionally allocated 900 transit permits for Ukrainian carriers without paying the transport tax for 2020. In addition, the quota for 2021 was 31,750 permits for international transportation. Also there were re-initiated discussions with Romania on the issue of additional exchange of permits. The 8,000 permits previously issued to Ukrainian carriers were not enough to carry out full-fledged international cargo circulation.

At the end of May 2021, new provisions of the TIR Convention concerning eTIR entered into force. These changes will allow for a completely paperless transboundary transit of goods under a TIR customs guarantee.

TASKS:

1. Identify the main trends in the EU road transport sector of different EU member countries. For this, use the Eurostat data and European Commission reports additionally.

2. What were the main problems of the freight road transportations in COVID-19 period? Where the measures named in Fig. 2.6 helpful to change situation for better?

3. Determine the potential and future perspectives of the EU road transport sector development, compare it with potential of other transport sectors. Consider it additionally from the point of view of the EU Green Deal and implementing Sustainable and Smart Mobility Strategy.

4. Analyse perspectives of Ukrainian transport and logistics companies in international cargo transportations considering the trends on the EU market.

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3. EUROPEAN TRANSPORT AND LOGISTICS CLUSTERS

Theoretical material

3.1. Modern trends in logistics and supply chain management

Primarily, it is necessary to consider top trends in logistics and supply chain management. So, they will be insights in the future development directions of the transport sector (Fig. 3.1).

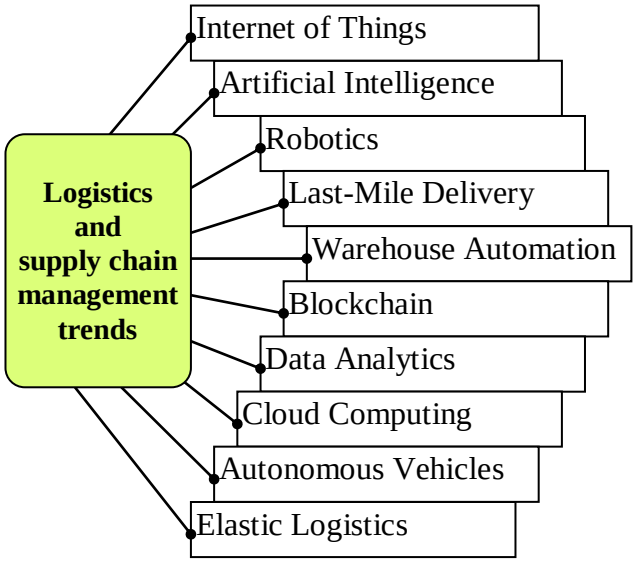

Fig. 3.1. Top trends in logistics and supply chain management

Internet of things (IoT) can be considered as a dominating trend. In transport sector it is implied in providing fleet management (platforms to control and manage fleet) and real-time supply chain visibility (platform for accurate tracking of shipments throughout the supply chain).

Artificial intelligence (AI) is used almost everywhere. In logistics it can be applied for demand forecasting (machine learning-enhanced platform for risk assessment and demand forecasting to automate process decisions and control operational conditions) and process optimization (software allowing companies to improve their logistics processes and reduce costs).

Integrating *robotics* into logistics can speed up and increase accuracy of supply chain processes and reduce human factor issues, increase productivity.

Interesting fact	Europe mobile logistics robot market reached USD 735.1 million in 2019 and will grow by 27.6% till 2026. Main EU logistics robot markets: Germany, France, Spain and Italy.

Last-mile delivery is another relevant challenge. At present there are solutions for ensuring efficiency and customer satisfaction on the last step of the supply chain (from the warehouse or distribution centre to the customer).

Interesting fact	The largest number of pick-up drop-off (PUDO) and automated parcel machine (APM) is available in Poland (11,000), Spain (10,000) and Germany (7,000). The densest out-of-home network is in Finland.

In accordance with European Logistics Industry forecast till 2024 the logistics market in Europe will grow by $ 217.52 billion (at a compound annual growth rate of 3%). Opportunities are represented by strong demand for e-commerce, increasing number of M&As, development of TEN-T.

3.2. Transport and logistics clusters in the EU: the essence, features and factors of formation

Addressing priorities in the development, challenges of the EU transport sector and trends in logistics and supply chain management of the EU transport sector lead to the need to make some solutions. Creating clusters can be considered as one of the ways to support strong EU transport sector.

Transport and logistics cluster	A group of geographically localized interconnected companies specializing in storage, forwarding and transportation of goods and passengers, organizations serving infrastructure, R&D, educational institutions, and other supportive organizations aimed at increasing the competitiveness of transport and logistics services.

Transport and logistics clusters link together international transport corridors, transport hubs of mainline infrastructure, mainline, regional and local tracks, transport and distribution logistics centres.

Main features of transport and logistics clusters are as following:

- representing cluster of services that differs from classical cluster for manufacturing goods;
- clusters are created in areas with strong transit potential;
- combination of cooperation and competition relations;
- geographical proximity of main participants;
- interlinks between technologies;
- common supplying base;
- innovative component of activity.

There are some *prerequisites of creating transport and logistics clusters*, among them: growing transport needs; issues in connectivity, frequency and not enough volumes; insufficient economic efficiency and lack of social responsibility; poor communications; existing bottlenecks and missing links; inability to ensure the desired level of quality of transport and logistics services under the existing conditions; lack of innovative solutions; problems with accessibility; other issues.

The cooperation in establishing a cluster is a stepwise process consisting of stages (Fig. 3.2).

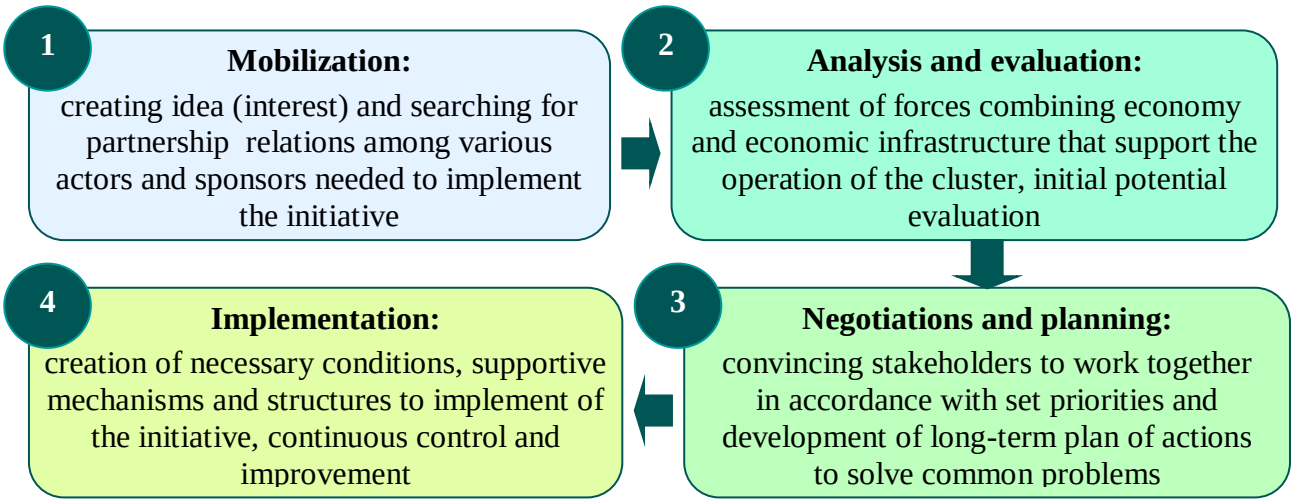

Fig. 3.2. Steps of the cooperation in establishing a transport and logistics cluster

Detailed stages of the transport and logistics cluster formation include:

- definition of transport and logistics type of cluster;
- formation of its institutional and organizational structure;
- determining the composition of cluster entities;
- quantitative analysis of the cluster and determination of the structure of relationships between cluster's participants;
- analysis of the competitive environment and innovation component of the cluster;
- determining the degree of success of the cluster.

Nevertheless the necessary conditions should be created and ensured, namely support of the EU, member state's government and local authorities, sufficient development of transport infrastructure, support for the introduction of relevant market initiatives, demand on transport and logistics services in the region.

3.3. Types of European transport and logistics clusters

There is a variety of transport and logistics clusters depending on different signs: primary transport and logistics clusters (including global logistics clusters) and secondary transport and logistics clusters.

Medium efficiency clusters in transport and logistics in the EU are located in Germany (Darmstadt), Spain (Galicia, Pais Vasco, Madrid, Castile and Leon, Castile-La Mancha, La Comunidad Valencia, Andalusia, Canary Islands), France (Rhône-Alpes), Italy (Liguria, Lombardy, Lazio), Romania (Northwest, Center, West), Slovakia (Western Slovakia).

Port, border and regional clusters are main types of European transport and logistics clusters.

Port clusters	Transport and logistics clusters created on the basis of seaports and are more positioned as freight, as cargo traffic share is dominative.

The **EU port clusters** can be characterized in the following way:

– ports are core of the cluster;

– main activities: transport and cargo handling, logistics activities, industrial activities, energy activities.

– mostly focused on freight transportations (passenger maritime ports and river ports can be parts of port transport and logistic clusters);

– clustering of ports around a maritime range and clustering of activities around the port.

– main elements: ports, terminals, shipping companies, shipyards, shipbuilding companies, suppliers of related industries, research centres, educational institutions, regulatory structures, financial institutions.

Port clusters are represented by *port gateways* and *transhipment (interlining) ports* (Table 3.1).

Table 3.1

Features of port gateways and transhipment ports

Port gateways	Transhipment ports
▪ transhipment operations from sea routes to land or vice versa are main type of operations; ▪ connect the maritime transport network with land transport infrastructure.	▪ transhipment operations from one ship to another is the predominant type of operations.

For better cooperation in transportation and logistics different partnerships were created. Among them *European Network of Maritime Clusters*, consisting of 20 member countries, can be mentioned. It was created to establish an efficient framework for maritime sectorial cooperation, focused on vocalizing the unambiguous maritime interest to European policy makers towards a European maritime level playing field; a single European Maritime Cluster.

Interesting facts	*Rotterdam* is the largest and most important offshore cluster in the Netherlands providing an access point for the offshore industry. The Rotterdam region is home to a wide array of storage, refining and transport assets for the oil and gas sector. *The Port of Antwerp (Belgium)* is the leading European diversified oil and chemical cluster. Its creation provided congestion free terminals and a smooth and swift transfer to the European market.
Border clusters	Transport and logistics clusters formed on the basis of transport nodes at the intersections of major international transport corridors with state borders and have cargo specialization.

Border clusters include operating road and rail transport infrastructure. Padborg (Denmark) is an example of such a transport and logistics cluster.

Regional clusters	Transport and logistics clusters formed on the basis of transport systems of medium and large cities, urban agglomerations (metropolises, megacities, where the city is integrated with the suburbs and around located settlements).

Regional clusters cover both passenger and freight sectors. Frankfurt am Main, Germany Example is an example of the regional transport and logistics cluster.

Also there are different initiatives supporting clustering funded by the EU.

The European Cluster Partnerships have been launched by the European Commission to encourage clusters from Europe to intensify collaboration across regions and sectors.

The European Cluster Collaboration Platform was created to be the European online hub for cluster stakeholders (cluster organizations, policymakers and other related stakeholders from the cluster ecosystem) and the reference one-stop-shop for stakeholders in third countries aiming to set up partnerships with European counterparts.

The ultimate impact of such multi-partner platforms is to strengthen the competitiveness and sustainability of Europe's economy and industry, particularly SMEs, improving their performance in terms of productivity, innovation, internationalization and resource efficiency.

European Association of Transport & Logistics Centres supports initiatives in the direction of creating strong and competitive transportation and logistics spheres.

Transport and logistics centres	Defined areas within which all activities relating to the transport, logistics and distribution of goods, both for national and international transit, are carried out by various operators on a commercial basis.

Transport and logistics centres (TLCs) play a significant role in the EU economy development.

TLCs are key in supporting the development and operation of a modern, more efficient and sustainable EU transport and logistics system:

- Providing tailored infrastructures, facilities and services to underpin and enhance the development of specialist activities within the transport and logistics market.
- Generating synergies, effectiveness and added value to transport and logistics operators in comparison with traditional and generic industrial facilities.
- Securing a more efficient connectivity with the main local, regional, national and TEN-T.
- Promoting the use of intermodal transport solutions when connecting long haul and the last mile transport services.
- Serving cities and supporting sustainable and innovative urban distribution services.
- Fostering the delivery of innovative and state of art transport and logistics services through the promotion and facilitation of specialist training and the use of new technologies.

TLCs are characterized with particular features (Fig. 3.3).

Germany, Spain, France and Italy are key locations of transport and logistics centres in the EU (47,9% of the total number of TLCs and 62,1% of their gross surface). Before Brexit there were 240 TLCs providing approximately 25.891 Ha of gross surface specifically designed, built and equipped for the development of transport and logistics activities.

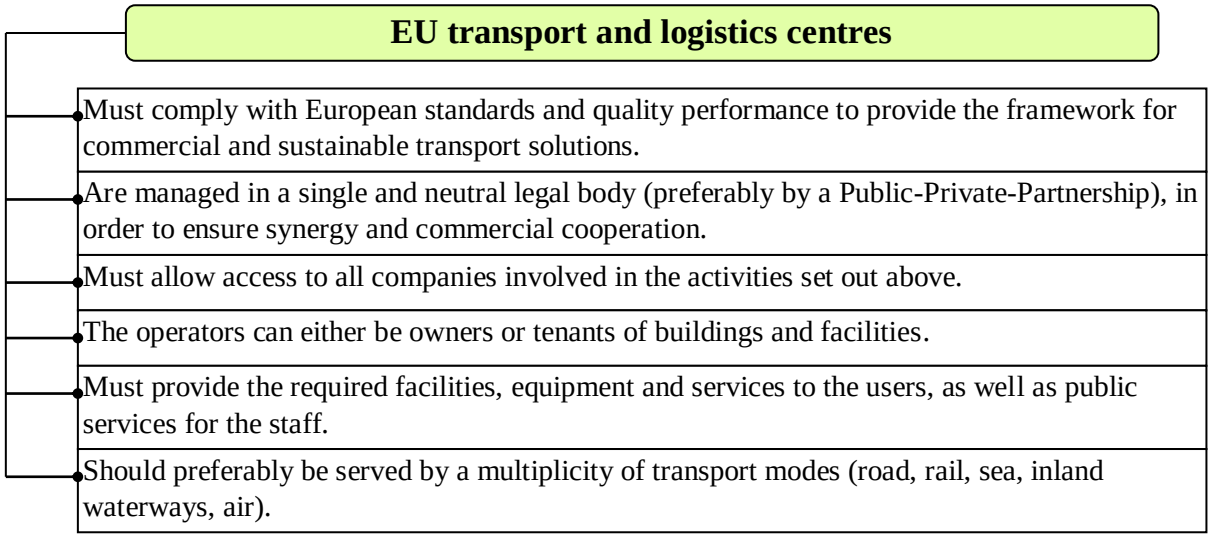

Fig. 3.3. Key characteristics of the EU transport and logistics centres

3.4. Effects of cluster transport and logistics interaction

Main impacts of transport and logistics centres in the EU can be considered through economic, social, sectorial and environmental aspects (Table 3.2).

Table 3.2

Impacts of transport and logistics centres in the EU

Economic impact	Social impact	Sectorial impact	Environmental impact
▪ Supporting efficiency and cost reduction. ▪ Creation of added value along the supply chain inherent to any economic activity. ▪ Are able to generate direct and indirect employment with lower investment rates than other industrial and service activities.	▪ The management board of TLCs provides the necessary critic mass and recognition within the local, regional and national scale, to facilitate the necessary stakeholders management, promoting a more active cooperation with them and a more ambitious corporate social responsibility.	▪ Facilitating a broad modernization and sophistication of the transport and logistics services provision. ▪ Fostering quality and innovation ▪ Generating synergies and critic mass when required in the delivery of a particular transport and logistics specialist services.	▪ The widely accepted standards in the design, build and operation of TLCs imply a more careful and responsible approach to visual and acoustic impacts, waste management, usage of renewable energy and materials. ▪ A more strict design and implementation of compensation measures.

There are some **effects of cluster transport and logistics interaction** defining their importance, among them:

- reduction of operating costs by optimizing logistics chains, obtaining certain mutual preferences between participants;
- reduction of transaction costs due to the creation of a single cluster environment;
- addressing relevant challenges in transport and logistics area using joint efforts by cluster participants – congestion, noise, land use and local pollution issues;
- improvement of connectivity – hyper connected network of logistics hubs and clusters.

Impacts of cluster transport and logistics functioning can be considered at different levels – industry, regional, integration union and transnational.

Relevant **issues in using full potential of the EU transport and logistics clusters** cover the following:

- not enough coordination between the local actors in the cluster;
- not enough connectivity and coordination among European logistics clusters.

Removing the problems can lead to the maximization of using the full network potential of the clusters and related hubs.

It can be concluded that transport and logistics clusters can be really strong platform for the development of the EU transport sector.

Practical tasks

Case study №1 "The best practices of the EU port clusters"

Investigate given examples of successful EU port clusters' operation, additionally find other examples and summarize information in the form of Table 3.3.

1. Rotterdam is the largest and most important offshore cluster in the Netherlands.

The Port of Rotterdam provides an access point for the offshore industry. The Rotterdam region is home to a wide array of storage, refining and transport assets for the oil and gas sector (Fig. 3.4).

Structure consists of the port, the refineries of integrated oil and gas companies, oil storage infrastructure.

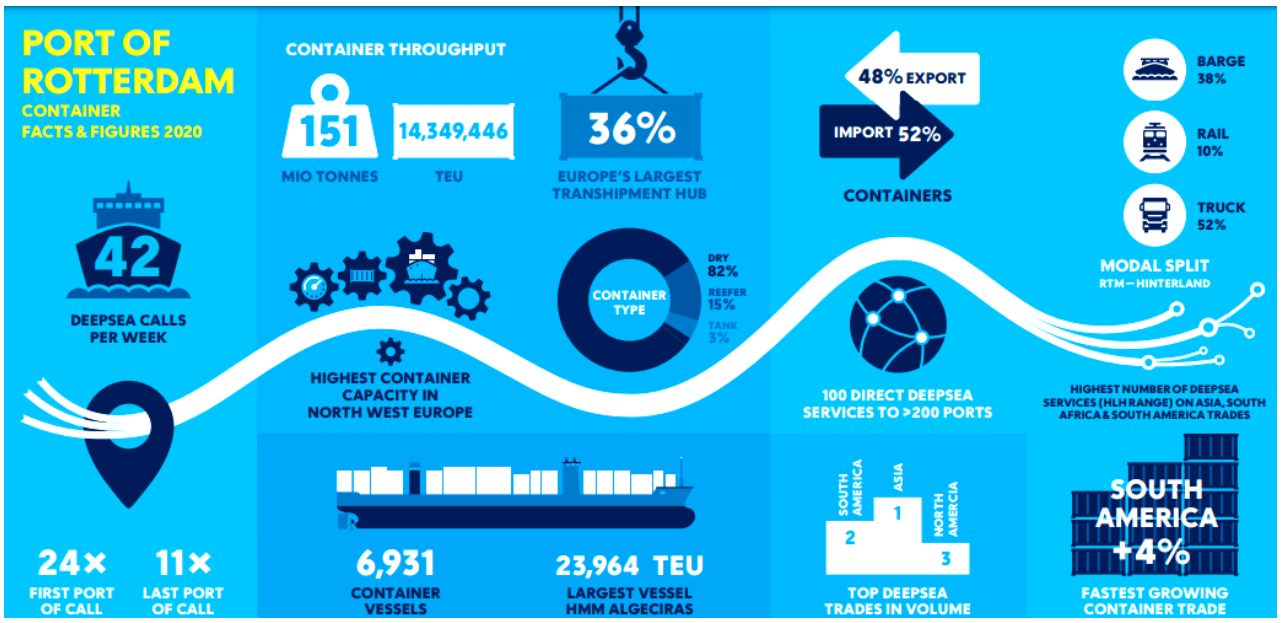

Fig. 3.4. Main indicators of Rotterdam as the largest offshore cluster in the Netherlands

2. The Port of Antwerp (Belgium) is the leading European diversified oil and chemical cluster (Fig. 3.5).

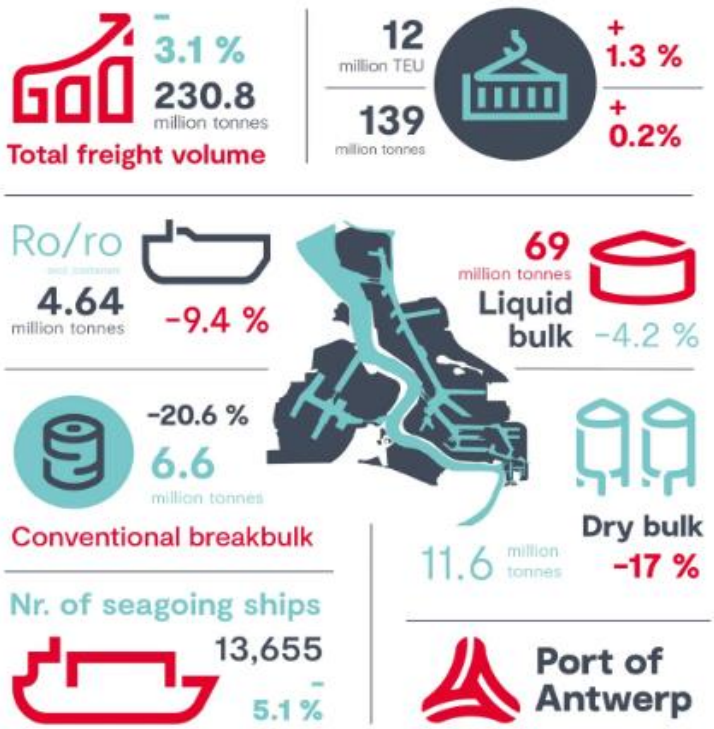

Fig. 3.5. Main indicators of the Port of Antwerp as the leading European diversified oil and chemical cluster

Structure of the Antwerp Chemical Cluster includes:

- port;
- 7 of the world's top ten (petro) chemical companies with one or more production units;
- 5 refineries;
- 4 steam crackers;
- a number of downstream production facilities.

Main results: congestion free terminals and a smooth and swift transfer to the European market.

Table 3.3

Generalized information on EU port clusters

№	Cluster name	Cluster specialization and operations performed	Reasons of the clusters' creation	Components of the cluster	Partnerships	Main impacts on EU economy
1.						
2.						
3.						
4.						
5.						
6.						

TASKS:

1. Identify the main prerequisites and factors that contribute to the creation of transport and logistics clusters. What are the restraining factors for their creation and development?
2. Analyse key impacts of the port clusters on the EU economy development.
3. Study main logistics solutions in the EU ports affecting positively their effectiveness, efficiency and sustainability.

Case study №2 "Berlin-Brandenburg: the Cluster for transport, mobility and logistics"

Germany, Spain, France and Italy are key locations of transport and logistics centres in the EU (47,9% of the total number of TLCs and 62,1% of their gross surface). It can be seen in Table 3.4.

Table 3.4

Location of transport and logistics centres in the EU

COUNTRY		TLCs			
#	Name	Number (#)	%	Surface (Ha_{TLC})	%
1	Germany	35	14,6%	6.132	23,7%
2	Spain	33	13,8%	3.726	14,4%
3	France	26	10,8%	2.756	10,6%
4	Italy	21	8,8%	3.460	13,4%
5	The Netherlands	15	6,3%	999	3,9%
6	Czech Republic	11	4,6%	496	1,9%
7	Sweden	10	4,2%	445	1,7%
8	United Kingdom	9	3,8%	858	3,3%
9	Denmark	7	2,9%	1.195	4,6%
10	Belgium	7	2,9%	977	3,8%
11	Hungary	7	2,9%	216	0,8%
12	Portugal	6	2,5%	393	1,5%
13	Poland	6	2,5%	346	1,3%
14	Slovakia	6	2,5%	89	0,3%
15	Austria	5	2,1%	867	3,3%
16	Finland	5	2,1%	330	1,3%
17	Croatia	4	1,7%	465	1,8%
18	Luxembourg	4	1,7%	124	0,5%
19	Ireland	4	1,7%	55	0,2%
20	Lithuania	3	1,3%	592	2,3%
21	Estonia	3	1,3%	340	1,3%
22	Cyprus	3	1,3%	95	0,4%
23	Greece	2	0,8%	263	1,0%
24	Slovenia	2	0,8%	158	0,6%
25	Latvia	2	0,8%	105	0,4%
26	Malta	2	0,8%	89	0,3%
27	Romania	1	0,4%	250	1,0%
28	Bulgaria	1	0,4%	70	0,3%
		240	*Total*	25.891	100,0%
			Average	108	

The *Cluster Transport, Mobility and Logistics Berlin-Brandenburg (Germany)* is focused on automotive, logistics, aerospace, rail systems technology and intelligent transport systems.

It has integrated 630 cluster members including:

- 380 SME sand 80 large companies;
- 70 research organizations;
- universities;
- technology centres;
- 100 other ecosystem actors.

Mission: to give business and technology support to companies, investors and scientific institutes in the German Capital Region Berlin-Brandenburg, facilitating integration of business-enhancing tasks with business service (inventory management), business development and start-up support.

It results in the spheres of identification, development and demonstration of electromobility for ensuring future-oriented mobility; perspective development of smart and intelligent intermodal and multimodal mobility solutions.

TASKS:

1. Analyse economic, infrastructural, political and legal, social, technological and market factors influencing the functioning of the cluster in particular countries. What are the main reasons of Germany, Spain, France and Italy being key locations of transport and logistics centres in the EU?

2. Determine the need for inclusion of SMEs, large companies, research organizations, universities, technology centres and other supporting organizations in the Cluster Transport, Mobility and Logistics Berlin-Brandenburg. What are their main roles and functions?

3. Why can the creation of the cluster can be a good opportunity in introducing modern multimodal mobility solutions? Study the basic impacts of comodality in the perspective development of the EU transport sector.

Case study №3 "Clusters 2.0 as Horizon 2020 project imitative for sustainable solutions"

Clusters 2.0 is a EU funded Horizon 2020 project aimed at solving issues in transport planning and optimization with logistic clusters for the creation of sustainable, efficient and fully integrated transport system (Fig. 3.6).

It relies on an Open Network of Logistics Clusters operating in the frame of TEN-T and supporting local, regional and European development.

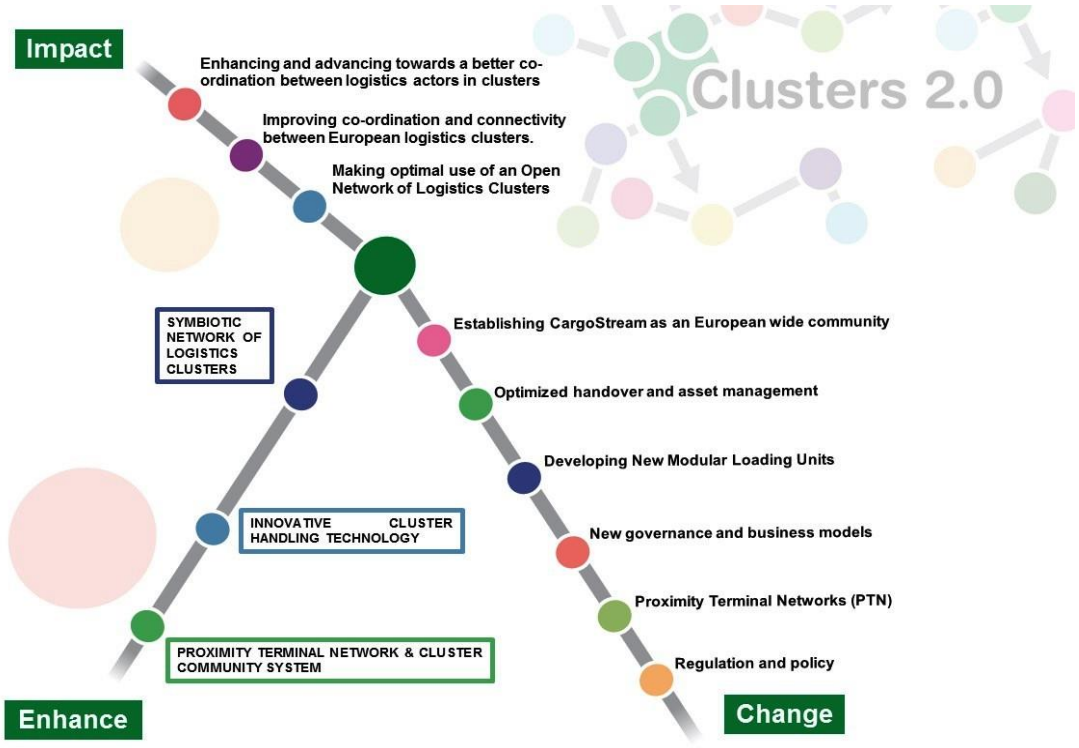

Fig. 3.6. Framework of Clusters 2.0 implementation

Clusters 2.0 aimed at:

- increasing the engagement, performance and coordination of terminals and hubs in the clusters;
- achieving a significant step forward in the European Transport performance through a hyper connected network of logistics hubs and clusters;
- developing low cost, low capital and investment intensive enhanced goods handling and transhipment solutions.

There are 27 partners in Clusters 2.0 project representing different kinds of stakeholders participating in the logistics chain, among them: PTV Planung Transport Verkehr AG (Germany), Procter & Gamble Services Company NV (Belgium), Consorzio IB Innovation (Italy), Fundacion Zaragoza Logistics Center (Spain), Chambre de Commerce et d'Industrie Artois (France), Trelleborgs Hamn AB (Sweden), Piraeus Container Terminal SA (Greece), Heathrow Airport Limited (United Kingdom), DHL Global Forwarding (Belgium), Universiteit Antwerpen (Belgium).

Clusters 2.0 initiative is intended on addressing congestion, noise, land use and local pollution levels issues.

TASKS:

1. Study the Clusters 2.0 as a funded Horizon 2020 project. Identify main features and shifts it can bring to the TEN-T and regional development.
2. Analyse the interests of partners in Clusters 2.0 project implementation.
3. Identify the objectives of EU national and regional cluster programs. Investigate the features of "smart" specialization of regions in ensuring effective EU cluster policy. What are the main trend in the development of clusters in the European region?
4. Explore the specifics of applying specific approaches and programs to support enterprise clusters in different EU countries.

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4. PROSPECTS AND PROBLEMS OF IMPLEMENTATION OF THE EU TRANSPORT STRATEGIES

Theoretical material

4.1. Key ideas of the EU's transport of future

The EU efforts are focused on censuring smart, green and integrated transport (Fig. 4.1).

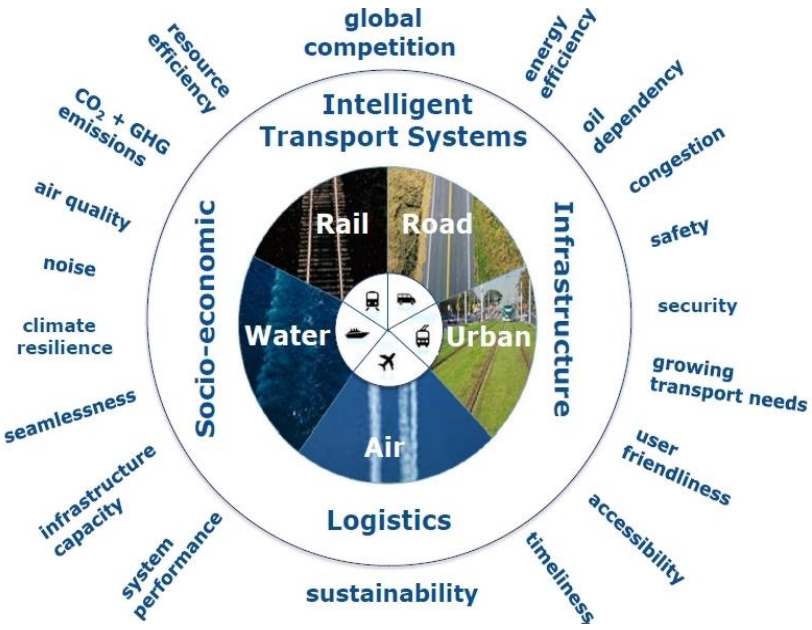

Fig. 4.1. Main dimensions of the EU's transport of future
Source: European Commission

For this, the **Strategic Plan 2020-2024** was adopted considering such aspects:

- *European Green Deal* – a sustainable transport area reducing transport impact on the environment, providing healthier and cleaner options to mobility and increasing the use of sustainable alternative fuels for land, waterborne and air transport in the EU and globally.

- *Europe fit for the digital age* – a smart and innovative transport sector that makes the most of digitalisation and automation, supported by adequate funding.

- *Economy that works for people* – a fully integrated and connected TEN-T with appropriate funding for a robust and modern European transport infrastructure with fully restored connectivity; an efficient and accessible internal market for transport that drives economic recovery and is governed by clear rules that are applied and enforced consistently.

- *Stronger Europe in the world* – EU that acts united in cooperation with key partners and neighbours to improve connectivity links, open-up new market opportunities and promote high safety and security standards.

- *Promoting our European way of life* – high levels of transport safety and security are ensured and new security and safety challenges are addressed.

Strategic directions of the EU actions towards the transport of future are multifaceted (Fig. 4.2).

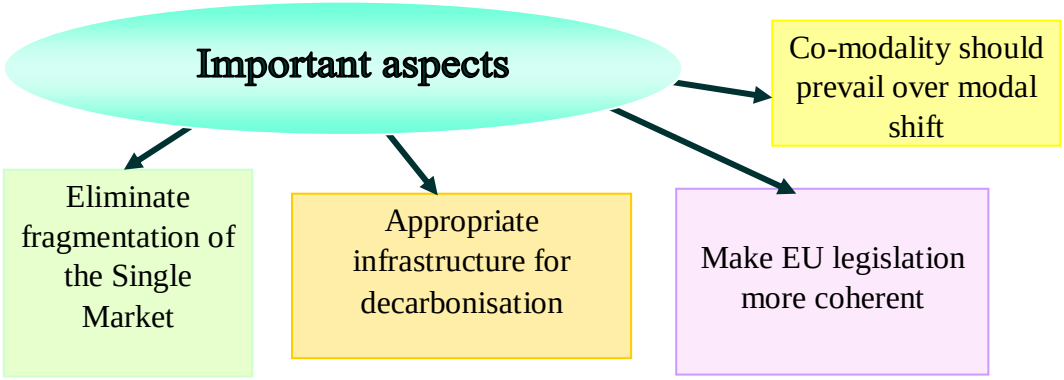

Fig. 4.2. Important aspects to support the EU's transport of future

Important fact	*Key ideas of the EU's transport of future* include: - Mobility should remain affordable, reliable and accessible for all Europeans. - Promote system-level innovation and collaboration between stakeholders in cities. - Explore the opportunities and challenges of micro-mobility concepts.

4.2. Stages of implementation of the EU Mobility Strategy: sustainable and smart until 2030, 2035 and 2050

The transport sector needs very comprehensive and consistent policies which focus on the paradigm shift considering two global trends – greening and digitalization of transport systems.

Sustainable and Smart Mobility Strategy 2020 stated that it is necessary to achieve a 90% cut in emissions by 2050 by delivering a smart, competitive, safe, accessible and affordable transport system.

The European Climate Pact empowers citizens and organisations to get involved in climate action.

Green transport is one of the focus areas.

There are three **goals of the Sustainable and Smart Mobility Strategy 2020:**

- *Sustainability:* providing zero-emission mobility; sustainable urban mobility; specific incentives for sustainable choices.

- *Digitalization and Automation:* ensuring large-scale multimodal connected and automated mobility; smart mobility through innovations, AI, data analysis and robotics support.

- *Resilience:* creating strong and resilient Single Market; ensuring fair and inclusive mobility; high security and safety standards.

The transport sector's business environment and its working conditions depend on the policies of the EU, considering actions taken by national, regional and local authorities determining importance of regulatory acts, funding, supportive actions and coordinating activities.

The EU Mobility Strategy implementation was planned by stages: actions that should be done by 2030, 2035 and 2050 (Fig. 4.3).

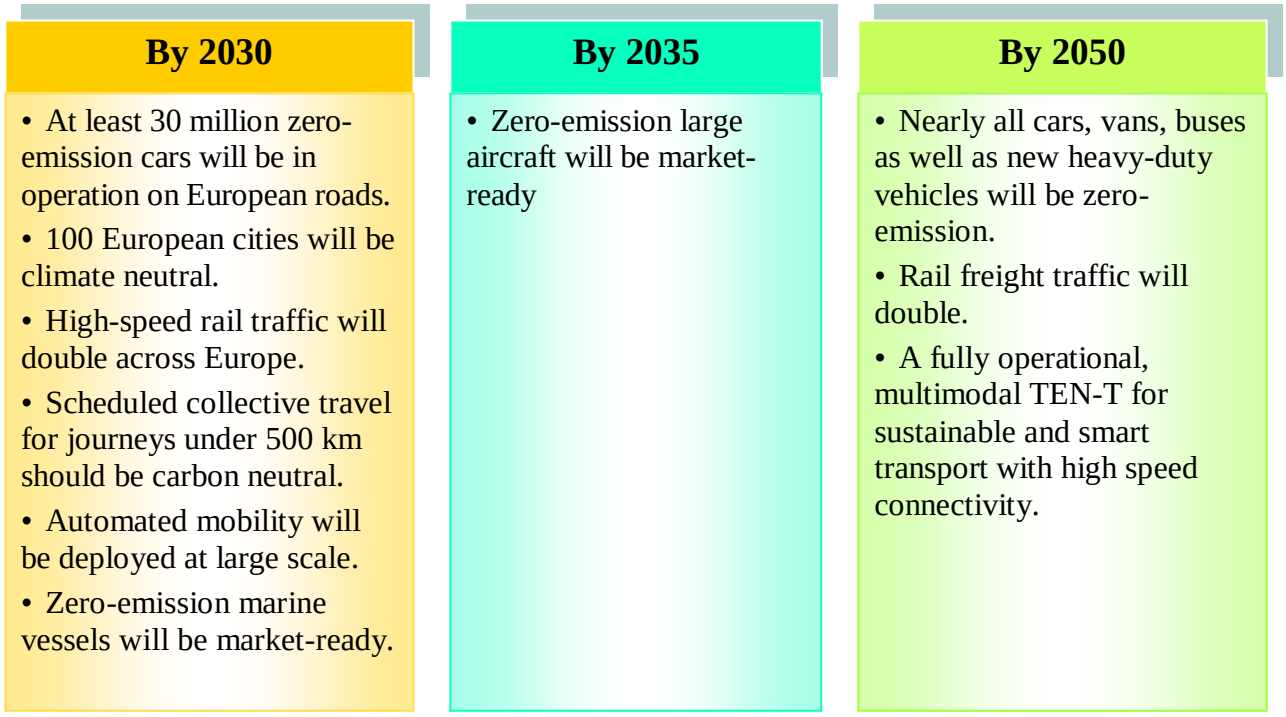

Fig. 4.3. Stages of the EU Mobility Strategy implementation

Till 2050 a fully operational, multimodal Trans-European Transport Network (TEN-T) for sustainable and smart transport with high speed connectivity must be created.

In term of the EU Mobility Strategy there are various impacts on transport modes: road, rail, air transport and waterborne transport.

Sustainable mobility means making all transport modes more sustainable, making sustainable alternatives widely available in a multimodal transport system, putting in place the right incentives to drive the transition.

Directions for sustainable mobility cover the following:

- Boosting the production, distribution and use of renewable and low-carbon fuels in transport and supporting the replacement of existing fleets with low- and zero-emission vehicles.
- Increase the number of passengers travelling by rail and commuting by public transport and active modes.
- Shifting a substantial amount of freight onto rail and inland waterways.
- Implementation of the 'polluter pays' and 'user pays' principles in all transport modes (through carbon pricing and infrastructure charging mechanisms).
- sustainable first and last mile for citizens and goods.

Full decarbonisation of the EU transport sector should be achieved by 2040.

Important fact	European transport policy has historically been based on a 'modal shift' approach, from road to other modes – particularly rail. Road transport remains the preferred mode because it is reliable, safe, flexible and fast both for passenger and freight transport, over both long- and short-distance journeys. The various transport modes are complementary. Digitalisation is reshaping mobility and opening new potential for co-modality.

Multimodality has really great future. In the EU transport sector it means the use of different modes (or means) of transport on the same journey (for freight and passenger transport).

It can bring such benefits as: to offer more efficient transport solutions for people and goods which will help ease the pressure on congested roads, and make the whole sector more environmentally friendly, safer and cost efficient.

Hence, the European Commission pursues a policy of multimodality by ensuring better integration of the transport modes and establishing interoperability at all levels of the transport system. This can create a truly sustainable and integrated EU transport system.

Research and innovation to support EU transport of the future is a key to success, in particular:

- *European flagship initiatives on mobility* (for example, focus on mobility innovation that bring together universities, research centres and players from the entire automotive value chain to support the development and roll-out of connected and automated driving by removing regulatory obstacles to the cross-border deployment of new mobility technologies by ensuring fair access to vehicle data while ensuring safety and security). Also establishing the required digital communications infrastructure (V2X) to complement the existing transport and road infrastructure, enabling innovation in new, data-driven mobility business models, on-demand transport solutions and ownership models such as car-sharing schemes should be priorities.

- *Supporting innovative business models* (all technological options and fuels should be allowed to compete for reducing emissions across the different transport modes).

4.3. The EU urban transport and smart mobility: innovative solutions

Future transport should be considered not only in international or regional aspect but from the urban perspective as well.

Interesting fact	Cities are home to over 70% of the EU population and account for some 85% of the Union's GDP.

The **Transport 2013 Urban Mobility Package** was implemented reinforcing supporting measures in the area of urban transport by:

- sharing experiences, show-casing best practices, and fostering cooperation;
- providing targeted financial support;
- focusing research and innovation on delivering solutions for urban mobility challenges;
- involving the member states and enhance international cooperation.

As the world trend creation of smart cities can be considered.

The European Commission defines a **smart city** as "a place where traditional networks and services are made more efficient with the use of digital and telecommunication technologies for the benefit of its inhabitants and business."

The attractiveness of a city is connected with modern urban competitiveness and growing importance of social and environmental capital. For these issues different smart solutions can be used.

The EU smart cities have particular features (Fig. 4.4).

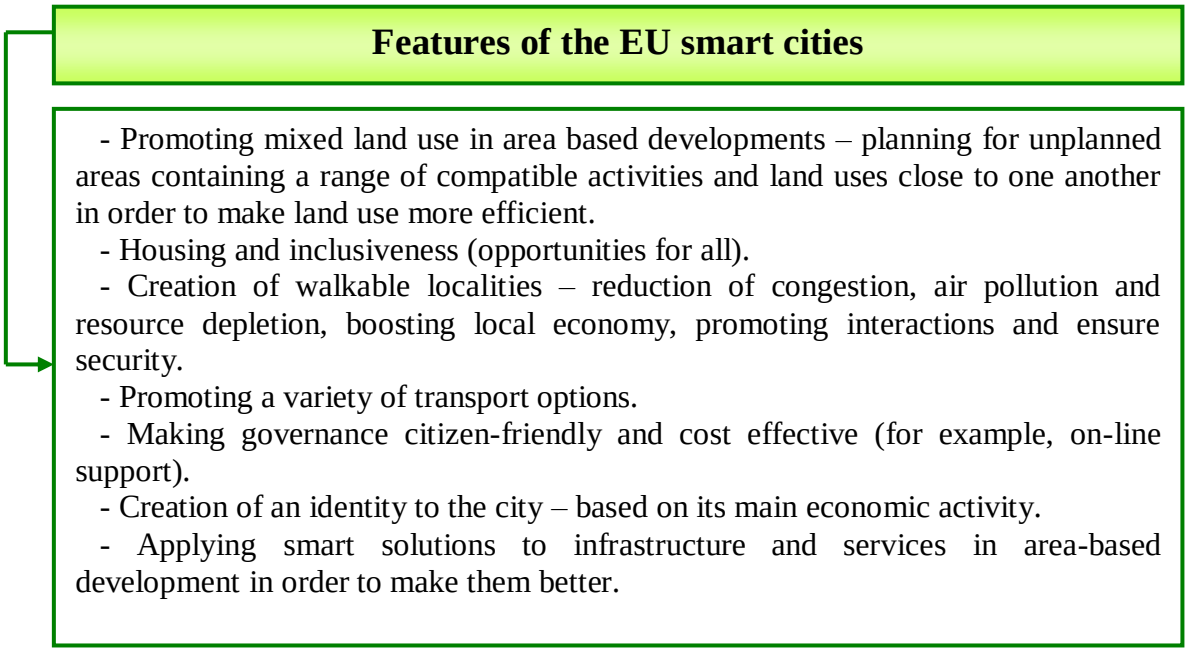

Fig. 4.4. Main features of the EU smart cities

Challenges of competitiveness and sustainable urban development, saving money, traffic congestion and increase in the environmental footprint are main *reasons for the creation of smart cities*.

So, it can be concluded that transport sector will be extremely important for the long-term sustainable development of the EU determining the necessity to follow future trends.

Practical tasks

Case study "Sustainability concepts' implementation by EU transport enterprises"

The European Union has already determined how its transport system can achieve its green and digital transformation and become more resilient to future crises. In December 2020, the European Commission approved a Sustainable and Smart Mobility Strategy. Together with it, the Action Plan was approved including 82 initiatives and 10 main directions (Fig. 4.5).

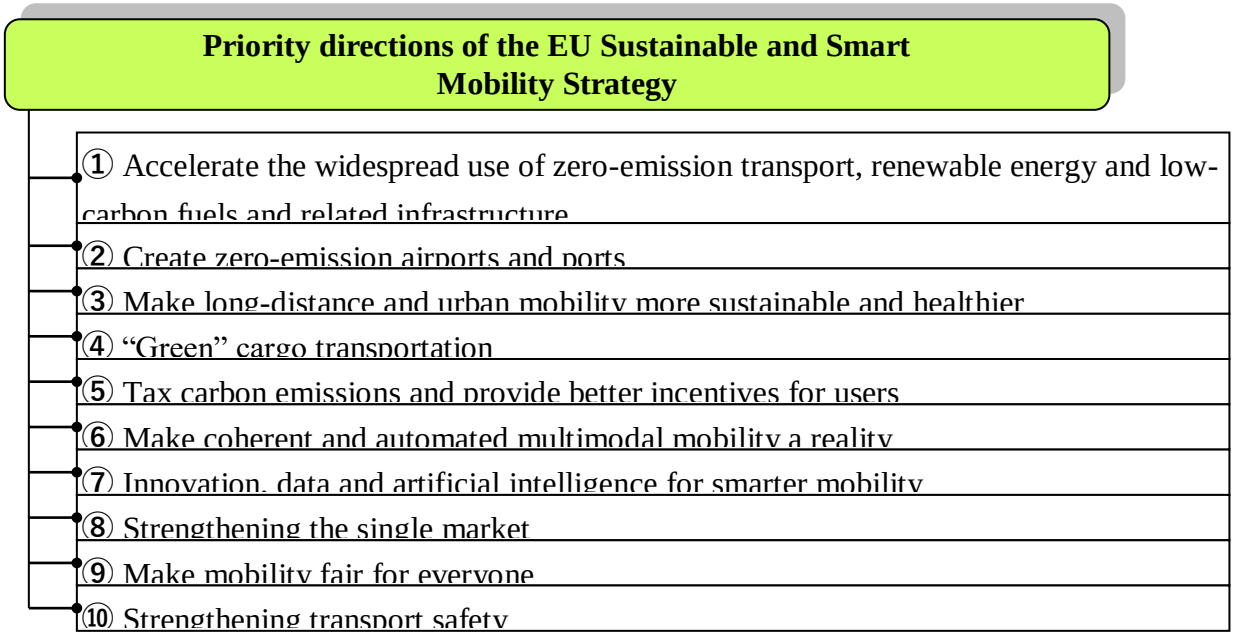

Fig. 4.5. 10 main directions of the EU Sustainable and Smart Mobility Strategy till 2050

Due to a smart, safe and accessible transport system, the EU wants to reduce emissions by 90% by 2050. So, mobility becomes smarter, more efficient and more environmentally friendly.

At the same time, businesses need clear guidelines for the implementation of green investments, which they will need to make in the coming decades. All EU transport modes need to become more sustainable, with a wide range of green alternatives and the appropriate incentives to stimulate this transition.

The European Union believes that freight from road transport should shift to more environmentally friendly rail transport.

EU companies actively implement sustainable concepts in their activities.

1. In 2017, the European airports committed to reach 100 carbon neutral airports by 2030. The next step will be providing net zero carbon emissions by 2050. 235 EU airports, accounting for 68% of European passenger traffic in 2019 set the goal to achieve net zero CO_2 emissions by 2050. Among them 91 airports set to reach net zero emissions by 2030.

The Amsterdam Schiphol Airport also set such a commitment including own energy consumption control, the reuse of materials, responsible use of energy, creating a zero waste airport, ensuring optimal mobility, sustainable employment, sustainable construction, noise and air quality, the use of bio-based materials and employees' commuter traffic. For this the airport has collaborative agreements with partners on sustainability issues and implements a range of targeted solutions.

2. The Deutsche Post DHL adheres to the sustainability motto "Excellence. Simply Delivered. In a Sustainable Way".

All operations of the company are targeted at connecting people and improving lives. This commitment directs efforts and sense of responsibility, underscores values, focuses the company's mission, and creates long-term value.

For providing a continuous positive sustainability impact the company developed a clear strategy with identifying three sustainability focuses (Fig. 4.6).

It wants to create even better world.

Fig. 4.6. Sustainability concept of the Deutsche Post DHL

Deutsche Post DHL Group is increasing the pace of its planned decarbonisation with €7 billion investments over the next ten years to reduce CO_2 emissions.

3. The Lufthansa Group is committed to creating added value for its customers, employees and investors and to meeting responsibilities toward the environment and society.

The company impalements concepts of corporate social responsibility, economic sustainability, climate and environment sustainability, and product responsibility. It invests in environmentally-friendly planes and alternative fuels, improving all aspects of flight operations via the adoption of sustainable practices and innovative solutions.

TASKS:

1. Study priority directions of the EU Sustainable and Smart Mobility Strategy implementation. Identify the key challenges for Ukraine in terms of aligning with these principles.

2. Analyse importance and main directions of increasing public and private investments in the modernization and greening of fleets and infrastructure and strengthening the single market to make European transport more competitive and resilient to future crises.

3. Explain why Ukraine needs to take into account the EU's Sustainable and Smart Mobility Strategy in developing its Action Plan for the implementation of the National Transport Strategy 2030. How it can change the situation for Ukrainian transport and logistics companies?

4. Identify the prospects for the creation of multimodal complexes on the border of Ukraine and the EU during shifting the freight from road transport to more environmentally friendly rail transport.

5. Investigate possible changes in the implementation of transport infrastructure projects in Ukraine financed by European banks (EBRD, EIB) due to the EU green deal implementation.

6. Analyse sustainability practices implemented by the Amsterdam Schiphol Airport, the Deutsche Post DHL and the Lufthansa Group. Fill in the Table 4.1. Additionally study corporate social responsibility practices of these enterprises.

7. Study other sustainability practices of EU airports, airline companies and transport and logistic companies.

Table 4.1

Template for performing the task

Dimensions	**Sustainability policy implementation**			**Main impacts on the EU transport sector in terms of implementing the Sustainable and Smart Mobility Strategy**
	Amsterdam Schiphol Airport	**Deutsche Post DHL**	**Lufthansa Group**	
Toward environment				
Toward consumers				
Toward partners				
Toward the EU				
Corporate social responsibility practices				

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5. STRATEGIES FOR INTEGRATION OF DOMESTIC TRANSPORT ENTERPRISES INTO THE EU MARKETS

5.1. Problems and priorities in the development of Ukraine transport sector

At present Ukraine has significant transport sector potential. Of course, there are problems in its full use and issues in improvement of transport infrastructure to be solved.

Important fact	Transport sector is a pillar for enhancement of national economic development with Ukraine as international transport hub between Europe and Asia.

There is a need to ensure responsiveness to the needs of industry and the citizens of Ukraine through an establishment of safe, secure, effective, efficient, and multi-modal and with suitable transport systems, which embody market principles.

Pan-European transport corridors over 5,000 km long run through Ukraine, so its essential to create strong links with other countries to create seamless transport networks.

Interesting fact	The *European route E-40* is the longest European highway, 8,500 km long, connecting Calais (France) via Belgium, Germany, Poland, Ukraine, Russia, Kazakhstan, Uzbekistan, Turkmenistan and Kyrgyzstan with Ridder (Kazakhstan) near the border with the Russian Federation.

To understand the importance and role of transport in Ukraine's economy there is a need to analyze some macroeconomic indicators, among them – structure of GDP of Ukraine. Transportation and storage has accounted for 6.58% share in GDP.

43.70% of total exports belongs to exports of transport services and 19.46% of total imports – to imports of transport services.

Considering the volumes of transport services in foreign trade of Ukraine by transport modes, road transport has the biggest share in the structure of passenger transportation (more than 31%). Different situation can be seen in the structure freight transportation where rail transport is a dominating mode with more than 53%.

During the pandemic period transport industry of Ukraine has suffered a lot from COVID-19 negative effects.

General view of the situation considering pandemic situation: according to preliminary data of the State Statistics Service of Ukraine, in 2020 the cargo turnover of transport enterprises amounted to 290.3 billion tkm, or 85.7% of the volume of 2019. Transport enterprises transported 600.0 million tons of cargo, which is 88,8% of the volumes of 2019.

The situation can be considered in transport mode split:

- *Air transport*: in February 2021 about 56% fewer flights than in the same month last year were served. Less than 3 thousand flights were operated by domestic airlines (-51.7%), and almost 5.8 thousand – foreign (-58.2%). The air transport industry is slowly recovering, but the losses are too great. Last year's flight service decreased by 57.6%. In the first three quarters of 2020 alone, the country lost UAH 1.04 billion in air transport, as traffic more than halved.

- *Water transport:* The Rivers of Ukraine Association reported that traffic on the Danube fell by 28% last year. If in 2019 the river shipping company provided the transfer of 5.6 million tons of cargo, in 2020 – only 4.1 million tons.

- *Rail transport:* Ukrzaliznytsia reported a 52.4% reduction in passenger rail traffic in the first two months of 2021. In January 2021, UZ trains served a little more than 1.6 million passengers, last year – almost 3.68 million people. In February, the volume of traffic amounted to almost 1.56 million people, while in the same month a year earlier – more than 3 million people.

Also there are critical problems of Ukrainian transport sector to be solved (Fig. 5.1).

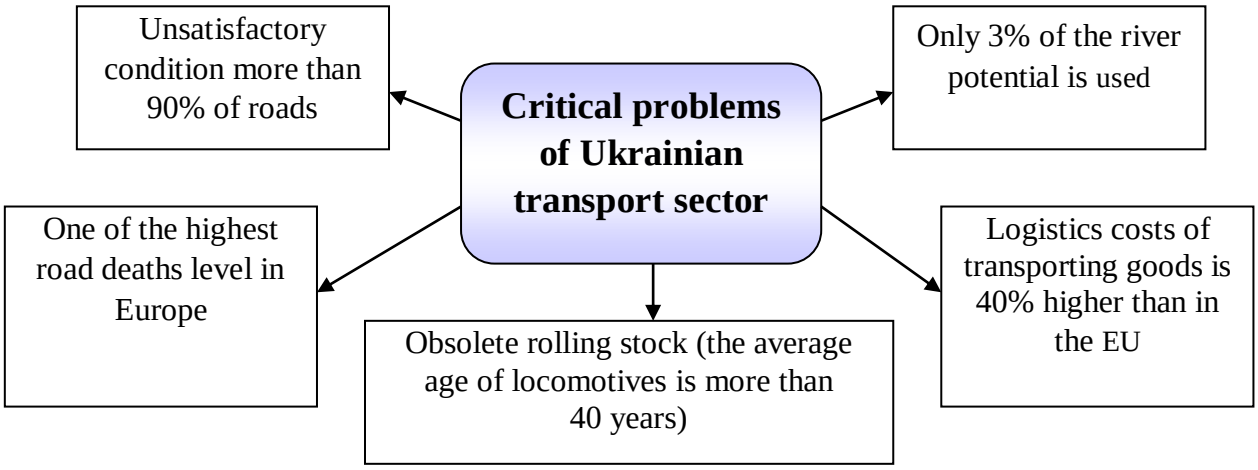

Fig. 5.1. Critical problems of Ukrainian transport sector restraining development

Transport infrastructure is vital platform for the implementation of transport strategy and policy of Ukraine.

An expert study of the general state of transport infrastructure development in Ukraine the European Business Association conducted in 2020 showed that integrated infrastructure index is 2.58 points out of 5 possible. The level of state implementation of strategies for the transport sector development was the worst assessment among the components of the index.

Key challenges that should be addressed are insufficiently transparent decision-making process on infrastructure projects, lack of an independent transport regulator and shortage of qualified personnel in the authorities.

Business sector suggested their solutions for Ukrainian transport sector (Table 5.1).

Table 5.1

Transport infrastructure of Ukraine: solutions from business sector

Transport mode	Solutions
Rail	Reorganization of Ukrzaliznytsia, changes in tariff policy and introduction of a legislative opportunity to attract private investment in public railway infrastructure.
Road	Strengthening of dimensional and weight control and responsibility, involvement of international independent players in technical supervision and monitoring of road construction, application of transparent and non-discriminatory public procurement procedures.
Air	Development of Boryspil Airport as an international hub, providing the state support to Ukrainian air carriers, transfer of airports to the private sector on the terms of public-private partnership/concession.
Maritime	Reduction of port fees and deductions of net profit of The Ukrainian Sea Ports Authority (USPA) to the state budget, creation of an independent regulator - the National Commission for state regulation in the field of transport, systematization of services provided by USPA.
River	Providing state support for public infrastructure and the shipbuilding industry, creating conditions and mechanisms for attracting private investment in public infrastructure.

5.2. Implementation of the National Transport Strategy of Ukraine 2030

The perspective Ukraine's transport policy is based on the following *principles*:

- responsiveness to the needs of transport users – the industry and the citizens;
- effectiveness and efficiency of the system in transporting goods and passengers;
- safety and security increase;
- transport sustainable development;
- sustainable urban mobility and economic and social cohesion.

The purpose of the national transport strategy is to establish conceptual basis for implementing the state policy in order to provide sustainable and efficient transport sector operation, to create conditions for social and economic development of the country, to improve competitiveness of national economy and wellbeing of its people.

To achieve the desired goals in the development of **national transport sector priorities until 2030** were identified (Fig. 5.2).

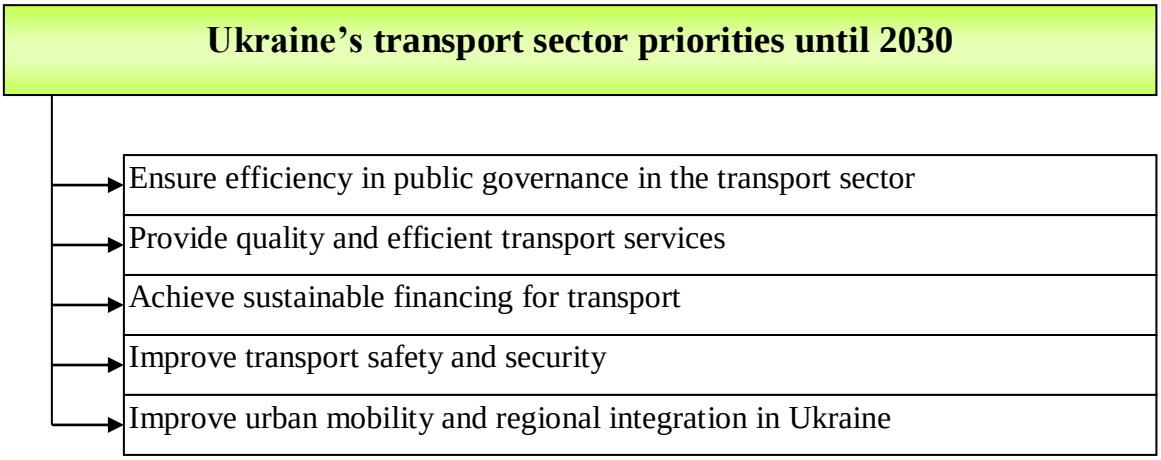

Fig. 5.2. National transport sector priorities until 2030

The **National Transport Strategy of Ukraine 2030** represented a *new vision* on the transport industry including:

- development of new transport corridors, ensuring consumer orientation (reduction of logistics costs by 40%;
- development of multimodal transport, development of transport connections with the EU;
- appropriate level of service for passengers and traffic safety focus;

▪ meeting energy efficiency and ecology requirements (reduction of costs through the rational use of resources; development of electric transport).

The key directions of implementing the National Transport Strategy "Drive Ukraine 2030" by transport sector are given in Table 5.2.

What is expected as a result of implementing such an ambitious strategy? Result of the Action Plan implementation should be the formation of a *single transport space of Ukraine*, which will effectively integrate the transport infrastructure of national and regional levels, transport infrastructure of cargo owners, creating a single information environment for interaction of different modes of transport.

Table 5.2

Directions of implementing the National Transport Strategy "Drive Ukraine 2030" by transport sector

Rail transport	Road transport	Air transport
100% renewal of rolling stock, locomotives Construction of 5 Hyperloop tracks Railway tracks modernization	Construction of roads +100 complexes for weight control of trucks + 2 plants for the production of electric cars	+30 new airports Up to 350 flight directions Over 50% of low-cost transportations
Water transport	**Urban transport**	
Up to 50 million tons of cargo per year - by rivers Increasing the cargo flow in the Black Sea basin "Single window" for registration of cargoes in ports	Refusal of minibuses Transition to electric transport A single ticket for all modes of transport	

5.3. New EU Transport Strategy: opportunities for Ukraine and domestic transport enterprises

Ukraine should think "outside the box" developing partnerships with other countries.

There are *transport regional activities with Ukraine participation contributing to integrating processes*. Among them:

- Infrastructure-TEN-T-Connecting Europe (the TEN-T extension to Ukraine is already included in the Association Agreement);

- Eastern Partnership Transport Panel;
- the Transport Corridor Europe-Caucasus-Asia (TRACECA);
- Baku process.

The TEN-T extension to Ukraine is already included in the Association Agreement. At present full integration of the EU standards in Ukrainian transport system is a relevant issue.

Cooperation between Ukraine and the EU in the field of transport is regulated by the **Association Agreement between Ukraine and the European Union** and aims to promote the development of stable transport systems, efficient and safe transport, intermodality and operational compatibility of transport systems.

The impacts of the Association Agreement on transport sector of Ukraine are shown in Fig. 5.3.

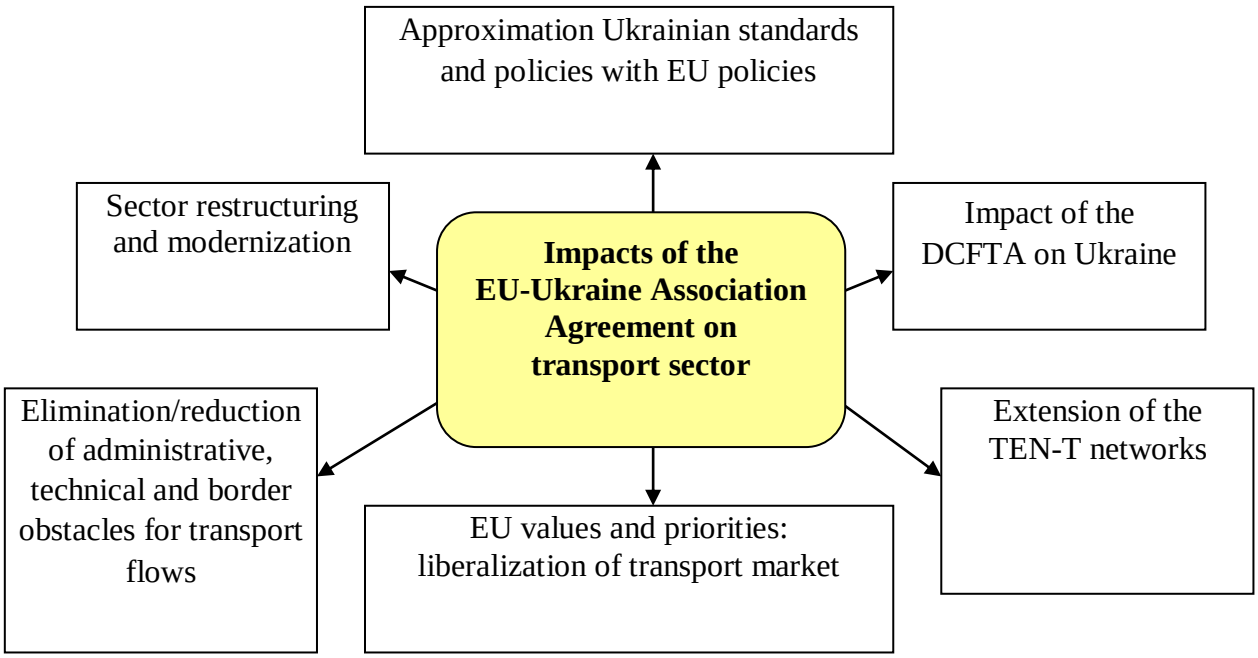

Fig. 5.3. Impacts of the Association Agreement on transport sector of Ukraine

Improving the movement of passengers and goods, increasing fluidity of transport flows between Ukraine, the EU and third countries, improving transport networks and upgrading the infrastructure and removing administrative, technical, cross border and other obstacles are the Ukraine – EU cooperation targets in the transport sector (Fig. 5.4).

Fig. 5.4. The Ukraine – EU cooperation targets in the transport sector

The harmonization to meet EU standards is needed. In the context of harmonization of national legislation of Ukraine, the National Transport Strategy of Ukraine until 2030 was approved by the order of the Cabinet of Ministers of Ukraine on 30 May 2018, adapting national legislation to EU standards and promoting further liberalization and mutual access to the markets.

Implementing the provisions of the Transport Association Agreement, Ukraine needs to adopt legislation that would meet EU requirements in the areas of road, rail, inland waterways and the transportation of dangerous goods. It is expected that the Action Plan for the implementation of the National Transport Strategy and a Comprehensive Action Plan to improve the management of the infrastructure cycle will be adopted in accordance with international standards.

As for the creation of **Common Aviation Area** between Ukraine and the EU it was initiated in 2013. The basic focus of this Agreement is to create a common aviation area between Ukraine and the EU on the basis of common and reliable standards in the field of flight safety and air traffic management.

It can expand market access and offer new business opportunities for consumers and airlines on both sides.

The EU has provided international technical assistance in the field of transport to Ukraine: 2016-2018 – **the European Union technical assistance project "Support to the implementation of the Association Agreement and the National Transport Strategy***"* with budget of €3,740,000.

It was aimed at promoting the integration and modernization of the transport sector of Ukraine and certain sub-sectors of the transport sector in accordance with the obligations under the Association Agreement between Ukraine and the EU, as well as updating the National Transport Strategy of Ukraine in accordance with EU legislation, standards and requirements to provide its further implementation.

Also **Twinning** initiative was implemented – a long-term institution-building instrument supporting partner countries through institutional cooperation, acquiring the necessary skills and expertise to approximate EU legislation. Except Ukraine other counties are covered by this initiative such as Algeria, Armenia, Azerbaijan, Egypt, Georgia, Israel, Jordan, Lebanon, Moldova, Morocco, Tunisia).

Twinning objectives are upgrading the administrative capacities of the partner countries' administrations through the training of staff, and support to the reorganisation of state institutions' structures.

Ukraine cooperates with specialized EU programmes and agencies:

- the European Aviation Safety Agency (EASA);
- the European Railway Agency (ERA);
- the European Maritime Safety Agency (EMSA).

As the conclusion the perspective directions of development in the transport sector of Ukraine should be identified. Ukraine is moving ahead with public-private partnership (PPP) and concession models to deliver its ambitious national transportation strategy and much progress has been made to date:

- $5.3 billion 'Great Construction' programme (2021) is the largest road building programme in Ukraine's history and will be delivered through the PPP model;
- following the first successful seaport concessions last year, the next wave of concessions has been lined up as well as a number of port privatisations;
- government plans to reconstruct or build 16 regional airports with a number to be offered a concessions;
- a number of major railway stations are being put up for concessions and the same model is proposed for high speed train networks;
- anticipating innovative financing mechanisms involving international financial institutions' support.

So, there is a need to ensure that transport potential of Ukraine will be used sufficiently. Under these conditions cooperation with the EU is essential.

Practical tasks

Case study "Assessment of the adaptation potential of the transport and logistics enterprise in conditions of European integration"

Under the terms of implementing the EU – Ukraine Association Agreement, new opportunities have opened up for Ukrainian companies to develop and expand the geography of their markets.

1. Analyse main directions of adaptation Ukrainian air transport enterprises and enterprises in the transport and logistics sector in conditions of deepening European integration. Identify the necessary conditions for the successful presence of Ukrainian companies in the markets of EU countries.

2. Assess the external environment turbulence of the selected Ukrainian air transport enterprise or enterprise in the transport and logistics sector, the adequacy of its management response to changes, and the adaptive capacity of the enterprise using the method of expert assessments. To do this, according to the following questionnaire, conduct a preliminary survey among managers and specialists of the enterprise (the number of respondents – from 7 to 10).

Use the questionnaire given in Table 5.3 in order to identify the opinions of the experts. Range of points for assessing the importance of elements of adaptation potential and its impact:

1 – very insignificant impact;

2 – insignificant impact;

3 – average level of impact;

4 – significant impact;

5 – very strong impact.

3. Using the concept of Ansoff's gap, according to expert estimates, determine the degree of gap in the management response of the enterprise from modern market conditions. Summarize the results of the survey for each of the categories and subcategories, and present in the form of summary table (Table 5.4). Identify the level of each indicator as the arithmetic mean of the experts' assessments.

4. Based on the data obtained, determine whether there is a gap in the response of the company's management to market conditions.

Table 5.3

QUESTIONNAIRE
for the assessment of the adequacy of management responses to changes in the enterprise's external environment

_____
(name of the selected air transport/transport and logistics enterprise)

1. Expert position _____
2. Evaluate the level of each of the following indicators:

Indicators	Indicator impact level (lowest → highest)				
	1	2	3	4	5
1. External environment turbulence of the enterprise					
1.1. Complexity of the market environment					
1.2. Novelty of events					
1.3. Rate of changes in the external environment					
1.4. Vision of the future					
2. Strategic aggressiveness of the enterprise					
2.1. Degree of prospects of data for the strategy development					
2.2. Degree of strategic changes					
2.3. Degree of market expansion					
3. Adequacy of the enterprise management response					
3.1. Risk assessment					
3.2. Methods of solving problems					
3.3. Level of knowledge and competences for adaptation					
3.4. Key function					
3.5. Information support					
3.6. Motivation system					

5. Investigate the adequacy of the adaptive potential to the conditions of the enterprise (compare the levels of each element of potential with the level of turbulence in the environment).

Table 5.4

Consolidated results of the assessment of the adequacy of the management response of the enterprise to the conditions of the external environment

Indicators	Indicator impact level (from 1 to 5)	Gap between the indicator and the external environment turbulence level
1. External environment turbulence of the enterprise		–
1.1. Complexity of the market environment		–
1.2. Novelty of events		–
1.3. Rate of changes in the external environment		–
1.4. Vision of the future		–
2. Strategic aggressiveness of the enterprise		
2.1. Degree of prospects of data for the strategy development		
2.2. Degree of strategic changes		
2.3. Degree of market expansion		
3. Adequacy of the enterprise management response		
3.1. Risk assessment		
3.2. Methods of solving problems		
3.3. Level of knowledge and competences for adaptation		
3.4. Key function		
3.5. Information support		
3.6. Motivation system		

6. Form a matrix of the importance of the components of the adaptive potential of the enterprise (Table 5.5). You can change the factors for evaluation depending on the specifics of the selected enterprise.

Range of scoring the importance of potential elements: 1 – very little impact; 2 – insignificant impact; 3 – average level of impact; 4 – significant impact; 5 – very strong impact.

Table 5.5

Matrix of importance of enterprise's adaptation potential elements

Indicators	Score (E_I)	Element weight (W_I) $\sum W_I = 1$	Element importance ($WE_I = E_I * W_I$)
1. Experience of managers			
2. Corporate culture and social responsibility			
3. Organizational structure			
4. Management process			
5. Marketing activities			
6. Resource provision system			
7. Business model of the enterprise			

7. Suggest adaptation measures for the enterprise in accordance with the results of the assessment of its external environment and adaptation potential in conditions of deepening European integration. Identify the role of leadership in adapting to changes in the external environment.

8. Analyze the possible risks in the activities of the enterprise in the implementation of the proposed adaptation measures. Determine which of them are acceptable risks and which are catastrophic. A risk map can be drawn up to better reflect the results.

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AFTERWORD

The knowledge of the EU transport integration issues is extremely important and relevant for the further professional activity of students as it provides an understanding the development trends of the modern European transport system, its innovation standards and principles.

As a result of the training, the higher education seekers must improve the following competencies:

- knowledge of the subject area and understanding of the professional activity;
- understanding the peculiarities of implementing the common transport policy of the EU, transport strategies, innovative transport standards and principles of functioning of the modern transport system of the EU;
- possession of practical skills for analysis of successful European practices in the field of transport;
- possession of a system of general and professional competencies of managers taking into account the needs of the international and European transport market;
- ability to substantiate managerial decisions on the need to change the strategy of development of transport enterprises in the dynamic international competitive environment;
- ability to comprehensively analyze current trends in the transport sector development with the definition of priorities in terms of European integration;
- possession of modern tools for analyzing the activities of transport enterprises to provide proposals for their strategic development;
- understanding the problems and prospects of integration of the transport system of Ukraine into the common transport market of the EU, taking into account the opportunities for the development of transport corridors.

For notes

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