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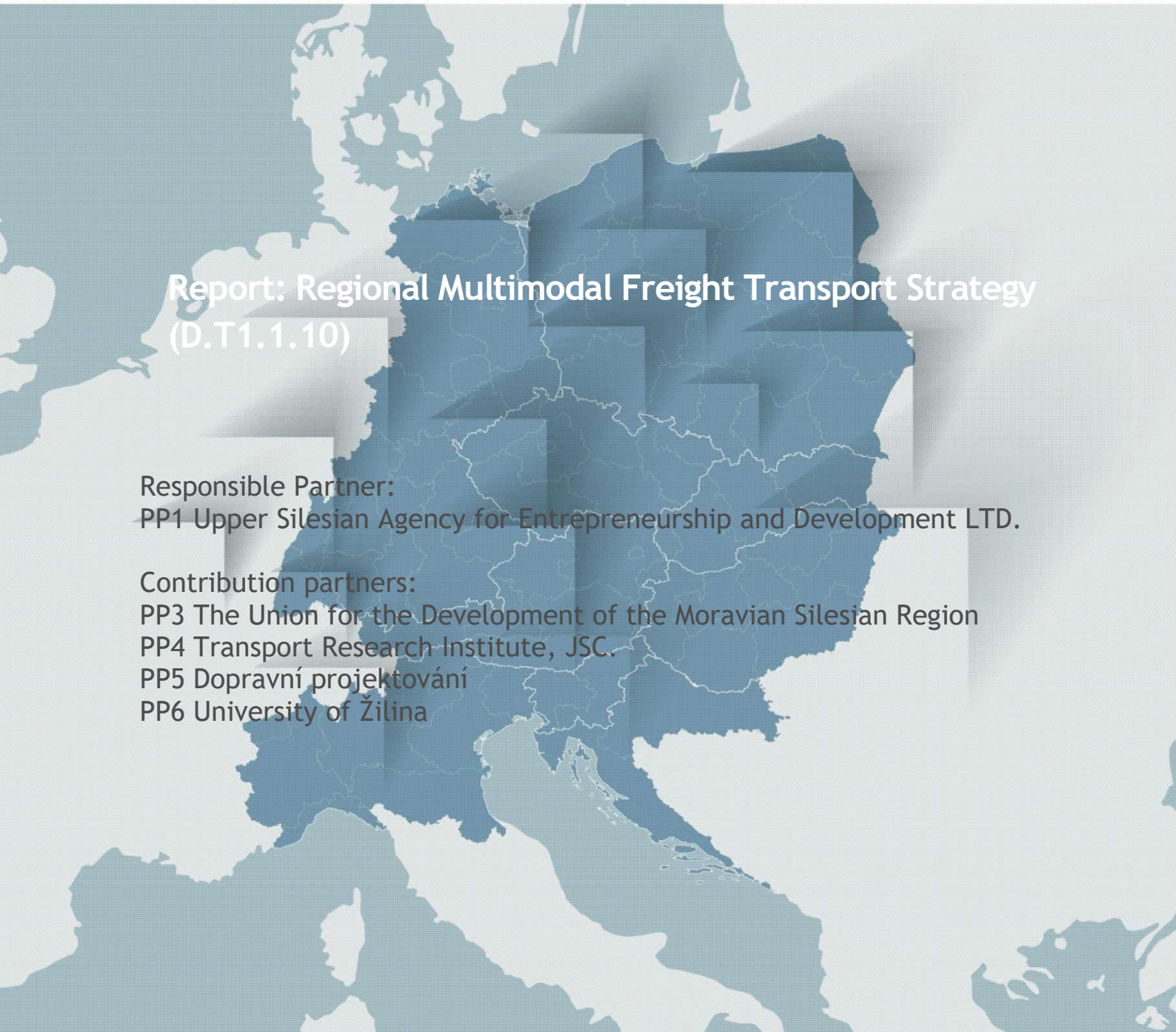
Regional Multimodal Freight Transport Strategy



Report: Regional Multimodal Freight Transport Strategy (D.T1.1.10)

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1. INTRODUCTION

High-quality infrastructure is one of the most important factors stimulating the sustainable development of regions. An integrated and modern transport system is a key link in building economic, territorial and social cohesion of states and regions. Thanks to the effective implementation of organizational and infrastructural projects as well as improvements introduced both in the legal environment and strategic planning, it will be possible to change the face of transport and change the quality of transport infrastructure, in particular in relation to those regions with high potential.

The aim of the strategy developed under the TRANS TRITIA project was not only to identify the possibility of developing a coherent, sustainable, innovative and environmentally friendly transport system in the regional, national and European dimension, but also to identify the possibilities of increasing transport accessibility through the use of alternative environmentally friendly modes of transport in cross-border regions , while improving the efficiency and effectiveness of transport processes.

At first, we identified the challenges facing both the entire TRITIA cross-border area and the development of multimodal transport in the region. Then, the stages of the strategy development process under the ongoing TRANS TRITIA project were discussed, followed by the results of strategic analyzes, strategic goals for the development of multi-modal transport in the cross-border area were defined, and a strategy map necessary for the implementation of the strategy was prepared. The necessary strategic projects to be implemented were successively identified and the organizational structure for implementing the strategy developed.

The authors of the strategy are convinced that the implementation of the strategy assumptions, including the implementation of the proposed strategic projects, will contribute to the development of a modern transport system in the cross-border areas covered by the project, but will also constitute an element of a wider context for the development of the transport system of the entire European Union.

1. CHALLENGES FOR REGIONAL MULTIMODAL FREIGHT TRANSPORT STRATEGY

1.1. Characteristics of the TRITIA region

The aim of the project is to improve coordination among freight stakeholders in order to increase environmentally friendly multimodal freight solutions. Resources include improving awareness, planning and coordination between regional authorities, transport managers and freight transport stakeholders. The project focuses on cross-border, transnational and interregional cooperation with a view to strengthening economic and social cohesion in order to achieve the objectives defined in the Europe 2020 Strategy or the EU White Paper on Transport. The specific objective of this part of project is presentation of TRITIA Regional Multimodal Freight Transport Strategy.

Figure 1. Region Tritia

The legal basis for EGTC TRITIA is the REGULATION (EC) No 1082/2006 OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL of 5 July 2006 on a European grouping of territorial cooperation (EGTC) transposed in the Polish legislation by the Law of November 7, 2008 on a European grouping of territorial cooperation. The decision to establish EGTC TRITIA was made by the leaders of the four regional governments of Moravian – Silesian Region (CZ), Opole Voivodeship (PL), Silesian Voivodeship (PL) and Žilina Self – governing Region (SK) in 2009, who subsequently made steps leading

towards its establishment. The leaders' decision was based on the positive experience of the regions in their mutual cross – border cooperation as well as the impacts of this cooperation on the improvement of wellbeing of the people in cross - border area.

EGTC TRITIA has an area of 24 566,09 km2 and a population of 6,5 mln people. There are two cities with more than 300 thousand inhabitants - Katowice (PL) and Ostrava (CZ). These conurbations together with other important city of Žilina (SK) is tied by intensive socio - economic relations. A Baltic - Adriatic Transport Corridor leads across the TRITIA territory. With a strong business ground, seven public universities, large number of tertiary education providers and research and development entities the TRITIA territory is an interesting area for research and innovation. Thanks to these relations among various entities on the EGTC TRITIA territory, as well as thanks to common challenges that this area faces, the EGTC TRITIA has an enormous potential for a continuous increase of intensity and systematization of a joint multilateral cooperation.

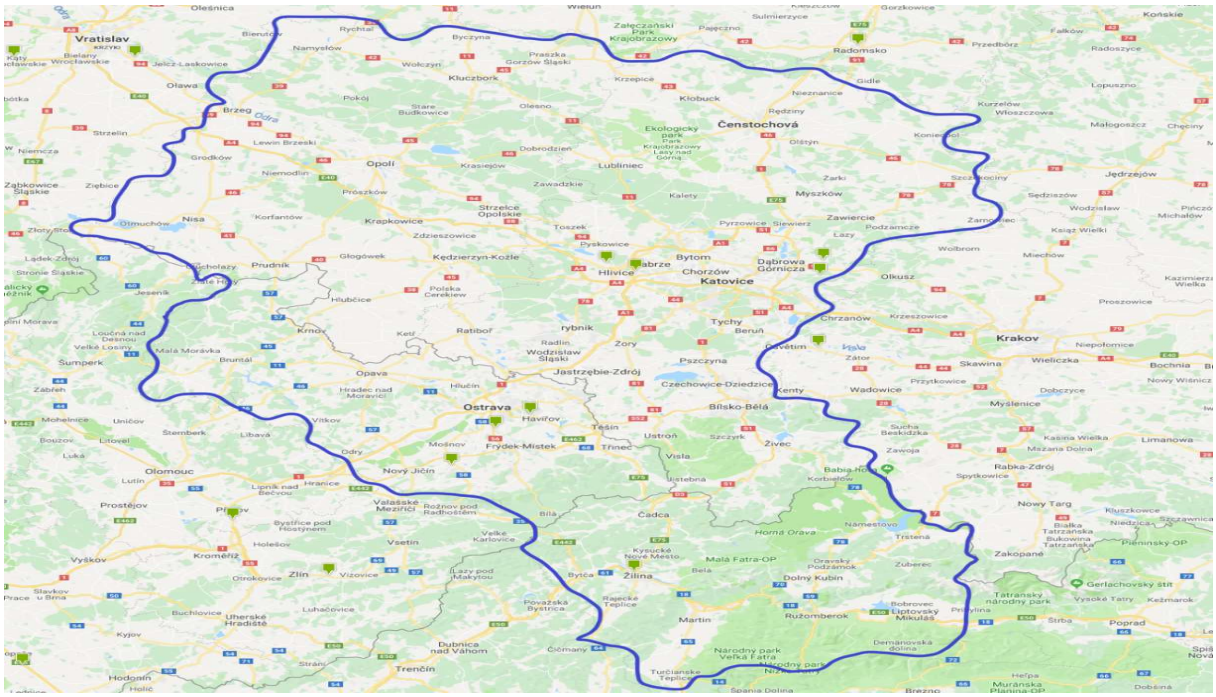


Figure 2. TRITIA Region

The Grouping has been established to facilitate and spread the cross – border, transnational, and interregional cooperation of its members with an objective to strengthen economic and social cohesion, particularly through implementation of territorial cooperation projects or programs with the following objectives: making the grouping's inhabitants everyday life easier, creating cross-border cohesion in the

framework of the whole grouping, implementation of projects with the purpose of common strategic development.

To achieve these objectives the Grouping carries out the following tasks: identification, promotion and implementation of programs, projects and joint actions in the framework of territorial cooperation in the following main areas: transport, economy, tourism, energy with a focus on renewable energy sources.

1.1. Freight flows in the TRITIA region - current status

The impact of freight flows on the economic situation and the development of individual regions is a very complex and multi-faceted. In the context of goods flows, the most important development parameters are mainly:

- size and value of transported goods;
- branch structure of transported loads;
- transport work performed;
- employment in the freight transport sector;
- share of freight transport in GDP;
- the volume of international transport performed;
- number of operating transport companies.

At the same time, as forecasts show, the development of freight transport in European countries will be at a high level in the future. It is expected that by 2050 the demand for cargo transportation will increase by as much as 80% compared to 2005 (by as much as 60% compared to 2020). This is a great challenge for the appropriate shaping of the transport system, indicating the directions of its development, and creating an appropriate basis for reducing the negative effects of activity.

Tables 1 and 2 present the volumes of cargo flows selected by transport branches for three countries (Czech Republic, Slovakia, Poland).

Table 1. Share of freight transport modes (%) - country 2017

Country	Railway transport	Inland waterway transport	Road transport	Intermodal transport
Czech Republic	96 516 000 t (17,005 %)	1 568 000 t (0,276 %)	459 433 000 t (80,947 %)	** Number of containers 796 882, Gross tones13 323 000, Net tons

Country	Railway transport	Inland waterway transport	Road transport	Intermodal transport
				10 058 000 t (1,772 %)
Poland	222 523 000 t* (11,264 %)	5 778 000 t (0,292 %)	1 747 266 000 t (88,444 %)	See table 2
Slovakia[1]	47 790 000 t (21,112 %)	1 780 000 t (0,786 %)	176 790 000 t (78,101 %)	5 000 332 gross tons

*without shunting
** The figures are from the annual report for combined transport

Table 2.Transhipment of containers at Polish intermodal terminals in 2017

Transport mode	Transhiped containers
Rail	11 002 978 t
Road	11 975 979 t
Maritime	37 848 637 t
Total	60 827 594 t

Tables 3 and 4 show the share of individual transport branches in the performance of freight transport in relation to the TRITIA region.

Table 3. Share of freight transport modes 2017 - region

Region	Railway transport	Inland waterway transport	Road transport	Intermodal transport
Žilina region	N/A	N/A	N/A	N/A
Moravian-Silesian region[2]*	12 400 thous. tonnes (19,97 %)	0 tonnes	49 700 thous. tonnes (80,03 %)	N/A
Silesian voivodship	N/A	Śląskie – śląskie - 43 300 t Śląskie – dolnośląskie - 84 500 t Dolnośląskie- Śląskie 11 500 t Total: 139 300t	Table 4	1 242,5 thous. tonnes**
Opole voivodship	N/A	Opolskie – Niemcy- 400 t Opolskie- Holandia - 1 100t Total: 1500t	Table 4	45,01 thous. tonnes**

*Notice: excluding transit traffic
** Transport of goods in containers by national intermodal road transport by the voivodship in 2017
Data at regional level for Žilina region are not available

[1] Source: Statistical Office of the Slovak Republic, 2017

[2] Statistical yearbook of the Moraviansilesian region 2017

Description about transport modes in Silesia and Opole regions (connection to table 4).

Table 4. Voivodship balance of goods road transport in 2017 (thousand tonnes)

Region	Delivered				Received				Transport balance
	Total	Within the vovivodship	To other voivodships	Abroad	Total	Within the vovivodship	To other voivodships	Abroad	
Silesian v.	149 113	95 282	41 782	12 049	146 341	95 282	39 939	11 120	+2 772
Opole v.	42 098	21 293	17 502	3 303	37 926	21 293	14 534	2 098	+4 172

The model of transport flows for the Tritia area (together with the Opolskie Voivodeship) - scenario 0 - shows that in 2030 the expected potential for shifting from road transport to alternative transport modes will amount to 12,546,256 container kilometers per year (Figure 3).

The zero scenario of the traffic model potential for the use of the transport infrastructure in the TRITIA region by the year 2030 considered the natural development of the assessed area, which means that the assumption was made that the planned projects defined in the strategic documents will be implemented.

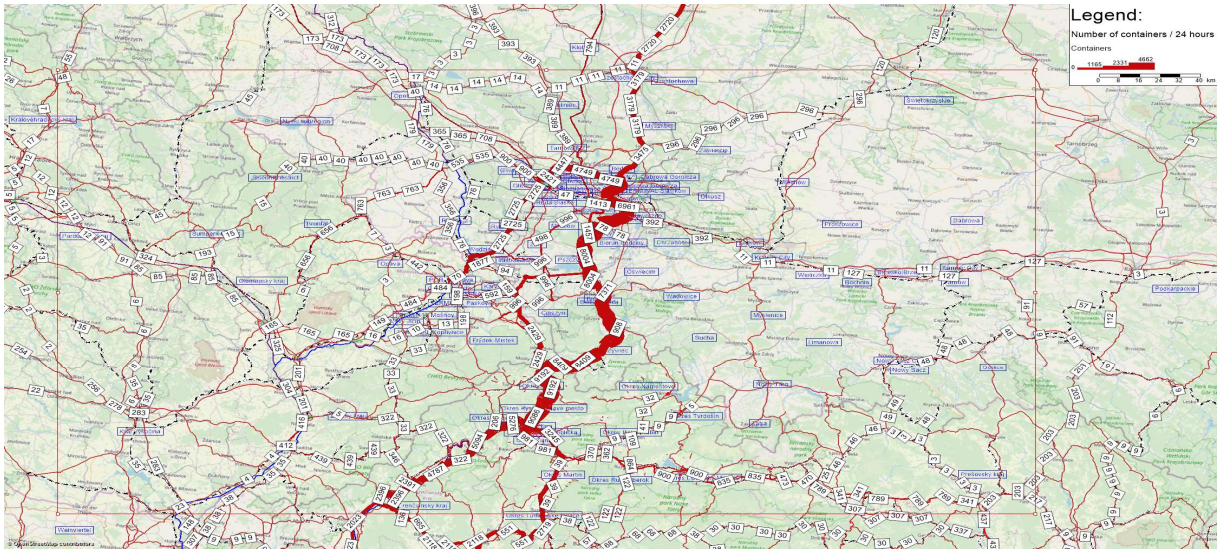


Figure 3. Redistribution model of transport load on multimodal transport network of TRITIA territory for zero scenario /2030/

It implies from TRITIA's multimodal (represented by a relative unit set as 1 intermodal transport unit ITU - 40' ISO 1A container) potential model outputs after the of traffic load redistribution that from the total volume of road freight transport (total potential of 12 546 256 container kilometres per year) it transfers almost half of this load to rail and around 4% to inland waterway transport. Within the modelling of modal shift, its capacity constraints have not been considered in the case of rail

and inland waterway infrastructure. The remaining part of the modelled traffic load (46.7%) remains on the road infrastructure where it is transported by HGVs (Figure 4).

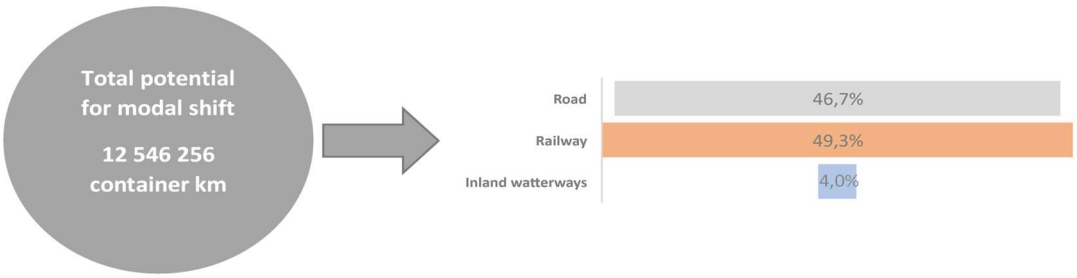


Figure 4. Modal shift of total transport load potential on individual transport modes for zero scenario /2030/

Figures 5 to 7 show the potential amount of shifted traffic flows for individual modes of transport in 2030 according to scenario 0.

Developed alternative scenarios (to assess the potential shift from road to rail and inland waterway transport) were examined in the TRITIA transport model for 2030, in order to verify the impact of changes in the charges for using infrastructure (or a specific service – handling) on the reallocation of traffic volumes (represented by a relative unit set as 1 intermodal transport unit ITU - 40' ISO 1A container) between the individual modes of transport.

The impact of the change was determined on the basis of the uncertainty in the development of the economy and infrastructure charges, or in the handling of intermodal transport units between individual modes.

The basic parameters entering the testing of the impact of changes on the modal shift are:

- change in GDP,
- change in road infrastructure charges (tolls),
- change in railway infrastructure charges;
- change in handling charges.

The size of potential multimodal transport flows generated in the Tritia area, broken down by individual modes of transport, taking into account the assumptions, is presented in Table 5. The model results indicate that the size of potential shift from road transport to multimodal transport flows in this area will be from 12,000,766 container kilometers per year (for scenario 0 with 10% increase in GDP) to 13 091743 container kilometers per year (for the O scenario with a 20% increase in GDP). Thus, for individual modes of transport, they will amount to:

- from 5 599 502 container kilometers per year to 6 108 547 container kilometers per year will stay in road transport;

- from 5 920 472 container kilometers per year to 6 458 696 container kilometers per year will potentially shift to rail transport;
- from 480 792 container kilometers per year to 502 646 container kilometers per year will potentially shift to inland waterway transport.

Table 5. Amount of potential multimodal transport flows generated in the Tritia area

Sceanrio/ Transportation branch	S0	S0	S0	S1	S1	S1	S1	S2a	S2a	S2a
	GDP growth +10%	GDP growth +15%	GDP growth +20%	Road infrastructure charges (toll) increase of +5%	Road infrastructure charges (toll) drop of -5%	Road infrastructure charges (toll) increase of +10%	Road infrastructure charges (toll) drop of -10%	Rail infrastructure charges + transshipment costs + 5% whole network + 10% transshipment	Rail infrastructure charges + transshipment costs drop by -5% whole network - 10% transshipment	Rail infrastructure charges + transshipment costs + 10% whole network + 20% transshipment
Road	5 599 502	5 854 025	6 108 547	5 870 619	5 660 180	5 867 955	6 080 196	5 881 255	5 789 355	5 995 430
Railway	5 920 472	6 189 584	6 458 696	6 220 868	6 264 560	6 174 467	6 021 063	6 176 592	6 348 530	5 996 294
Waterway	480 792	502 646	524 500	525 739	525 341	495 572	554 767	489 738	516 100	603 024
Total	**12 000 766**	**12 546 255**	**13 091 743**	**12 617 226**	**12 450 081**	**12 537 994**	**12 656 026**	**12 547 585**	**12 653 985**	**12 594 748**
Sceanrio/ Transportation branch	S2a	S2b	S2b	S2b	S2b	S3	S3	S3	S3	Combied
	Rail infrastructure charges + reloading costs drop by -10% whole network - 20% transshipment	Rail infrastructure charges increase of+ 5%	Rail infrastructure charges drop of - 5%	Rail infrastructure charges increase of + 10%	Rail infrastructure charges drop of - 10%	Terminal fees for transshipment increase of + 10%	Terminal fees for transshipment drop of - 10%	Terminal fees for transshipment increase of + 20%	Terminal fees for transshipment drop of - 20%	Toll +10%, railway +5%, transshipment +20%
Road	5 712 858	5 921 399	5 800 020	6 039 845	5 712 858	5 857 695	5 842 198	5 858 875	5 898 243	5 722 898
Railway	6 364 748	6 107 148	6 351 362	5 871 690	6 364 748	6 189 163	6 186 562	6 189 430	6 069 968	6 226 045
Waterway	510 246	555 722	492 877	750 626	510 246	497 079	530 063	489 931	633 035	492 453
Total	**12 587 852**	**12 584 269**	**12 644 259**	**12 662 161**	**12 587 852**	**12 543 937**	**12 558 823**	**12 538 236**	**12 601 246**	**12 441 396**

1.2. Challenges in the development of multimodal transport in the TRITIA area

The main requirements facing the development of transport in the EU result from the provisions of the transport policy included in the White Paper (2011) and in the strategic documents of individual countries (Poland, Czech Republic, Slovakia). The White Paper emphasizes that transport is the foundation of the European economy and society, and the mobility of goods and people is extremely important. Therefore, it should be possible to increase transport and support mobility, while striving to reduce emissions by up to 60%. To this end, it is necessary to create a new transport pattern that allows transport to take place by the most efficient means or a combination of such means. Further development of transport in the EU is based on three basic assumptions:

- increasing the energy efficiency of vehicles,
- optimization of multimodal logistics chains,
- greater involvement of traffic and information management systems.

In addition, one of the objectives set by the EU in the road map for transport by 2050 is to transfer 30% of road haulage over 300 km to rail or sea by 2030, and increase this ratio to 50% by 2050. It is assumed that on such sections rail or water transport is an attractive, cost and environmental alternative to road transport.

As a result, policy makers intend to reduce road transport to reduce carbon emissions and encourage more sustainable transport solutions. Local authorities have an important role to play in ongoing transformations by using proactive planning policies and establishing cooperation with the various parties involved (freight transport initiators, freight forwarders, rail operators, landowners and the general public).

Detailed strategic goals included in the White Paper are following:

- Reduce by half the number of conventional cars in urban transport by 2030. (by 2050, their complete elimination from cities).
- The use of low-emission fuels in air transport (reaching a level of 40%, with the possibility of increasing to 50% by 2050).
- Branch transfers in general transport over a distance of over 300 km (by 2030, 30% share from road to rail or water transport, while by 2050 it should be 50%).
- Completion of the fast European rail network program until 2050, as well as maintaining the appropriate density of the rail network per 100km2 in each member country.
- Established by 2030. a multimodal and fully functional TEN-T core network, by 2050 ensuring its highest level of functionality as well as the implication of relevant IT services.

- Connection of all airports and ports with a core network until 2050; At the same time, each airport is expected to be connected by a fast rail network and seaports by efficient rail corridors and, as far as possible, to the inland waterway network.
- Introduction of advanced transport management systems by 2020 in all branches of transport (SESAR, ITS, SSN, LRIT, RIS, ERTMS), as well as the Galileo system.
- Established by 2020 framework for a European management system, payments and information for multimodal transport.
- Achievement by 2050. almost zero deaths in road transport accidents.
- Implementation of the 'user and polluter pays' principles and broader cooperation with the private sector to eliminate distortions that arise and to finance future transport investments.

The most basic goal of transport policy is to reduce road transport towards less polluting and more energy-efficient modes of transport. This is a big challenge for the countries of the TRITIA area, in which the share of road transport in cargo transport is dominant (tables 3 and 4), and this results in generating significant external costs of transport.

The need to change the branch structure of the transported loads is particularly important due to the forecasts that provide for an approximate 60% increase in freight transport in the EU between 2020 and 2050. The load growth trend will also apply to TRITIA countries.

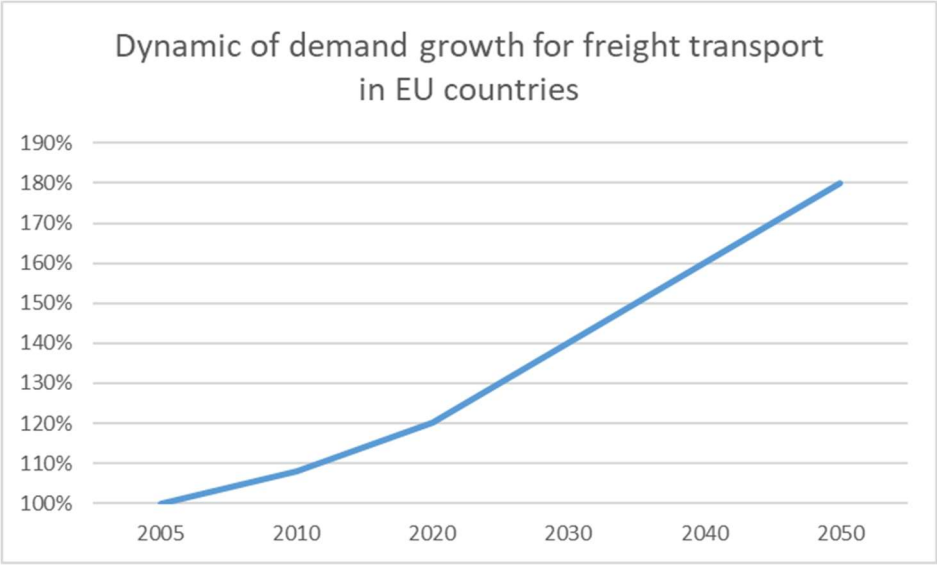


Figure 5. Dynamics of increase in demand for freight transport in EU countries (2005 = 100)
Source: K. Wojewódzka-Król, E. Załoga (pod red.), Transport Nowe wyzwania, PWN, Warszawa 2016, s. 412

1.3. National and regional challenges for TRITIA

The challenges for freight transport development will focus on several areas:

1.3.1. National (Poland, Czech Republic, Slovakia) and regional (TRITIA) policies

Transport accessibility of individual countries included in the TRITIA area should be considered not only in the European and global, but also regional dimensions. It should be emphasized that stimulating economic and social development can be ensured by commonly available and high-quality transport services, and modern and efficient infrastructure will be one of the main conditions for the provision of these services. One of the basic challenges for the development of transport in the TRITIA cross-border area is the improvement of the integrated cross-border transport system, which requires prioritization in the implementation of investment and modernization works. In the first place, investment efforts should focus on: catching up with infrastructure backlogs in increasing transport accessibility in the TRITIA cross-border area (roads, railways, inland waterways, inland ports, intermodal terminals) and on organizing the basic infrastructure of an integrated transport system, including the implementation of cross-border multimodal transport.

The implementation of development plans in the field of transport infrastructure must be based on several fundamental principles:

- development and implementation of future National Multimodal Transport Development Programs;
- development and implementation of the Multimodal Transport Development Program for the TRITIA area;
- scheduling new infrastructure investments in the light of the existing financial conditions at the level of each TRITIA cross-border country and region;
- striving for maximum efficiency and usefulness of investments carried out with the support of European Union funds, which can be used for activities provided for in the Transport Development Strategies at the level of individual countries and regions of the TRITIA area, developing an optimal financial model taking into account funds from private investors (e.g. Investments in construction of trimodal reloading terminals);
- further elimination of barriers to and delaying the implementation of investment projects, including harmonization of the harmonization of cross-border rail services.

1.3.2. Line and point infrastructure

The maturity of the cross-border transport infrastructure system in the TRITIA area, which enables the implementation of sustainable freight flows, is expressed in a multimodal network of connections using rail transport and inland waterways as a basis, as well as road transport. In addition, maturity will be determined by the existence of a network of charging / refueling points for low-emission vehicles and by the openness of stakeholders to innovative solutions in the broadly understood transport infrastructure.

Therefore, access to multimodal transport infrastructure, as well as its technical parameters, constitute the basic challenge in the cross-border area in question. This requires all three countries to create a coherent network of line infrastructure with appropriate quality parameters. A particular challenge in this respect is the improvement of the quality of railways, which will allow for an increase in the operational and commercial speed of freight transport. A very big challenge for the entire TRITIA area is the adaptation of waterways to classes that allow a much higher level of use of inland waterways in international cargo flows. This requires not only the modernization of waterways, but also the construction of new roads that will connect the regions of the Czech Republic, Poland and Slovakia. It is also necessary to improve the parameters of motor roads in order to ensure their greater capacity, safety and adaptation to the increased load, especially in the context of their role of delivery and delivery to / from reloading terminals. A separate challenge is to create a network of multimodal transhipment terminals in the cross-border area. In this regard, it is also pointed out that the trimodality of some terminals is aimed at, but to a large extent this type of challenge goes beyond the year 2030. Apart from access to terminals, their parameters are also important issues, here we are talking about serviced intermodal units (ITU), length of transhipment tracks, equipment appropriate reloading infrastructure or increasing their innovativeness through the implementation of modern reloading systems. The last challenge concerns the information flows accompanying the transport of goods. Due to the role they play, it is necessary to provide infrastructure in the form of an efficient and coherent information system that will support the coordination of flows in the cross-border area, in an inter-sectoral system.

1.3.3. Social and economic effects

The most important social and economic challenge in the cross-border freight transport network is the reduction of external transport costs, the amount of which varies between modes of transport, and their internalisation through full implementation of the "polluter pays" principle. External costs of transport are costs directly related to the negative effects of transport activities on both human life and

the natural environment, they include costs related to: traffic noise; air pollution; climate change; transport accidents; a threat to the environment; transport congestion; land occupancy.

The internalisation of costs will make it possible to obtain funds for eliminating the effects of transport, i.e. treatment of road accident victims, limiting the effects of air pollution, excessive noise, etc. It will also make it possible to achieve such a relation between the prices of the transport service between different means of transport, so that it reflects the relation between services total costs.

In the social area, a significant challenge is also to improve the image of multimodal transport by conducting a broad information campaign and promoting its development, with particular emphasis on social benefits (in relation to the indicated external costs).

The development of the transport market also requires an appropriate number of employees. The shortage of operational staff (drivers, train drivers, etc.) with skills at the level expected by the industry causes the risk of not having a full staff for the rolling stock owned by carriers. The imbalance of supply and demand for labor in freight transport, as well as an increase in the financial expectations of employees in the industry, will also translate into higher costs.

From an economic point of view, the most important challenges for multimodal cross-border transport are:

- financial support from public funds for investments in the development of rail transport and inland waterways infrastructure as well as multimodal terminals and logistic centres, as well as facilitating access to the use of EU funds in this area,
- creation of the Multimodal Transport Fund to support the development of this transport system;
- introducing incentives, financial allowances for investors and guaranteeing low-interest loans;
- introducing incentives or exempting road hauliers operating in the multimodal chain from fixed road tolls, from tax on means of transport; preserving and increasing the multimodal concession, reducing handling charges (for the use of infrastructure and transhipment terminals).

1.3.4. Key stakeholders activities

The multimodal freight transport system involves many stakeholders who have a strong influence on the development of transport, and who are also affected by it. Given the perspective of a cross-border freight transport network, the range of stakeholders is even wider and should be seen as internal and external stakeholders.

The internal stakeholders should include all participants involved in the flows of goods between countries, both regionally and in terms of individual countries. Among the external stakeholders, a decisive role is played by EU, international and national institutions and bodies (in countries outside the TRITIA region), committees, associations and various forms of agreements. External stakeholders include the Transport, Telecommunications and Energy Council (European Union), the Visegrad Group, the International Commission for the Protection of the Oder River against Pollution (ICPO), etc. In the group of internal stakeholders, they should be indicated on the side of each country of the cross-border area.

The main problem that poses a major challenge in the cross-border freight transport network is the lack of coordination of flows. The indicated actors in individual regions making up the TRITIA cross-border area cooperate to a moderate or low degree, and do not undertake joint initiatives. Definitely low cooperation can be noticed between the stakeholders of different countries. Thus, building a structure and coordination mechanisms in the cross-border freight transport network in the TRITIA cross-border area is a fundamental challenge in the development of cross-border freight transport. This challenge is related to the problem of information flow and knowledge sharing between individual internal stakeholders. The reluctance of network actors to share knowledge and experience makes it difficult to undertake such initiatives that enable the sustainable development of the freight transport system in cross-border areas. Therefore, the second challenge in the area of stakeholders in cross-border freight transport is to build a system for collecting, processing and sharing knowledge, which is necessary for the effective coordination of flows in the cross-border freight transport network.

At the same time, it should be emphasized that the development of cross-border freight transport depends on a number of EU institutions and bodies, as well as structures created outside the cross-border area itself. Thus, the coordination system created for the freight transport network in the TRITIA cross-border area should take into account communication between the Tritia freight transport network and external stakeholders both at the level of monitoring, obtaining information on policies, strategies and operational activities, and on the other hand, in terms of informing about strategic and operational activities. in the TRITIA area. This scope of cooperation between the stakeholders of internal freight transport networks in the TRITIA area with external interlayers is particularly important in the area of harmonizing legal aspects and focusing on sustainable development by increasing the share of intermodal and multi-modal transport in the overall structure of freight flows. The communication system of internal stakeholders with external stakeholders can be considered as the third challenge posed at the level of stakeholders in the area of freight transport development in the TRITIA cross-border area.

2. THE PROCESS OF CREATION THE REGIONAL MULTIMODAL FREIGHT TRANSPORT STRATEGY

The structure of the Regional Multimodal Freight Transport Strategy (Fig. 6) includes three stages: strategic analysis, strategy project and its implementation:

- strategic analysis including: analysis of strategic documents, analysis of the environment, structural analysis, stakeholder analysis and SWOT analysis;
- strategy project including: vision for the development of freight transport for the EGTC TRITIA area, missions; startegy objectives, strategy map, detailed description of objectives with monitoring;
- strategy implementation including: organizational framework.

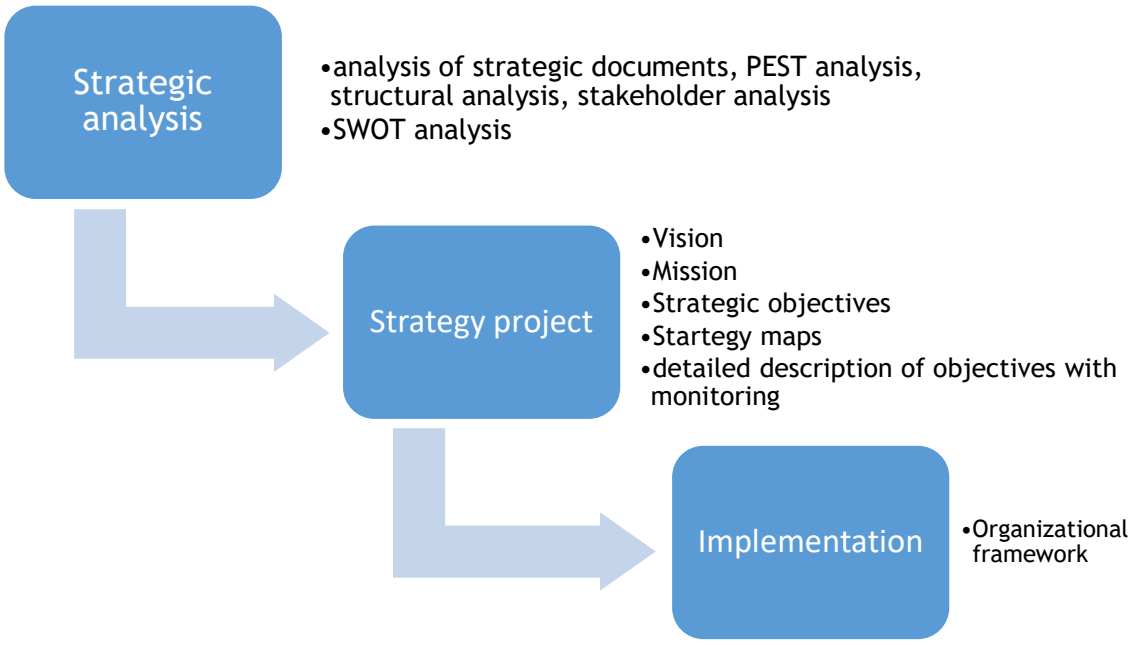


Figure 6. The process of strategy creation

3. STRATEGIC ANALYSIS – SWOT ANALYSIS FOR TRITIA AREA

The SWOT analysis is a summary of the part of the strategic analysis including analysis of strategic documents, PEST analysis, structural and stakeholder analysis. Its results will help to identify internal and external factors influencing the development of multi-modal transport in the TRITIA area, broken down into opportunities, threats, strengths and weaknesses. Moreover, the factors that occur in all surveyed regions and those that are characteristic only for a given region were indicated (table 6).

This discovery phase cascaded into discussions of how multimodal transport should develop and the definition of a strategy to ensure long-term success.

Table 6. SWOT analysis for the TRITIA area in the field of multimodal transport development

SWOT	Common conditions / features	Differences
1	2	3
Opportunities	– Economic growth (GDP growth) (CZ, PL, SK) – High fuel price (increasing of road freight transport costs, opportunities for more ecologic modes of transport – water, rail) (CZ, PL, SK) – Strategic transport position (new investors and investments) (CZ, PL, SK) – Taxes and fees (for roads and HGVs) (CZ, PL, SK) – Stability of the EU politics (security, duty-free union) (CZ, PL, SK) – Intensification of cooperation of entities in the TRITIA cross-border area (CZ, PL, SK) – Transit of international corridors (fees) (CZ, PL, SK) – Taking into account ecological aspects in the policy of sustainable transport development (CZ, PL, SK) – The development of multimodal transport as a solution supporting the reduction of external transport costs (CZ, PL, SK) – An integrated transport policy of the European Union that includes multimodal transport (CZ, PL, SK) – Development of transport infrastructure in various modes of transport (CZ, PL, SK) – Strong development of containerization and other reloading technologies and their standardization (CZ, PL, SK) – technological development and evolving of modern technologies including information and telematics technologies (CZ, PL, SK – beginning)	– Manpower from abroad (SK) – Modernization of railway lines (SK) – Interest of new investors (due to more transport possibilities) (SK) – Increasing cooperation of enterprises with the R & D sphere enabling the transfer of knowledge (CZ, PL)

Threats	– Lack of employees (CZ, PL, SK); – High labor costs (CZ, PL, SK); – Financial risk with long-term projects (the risk of exceeding the project budget) (CZ, PL, SK) – Lack transparent-ness political (CZ, PL, SK) – Increase of motorisation rate (CZ, PL, SK) – Some institutions which are the opponents to implemented solutions and investments in the area of transport (e.g. road blocks) (CZ, PL, SK) – Insufficient infrastructure (poor quality, low capacity, delays in the construction and modernization of infrastructure) (CZ, PL, SK) – Lack of money for transport in the national budget (CZ, PL, SK) – Legislative restrictions and high bureaucratic duties (CZ, PL, SK) – Rapid and unregulated growth of passenger transport (insufficient capacity) (CZ, PL,SK) – Low increase in commercial speed in the field of rail freight transport (CZ, PL, SK) – Legislative and political delays (CZ, PL, SK);	– Poor planning, low drawdown of EU funds (CZ) – Political instability (new priorities) (SK) – Lack of supporting instruments for the implementation of an environment-friendly transport system (incentives, penalties) (PL, SK) – Low level of lobbying in multimodal transport (PL) – Omission of Polish water transport routes in the European TEN-T transport network (CZ, PL) – Lack of coherent regional policy in the field of freight transport (PL) – Lack of proportionality in the implementation of ecological solutions in particular branches of transport (PL) – Diversity of the geographical environment - problems with the construction and modernization of infrastructure (PL, SK);
Strengths	– Current and potential labour market (potential supply of employees) (CZ, PL, SK) – Physical resources - number and location of re-loading terminals, logistics and distribution centres, available storage, logistic operators, number of transportation companies(CZ, PL, SK) – Sufficient number of multimodal operators (CZ, PL, SK) – Number of trucks, trailers and semi-trailers (CZ, PL, SK) – Availability of inland waterway infrastructure (CZ, PL, SK) – Knowledge resources: high numbers of colleges and universities; high level of education (CZ, PL, SK) – Demand for transport and logistics services (CZ, PL, SK) – The level of market saturation (CZ, PL, SK) – Market dynamics and new investments (CZ, PL, SK) – High barriers of entry (CZ, PL, SK) – Low barriers of exit (CZ, PL, SK) – Middle level of cooperation (CZ, PL, SK) – High competition in freight transport and logistics (CZ, PL, SK)	– Road infrastructure (PL) – Cluster (SK, CZ/cooperation network PL) – Low industry risk (CZ, SK) – Technological requirements - new, modern and fuel saving vehicles provide advantage of the competition (CZ, SK). – Strong support of business environment institutions (CZ, SK) – Development of information and telematics technologies (CZ)

Weaknesses	– Number of employed persons (CZ, PL, SK) – Low salaries for specialists (CZ, PL, SK) – High fluctuation of employees (CZ, PL, SK) – Number of fleet of barges, towing barges (CZ, PL, SK) – Low quality of roads, waterways and railways (CZ, PL, SK) – Insufficient level of investment in the development of freight transport (CZ, PL, SK) – Support of finance institutions, government institutions (CZ, PL, SK)	– Low level of innovation implementation (PL, SK) –

4. DEFINITION OF STRATEGIC OBJECTIVES OF TRITIA TERRITORY IN TERMS OF MULTIMODAL FREIGHT TRANSPORT

4.1. Vision and mission

VISION:

CREATING THE ECOSYSTEM FOR MULTIMODAL FREIGHT TRANSPORT IN THE TRITIA AREA

MISSION:

SUSTAINABLE DEVELOPMENT OF MULTIMODAL FREIGHT TRANSPORT IN THE BORDER AREA, BASED ON SUPPORT SYSTEM FOR TRITIA TERRITORY, TO INCREASE FUNCIONALITY, EFFECTIVENESS, COMPLIMENTARITY, COOPERATION AND REGULATION OF MULTIMODAL FREIGHT TRANSPORT

4.2. Strategic goals of TRITIA territory in terms of freight transport

Strategic goals are the result of analyses of the environment, the potential of regions and countries operating in the TRITA area as well as wide consultations with stakeholders. The strategy responds to the challenges of regional development and goals defined in strategies Europe 2020 or White Paper – Roadmap to a Single European Transport Area. There are include the key objectives of the development of multimodal transport in the area of TRITIA:

- Growth of multimodal freight transport in the TRITIA area
- Supporting initiatives aimed at increasing the competitiveness of multimodal transport in the TRITIA cross-border area.
- Promoting multimodal transport as an environmentally friendly solution with a positive impact on the standard of living of citizens and the competitiveness of the economies of the TRITIA area.
- Taking initiatives and actions to develop markets in the area of multimodal transport and create conditions of fair competition in these markets.
- Undertaking and supporting initiatives to increase the number of specialists in the multimodal transport market.

4.3. Balanced ScoreCard

The process of creating and using BSC is used both at the stage of formulating the strategy of development of intermodal transport in the TRITIA area and action plans presenting specific tasks to be implemented that are to translate into the implementation of the assumed strategy.

The standard BSC consists of four basic perspectives: financial, client, process and development. Each of them measures different aspects of operations and each delivers various pieces of information which together create the image of the strategy implementation process, therefore these perspectives cannot be dealt with separately. The model perspectives must be however treated as a template, not as rigid frameworks. The specifics concerning the approach to creating the region strategy is based on the place-based approach and the resource-based theory of strategy and requires consideration of additional perspectives or the change of their order. The classical Balanced Scorecard, due to its sectoral depiction, impact of multimodal transport development on the surrounding and impact of the surrounding on the freight transport development as well as the stakeholders of the multimodal transport development, was modified and the following perspectives together with their sequence were proposed (Fig. 7):

- Stakeholders.
- Financial.
- Sefty and sustainable development.
- Process.
- Infrastructure.
- Development.

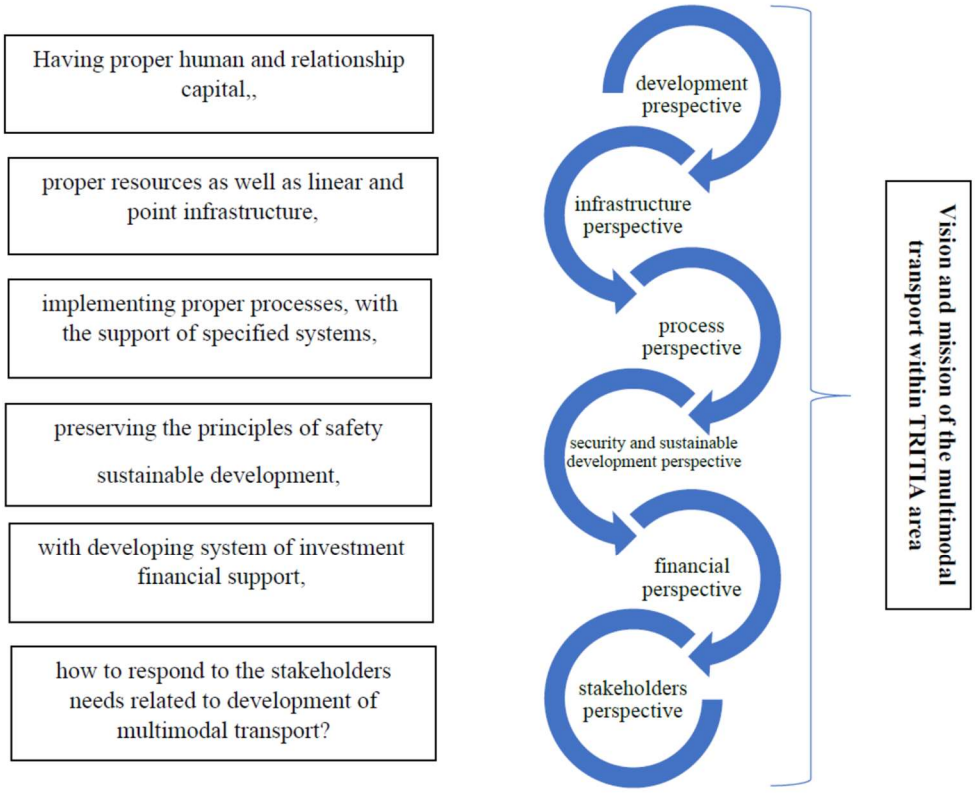
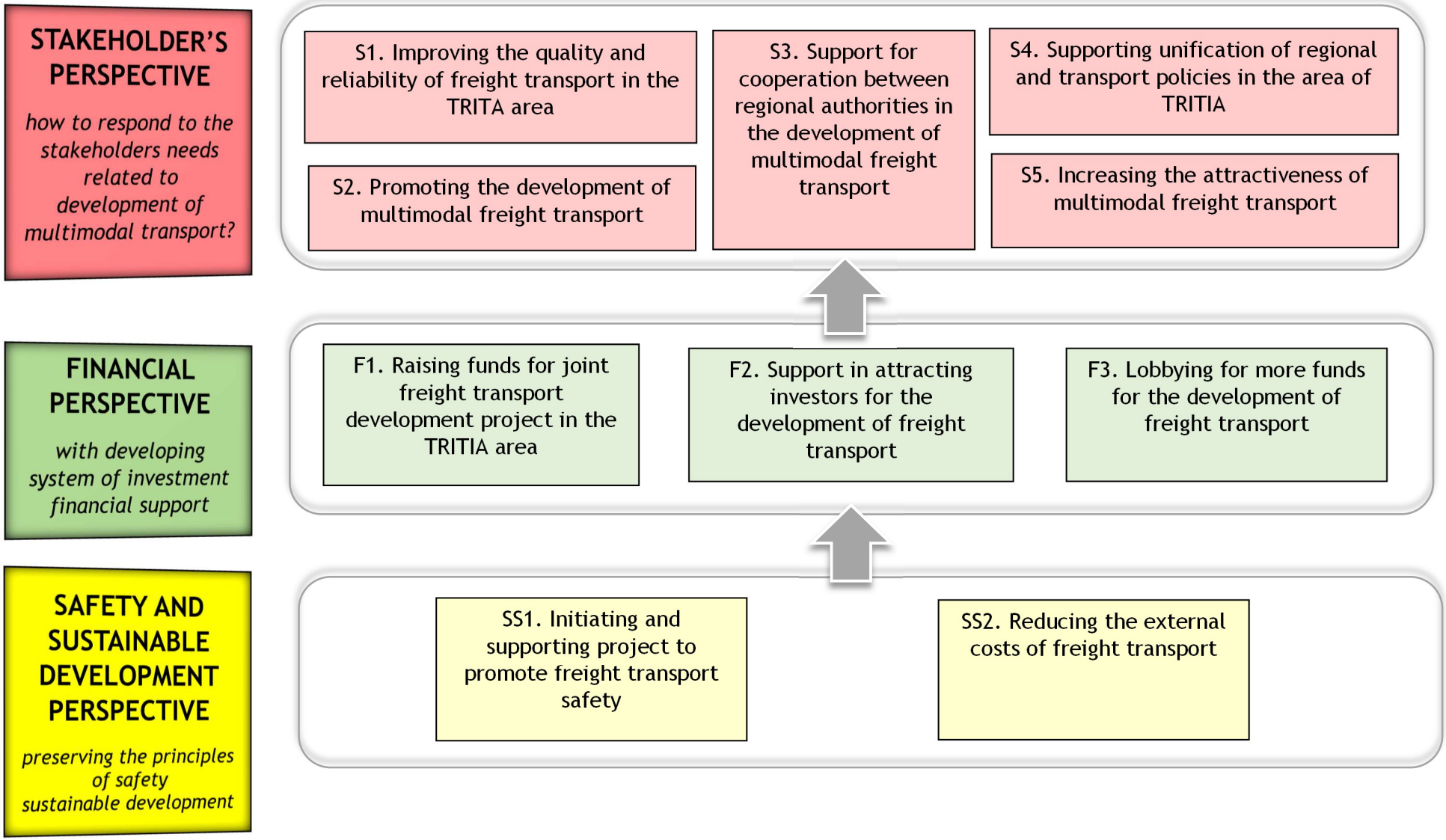


Figure 7. The model of the Balanced Scorecard related to developing the multimodal freight transport within cross-border area
Source: Kramarz M., Knop L., Strategy model for multimodal freight transport development within the cross-border area, in: Stajniak M., Szuster M., Kopeć M., Toboła A. (Eds.), Challenges and Modern Solution in Transportation, Instytut Naukowo-Wydawniczy „Spatium", Radom 2019.

The strategy map is shown in the figure 8.


STAKEHOLDER'S PERSPECTIVE
how to respond to the stakeholders needs related to development of multimodal transport?
S1. Improving the quality and reliability of freight transport in the TRITA area
S2. Promoting the development of multimodal freight transport
S3. Support for cooperation between regional authorities in the development of multimodal freight transport
S4. Supporting unification of regional and transport policies in the area of TRITIA
S5. Increasing the attractiveness of multimodal freight transport
FINANCIAL PERSPECTIVE
with developing system of investment financial support
F1. Raising funds for joint freight transport development project in the TRITIA area
F2. Support in attracting investors for the development of freight transport
F3. Lobbying for more funds for the development of freight transport
SAFETY AND SUSTAINABLE DEVELOPMENT PERSPECTIVE
preserving the principles of safety sustainable development
SS1. Initiating and supporting project to promote freight transport safety
SS2. Reducing the external costs of freight transport

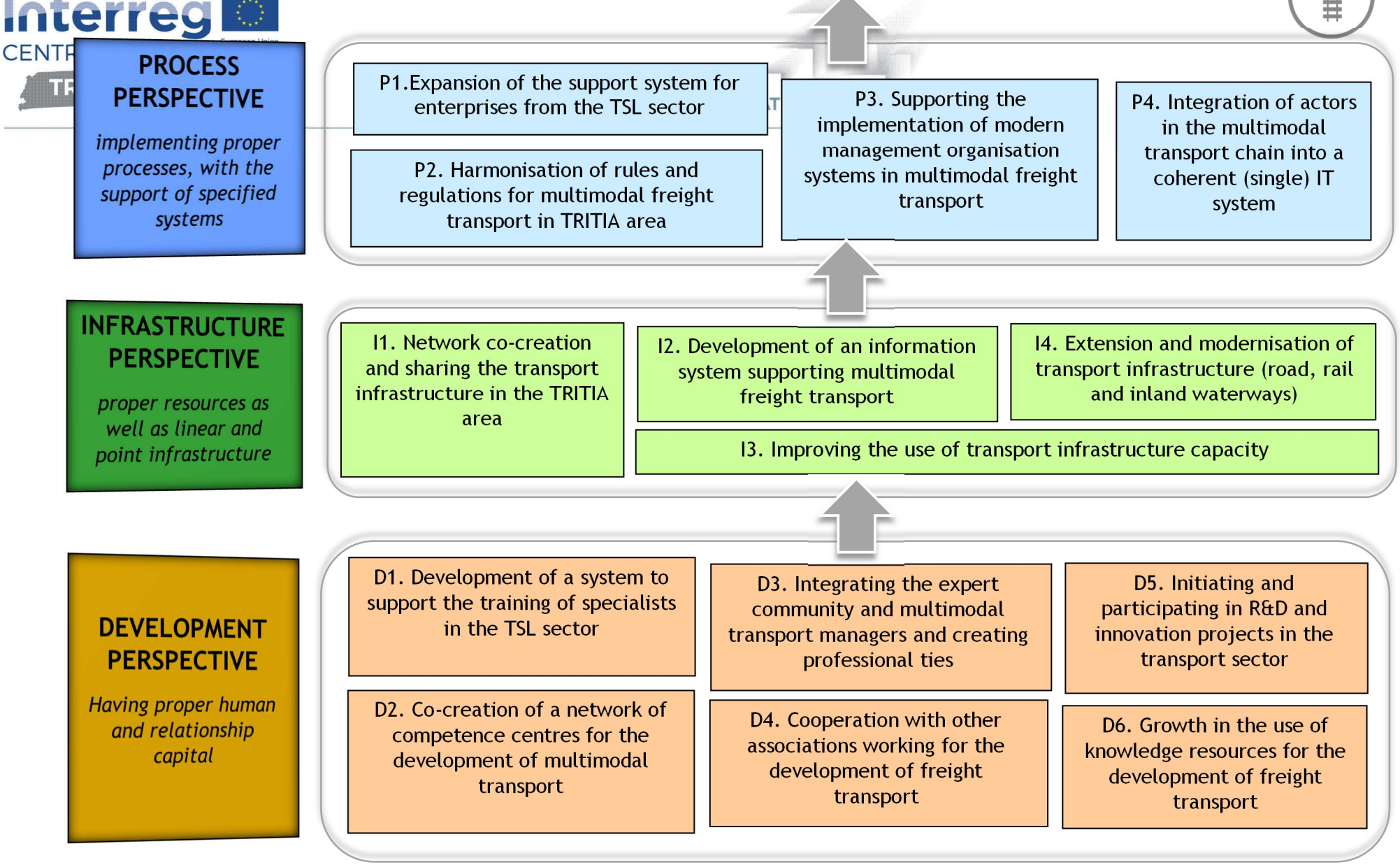


Figure 8. Strategy map

In the developed map of the strategy, which is a sketch of the plan for achieving the assumed vision, the process of detailing the goals and setting measures in individual perspectives was carried out at a later stage (tables 7 – 26). The proposed measures do not have a base value, as such data are not yet prepared for the analysed regions. The result of the project should be the extension of the base of indicators concerning multi-modal transport in the TRITIA area.

4.3.1. Stakeholder perspective

Table 7. Stakeholder perspective – specification of the goal S1

Goal symbol	Strategic goal	Measure/ Value
S1	**Improving the quality and reliability of freight transport in the TRITA area**	Average time delays in multimodal transport Number of damaged loads Average commercial speed
Effect / profits		**Data source and monitoring frequency**
Reducing delays in multimodal transport Reducing the number of damaged loads Increasing the average trade speed		Industry reports Survey research Annual monitoring carried out by the Observatory on the basis of reports and surveys, identifying trends

Table 8. Stakeholder perspective – specification of the goal S2

Goal symbol	Strategic goal	Measure/ Value
S2	**Promoting the development of multimodal freight transport**	Number of promotional campaigns targeted at enterprises Percentage share of multimodal transport in the total structure of freight flows in the TRITIA area
Effect / profits		**Data source and monitoring frequency**
Increased use of multimodal transport		Industry data EUROSTAT data and statistical offices of individual countries Annual monitoring by the Observatory

Table 9. Stakeholder perspective – specification of the goal S3

Goal symbol	Strategic goal	Measure/ Value
S3	**Support for cooperation between regional authorities in the development of multimodal freight transport**	Number of programs aimed at strengthening cooperation in networks and supply chains Indicator of the level of cooperation in logistics networks
Effect / profits		**Data source and monitoring frequency**
Strengthening cooperation in the joint organization of multimodal transport in international networks and supply chains		Data from national and EU programs Survey research

Table 10. Stakeholder perspective – specification of the goal S4

Goal symbol	Strategic goal	Measure/ Value
S4	**Supporting unification of regional and transport policies in the area of TRITIA**	Number and scope of agreements between countries (Poland, the Czech Republic, Slovakia) aimed at unifying policies in the implementation of material flows in the TRITIA area
Effect / profits		**Data source and monitoring frequency**
Unifying regional policies between countries in the territorial area of TRITIA		Expert research Analysis of strategic documents Research conducted once a year by the Observatory

Table 11. Stakeholder perspective – specification of the goal S5

Goal symbol	Strategic goal	Measure/ Value
S5	**Increasing the attractiveness of multimodal freight transport**	Cost level for the implementation of multimodal transport The level of delays in material flows carried out by multimodal transport Damaged cargo level The level of subsidy of tax reliefs for the use of multimodal transport
Effect / profits		**Data source and monitoring frequency**
Increased benefits for trade and production companies as well as TSL companies from the implementation of transport tasks in the concept of multimodal transport		Industry data Survey research Expert research GUS and EUROSTAT data

4.3.2. Financial perspective

Table 12. Financial perspective – specification of the goal F1

Goal symbol	Strategic goal	Measure/ Value
F1	**Raising funds for joint freight transport development project in the TRITIA area**	Number of projects acquired in the field of multimodal transport development in the TRITIA area Funds obtained as part of joint projects aimed at the development of multimodal transport in the area of TRITIA
Effect / profits		**Data source and monitoring frequency**
Increase in expenditure on the development of multimodal transport in the TRITIA area		Monitoring the number of acquired projects and funds by the Observatory Project initiation by the Coordinator

Table 13. Financial perspective – specification of the goal F2

Goal symbol	Strategic goal	Measure/ Value
F2	**Support in attracting investors for the development of freight transport**	Number of investors in the development of multimodal transport The level of incentives for attracting investors
Effect / profits		**Data source and monitoring frequency**
Increase in the number of investors in the development of multimodal transport		Data from the Coordinator

Table 14. Financial perspective – specification of the goal F3

Goal symbol	Strategic goal	Measure/ Value
F3	**Lobbying for more funds for the development of freight transport**	Number of initiatives undertaken to raise funds for the development of multimodal transport Number of organizations undertaking lobbying activities in the field of obtaining funds for the development of multimodal transport
Effect / profits		**Data source and monitoring frequency**
Increasing funds for the development of multimodal transport Establishing a fund for the development of multimodal transport at the level of the Visegrad Group		Expert research

4.3.3. Safety and sustainable development perspective

Table 15. Safety and sustainable development perspective – specification of the goal SS1

Goal symbol	Strategic goal	Measure/ Value
SS1	**Initiating and supporting project to promote freight transport safety**	Number of projects aimed at increasing the safety of multimodal freight transport in the TRITIA area Number of applied projects Number of initiatives undertaken in EGTC TRITIA towards increase
Effect / profits		**Data source and monitoring frequency**
Increasing the number of projects, initiatives and project applications aimed at increasing the safety of multimodal freight transport		Operational programs, EGTC Tritia, EU programs, Research conducted once a year by the Observatory

Table 16. Safety and sustainable development perspective – specification of the goal SS2

Goal symbol	Strategic goal	Measure/ Value
SS2	**Reducing the external costs of freight transport**	The level of external costs in freight transport
Effect / profits		**Data source and monitoring frequency**
Reduction of social costs of transport activity		Industry data Statistic data Cost monitoring by the Observatory

4.3.4. Process perspective

Table 17. Process perspective – specification of the goal P1

Goal symbol	Strategic goal	Measure/ Value
P1	**Improving the quality and Expansion of the support system for enterprises from the TSL sector**	The degree of use of support programs in the field of multimodal transport for enterprises from the TSL sector Number of multimodal transport support programs for enterprises from the TSL industry The amount of financial outlays supporting multimodal transport of enterprises from the TSL sector The level of financial allowances Number of IT systems supporting multimodal transport in the TSL industry Number of implemented innovations in the field of multimodal transport in the TSL industry
Effect / profits		**Data source and monitoring frequency**
Increase in the number of support programs Increased use of support programs Increase in expenditure on supporting enterprises in the TSL industry Process synchronization by appointing a Coordinator		Monitoring of the number of support programs and financial resources by the Observatory Statistical data (Eurostat and national statistical offices) EU programs Regulatory authorities and offices Coordinator

Table 18. Process perspective – specification of the goal P2

Goal symbol	Strategic goal	Measure/ Value
P2	**Harmonisation of rules and regulations for multimodal freight transport in TRITIA area**	Number of standardized procedures in multimodal transport in the Tritia area The level of standardization of procedures in multimodal transport in the area
Effect / profits		**Data source and monitoring frequency**
Harmonization of regulations in multimodal transport in the Tritia area		Coordinator Expert research

Table 19. Process perspective – specification of the goal P3

Goal symbol	Strategic goal	Measure/ Value
P3	**Supporting the implementation of modern organisational solutions in multimodal freight transport**	Number of implemented modern organizational solutions in multimodal transport The degree of coordinator's involvement in the implementation of processes in the multimodal transport network in the Tritia area
Effect / profits		**Data source and monitoring frequency**
Appointment of a coordinator and definition of his key competences		Expert research Survey research

Table 20. Process perspective – specification of the goal P4

Goal symbol	Strategic goal	Measure/ Value
P4	**Integration of actors in the multimodal transport chain into a coherent (single) IT system**	Number of participants in the multimodal transport chain supported Number of functionalities of the IT platform integrating participants of the multimodal transport chain
Effect / profits		**Data source and monitoring frequency**
Creation of an IT platform integrating participants of the multimodal transport chain		Coordinator

4.3.5. Infrastructure perspective

Table 21. Infrastructure perspective – specification of the goal I1

Goal symbol	Strategic goal	Measure/ Value
I1	**Network co-creation and sharing the transport infrastructure in the TRITIA area**	Degree of sharing of transport infrastructure
Effect / profits		**Data source and monitoring frequency**
IT platform integrating participants of the multimodal transport chain Increase in sharing and sharing of linear and point transport infrastructure		Expert research

Table 22. Infrastructure perspective – specification of the goal I2

Goal symbol	Strategic goal	Measure/ Value
I2	**Development of an information system supporting multimodal freight transport**	Number of available IT systems supporting multimodal transport Number of track and trace solutions available to support multimodal transport Number of entities using the IT platform integrating participants of the multimodal transport chain Number of entities using IT systems in the multimodal transport chain
Effect / profits		**Data source and monitoring frequency**
Improving information flows between participants in the multimodal transport chain Increasing cooperation between the participants of the multimodal transport chain Improving the safety of cargo transportation Reducing delays in multimodal transport		Survey research IT platform integrating participants of the multimodal transport chain Coordinator

Table 23. Infrastructure perspective – specification of the goal I3

Goal symbol	Strategic goal	Measure/ Value
I3	**Improving the use of transport infrastructure capacity**	Density of multimodal transhipment terminals Reloading capacity (throughput) of multimodal reloading terminals The size of the storage area of multimodal transshipment terminals Indicator of the average load on terminals with transshipments The maximum number of means of transport that can move on a given railway line / road / waterway per day Length of transhipment tracks in multimodal terminals
Effect / profits		**Data source and monitoring frequency**
Shortening the time of container handling in the terminal Reducing delays in multimodal transport Increasing the availability of terminal service Reducing bottlenecks in the line infrastructure of the		Observatory should conduct annual monitoring based on the data of terminal and line infrastructure managers.

Table 24. Infrastructure perspective – specification of the goal I4

Goal symbol	Strategic goal	Measure/ Value
I4	**Extension and modernisation of transport infrastructure (road, rail, inland waterways)**	Number of modernized track kilometers in rail transport The number of kilometers of roads of good, sufficient and unsatisfactory quality in rail transport Number of kilometers of modernized waterways Number of modernized locks, weirs, etc. on waterways Number of kilometers of new motor roads built (broken down into motorways, expressways, other)
Effect / profits		**Data source and monitoring frequency**
Increase of commercial speed in rail transport Shortening the time of multimodal transport Increase in transported goods with the use of inland navigation Increase of transported goods by rail transport Increase in multimodal transport with the use of rail transport		The observatory should conduct annual monitoring based on data and reports of infrastructure managers and statistical offices

4.3.6. Development perspective

Table 25. Development perspective – specification of the goal D2, D4

Goal symbol	Strategic goal	Measure/ Value
D1, D4	**Co-creation and cooperation of a network of competence centres and other associations working for the development of freight transport**	Number of competence centers Number and type of participants in the multimodal transport network (as sources of knowledge) Number and scope of joint initiatives, ventures and projects undertaken for multimodal transport Number of product, process and organizational innovations
Effect / profits		**Data source and monitoring frequency**
Increasing cooperation between participants in the multimodal transport network Selecting competence centers dealing with the development of multimodal transport Increase in the flow of knowledge between participants in multimodal transport networks using Increase in the level of innovation Increase in the level of lobbying		Observatory Competence centers as a repository of knowledge Eurostat, country statistical offices Survey research Expert study

Table 66. Development perspective – specification of the goal D1, D3, D5

Goal symbol	Strategic goal	Measure/ Value
D1, D4	**Growth in the use of knowledge resources for the development of freight transport** **D1. Development of a system to support the training of specialists in the TSL sector** **D3. Integrating the expert community and multimodal transport managers and creating professional ties** **D5. Initiating and participating in R&D and innovation projects in the transport sector**	Number of training courses and courses of study Number of trained and graduating specialists Number of specialists with industry education Number of R&D projects in the field of multimodal transport development for the TRITIA area and the countries representing them Number of experts cooperating with EGTC TRITIA Number of meetings organized by TRITIA (seminars, conferences, webinars, workshops) The number and scope of expertise prepared for multimodal transport
Effect / profits		**Data source and monitoring frequency**
Increase in the number of specialists in the field of transport and logistics New infrastructural and organizational projects supporting the development of multimodal transport Increase in the number of product, process and organizational innovations Developing lasting expert relations		Eurostat, statistical offices of individual countries Observatory EGTC TRITIA

5. STRATEGIC PROJECTS SUPPORTING DEVELOPMENT OF FREIGHT TRANSPORT ON TRITIA TERRITORY

Implementation of the objectives is the need to take a number of initiatives and projects. The discussion with the stakeholders allowed for the selection of three strategic organizational projects.:

1. Observatory of multimodal transport in the cross-border area (acronym: Observatory)
2. Coordinator of the multimodal transport network (acronym: Coordinator)
3. Competence center for sustainable freight flows in the TRITIA area (acronym: Competence center).

that contain other proposals for smaller projects. In addition, lists of infrastructure projects that are necessary from the perspective of the implementation of the strategy have been presented in detail in industry action plans and cross-border action plans.

Tables 27-29 present detailed descriptions of the three strategic projects. Infrastructure projects are described in detail in the reports:

DT 1.2.1 – Selection and prioritisation of cross- border projects for implementation,

DT 1.2.2 – Budgeting of selected cross - border projects.

Table 27. Project description: Observatory of multimodal transport in the cross-border area

Project aim:	The goal of the project is to launch a specialized observatory that will be responsible for observing technological and market trends in the development of intermodal transport in the cross-border area TRITIA. The observatory will respond to the specific needs of the actors of the intermodal transport ecosystem of the Śląskie Voivodship, Opolskie Voivodship, the Local Government of the Žilina Region and the Moravian-Silesian Region in the scope of supporting and tracking the development of intermodal transport, positioning its key technological areas and assessing the effectiveness of its development activities.
Included projects:	1. Odra Commission 2. The concept of determining the external costs of freight transport 3. Analysis of disruptions in freight transport that are the result of infrastructure sharing 4. System of data collection in freight transport 5. Monitoring of the development of the TEN-T network - including roads, railways, inland waterways in the TRITIA area 6. Monitoring of the development of roads, railways, inland waterways networks and point infrastructure 7. Monitoring of Intelligent Transport Systems further deployment

The scope of the project (main topics)	The activities of the observatory will include the collection and processing of specialized knowledge about technological and infrastructural areas, monitoring the implementation of multimodal transport development strategies; technological trends and infrastructure development, and an assessment of the endogenous potential of the TRITIA region in the development of intermodal transport. The scope of the project will include the following tasks: – mapping of the multimodal transport system in the TRITIA area – mapping relations in the multimodal transport network of the TRITIA area – the assessment of transport and logistics potential – cooperation for the development of the transport and logistics in the TRITIA area – monitoring of the development of the TEN –T network and infrastructure (roads, railways, inland waterways networks and point) – lobbying to establish an intergovernmental organisation that guarantees freedom of navigation and equal treatment for all banners on the Oder – comparison of application of externalities in freight transport, incl. charges for the use of transport infrastructure; elaborating maps of pilots projects before and after the full application of externalities (within TRITIA area);
Relation to strategic goals	S2, F2, SS1, SS2, P3, I2, I3, I4, D1, D4, D6
Level of importance	High
Project Leader	Upper Silesian Agency for Entrepreneurship and Development Ltd., Silesian University of Technology, EGTC TRITIA, R&D Institutes from Czech Republic, Poland, Slovakia
Source of funding:	Interreg EUROPE, Interreg Central Europe, Interreg CZ-PL incl. SK), etc
Term (period) of implementation (plan)	2020-2025

Table 28. Project description: Coordinator of the multimodal transport network (acronym: Coordinator)

Project aim:	The aim of the project will be to develop a model of multimodal transport network coordination for the TRITIA area. The subject matter of the project will be strongly in line with the guidelines of modern transport policy, emphasizing the need to build an integrated and sustainable multi-branch transport system.
Included projects:	1. Modelling of logistics centres networks and multimodal terminals 2. Alternative scenario of multimodal freight transport development
The scope of the project:	– selection of the method and mechanisms of coordination of the multimodal transport network in the TRITIA area. – design of innovative transport traffic management systems contributing to the reduction of environmental pressures generated by road transport – developing cooperation platform including an information system for multimodal transport networks. – based on data obtained from the Observatory, creating alternative scenarios for the development of multimodal transport in the Tritia area. The coordination model will take into account the available logistics

	infrastructure and its changes, network actors, as well as current and forecast freight flows in the network under study. – initiating network cooperation at the level of supply chains, logistics organizations and other multimodal transport stakeholders – lobbying for support for the development of multimodal transport, including harmonization of regulations
Relation to strategic goals	S1, S3, S4, S5, F1, F2, F3, SS1, SS2, P1, P2, P3, P4, I1, I3, I4, D2, D4, D5, D6
Level of importance	High
Project Leader:	Upper Silesian Agency for Entrepreneurship and Development Ltd., Silesian University of Technology, EGTC TRITIA, R&D Institutes from Czech Republic, Poland, Slovakia
Source of funding:	Interreg EUROPE, Interreg Central Europe, Interreg CZ-PL incl. SK), etc
Term (period) of implementation (plan)	2020-2030

Table 29. Project description: Competence centre for sustainable freight flows in the TRITIA area

Project aim:	Designing innovative service centres in the TRITIA area enabling the implementation of sustainable freight flows using vehicles with alternative propulsion sources. The project is part of the requirements of the transport policy of the European Union countries and the guidelines related to the need to develop electromobility and alternative fuels. The scope of the project covers freight transport previously omitted in projects related to electromobility.
Included projects:	1. Modelling of the network of innovative freight transport service centers in the TRITA area, including in their infrastructure power stations into alternative propulsion sources. 2. Designing innovative solutions for alternative vehicle power sources. 3. Forecasting freight flow streams taking into account the environmental impact of alternative propulsion sources used in TRITIA.
The scope of the project (main topics)	– research on current and emerging technologies for alternative propulsion sources; – analysis of global trends in the context of the development of electromobility in combination with multimodal transport, – preparation of innovative projects, – acquiring and developing competences and searching for talents in the studied area – mapping the type and size of freight streams in the TRITIA area; – analysis of the structure of transported loads, taking into account various modes of transport; – analysis of organizational and legal possibilities and restrictions in the scope of designing innovative centres for realization of balanced goods flows; – analysis of the possibilities and restrictions of using vehicles with alternative propulsion sources in the TRITA area. Both freight-based (last mile) and heavy goods vehicles will be included here – mapping the existing supply network of commercial vehicles and trucks to alternative power sources

	– configuration of the network of innovative freight transport service centres in the TRITA area, including in their infrastructure power stations into alternative propulsion sources – analysis of environmental benefits resulting from the increased share of electric vehicles or with an alternative drive to achieve freight flows (comparison of external transport costs)
Relation to strategic goals	S1, S5, F1, F2, SS2, I1, I2, I4, D4, D5
Level of importance	High
Project Leader	Silesian University of Technology, Upper Silesian Agency for Entrepreneurship and Development Ltd., EGTC TRITIA, R&D Institutes from Czech Republic, Poland, Slovakia
Source of funding:	Horizon EUROPE The next EU Research & Innovation Programme 2021-2027
Term (period) of implementation (plan)	2021-2027

6. ORGANISATIONAL FRAMEWORK FOR IMPLEMENTATION OF THE STRATEGY

The implementation of tasks in the area of management and monitoring of the Regional Multimodal Freight Transport Strategy for 2020-2030 will be based on the structure of EGTC TRITIA and other units. The organizational structure model for the implementation of the strategy is presented in Fig. 9.

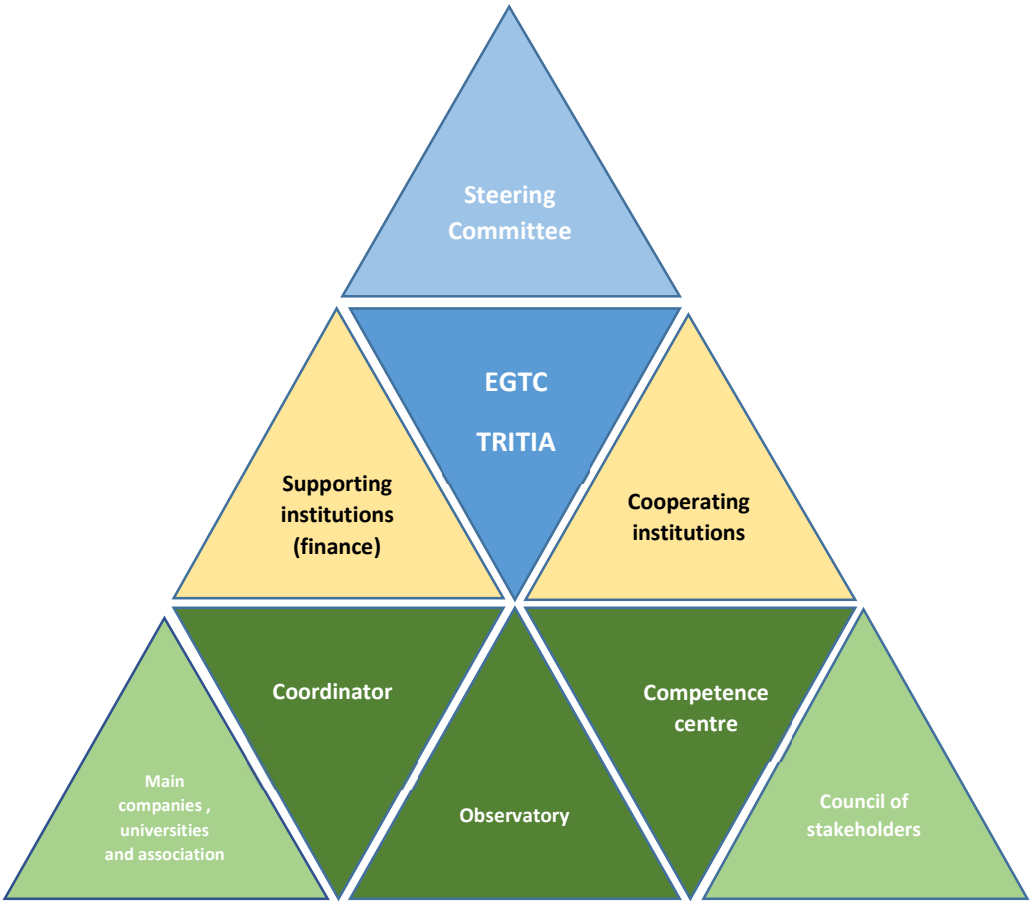


Figure 9. Model of organisational framework

EGTC TRITIA is responsible for the implementation of the strategy, i.e. primarily for building and developing the multimodal transport ecosystem in the TRITIA area. Every year, based on annual implementation reports and monitoring indicators, EGTC TRITIA presents a report on the level of implemented activities. The report is prepared by

the Observatory, which supported by the data of the Coordinator and the Competence Center, monitors the strategy indicators.

Annual reports are presented to the Steering Committee (strategic level), which brings together the key governmental and local government organizations of the Czech Republic, Poland and Slovakia. The key role of the Steering Committee is to perform the decision-making and advisory function in matters related to the implementation of the strategy as well as programming, coordination, implementation, monitoring and evaluation of the multimodal transport development policy in the area of TRITIA.

The activities of the Steering Committee are supported by the Council of Stakeholders, whose aim is to undertake substantive work on the main tasks resulting from the current needs of TRITIA in the field of multimodal transport development. The result of CoS works is the presentation of expert opinions and reports at the meetings of the Steering Committee.

Relations with the main entities (investors), universities and associations, which have a key impact on the development of multimodal transport, are of significant importance in the field of cooperation between CoS and EGTC TRITIA and the established Observatory, Coordinator and Competence Center.

The structure includes two support groups: entities financing strategic projects and those most often referred to as business environment institutions and support EGTC TRITIA in initiating, applying and managing strategic projects aimed at the development of multimodal transport in the TRITIA area.

The implementation of tasks in the area of monitoring and evaluation will be based on the current structure of EGTC TRITIA, supported by the Steering Committee for the development of multimodal transport appointed by EGTC TRITA. Monitoring includes the implementation of projects in TRITIA area and special indicators which were presented in detailed descriptions of goals. The EGTC TRITIA is proposed to ensure interconnection between entities, especially ministries and regional authorities, from the Czech Republic, Poland and Slovakia in solving problems that require the participation of entities from several countries.

7. SUMMARY

Transport development is considered to be one of the main elements of regional development. Observing the growing demand for transport, more and more attention is paid to their quality aspects. These include, among others, efficiency, safety, as well as constant striving to reduce external costs, which are primarily related to the negative impact on the natural environment. Cooperation between border countries and regions is essential for the coherence and continuity of goods flows. The challenges for the development of multimodal transport in the area of TRITIA indicated in the publication in the field of national (Poland, Czech Republic, Slovakia) and regional (TRITIA) policies, line and point infrastructure, social and economic effects, key players activities, provided the basis for seeking solutions to eliminate barriers to the development of multimodal transport in the TRITA cross-border area.

The strategy building methodology used combined a number of analyzes, including PEST analysis, resource analysis, stakeholder analysis, SWOT analysis and a strategic scorecard. The SWOT analysis was an important link between the results of the PEST analysis and the resource analysis. The results obtained jointly for all countries of the TRITA region indicate that the key threats to the development of multimodal transport in this region are legislative difficulties and unequal transport policies between countries, the quality of transport infrastructure is definitely a weakness. In the conducted analysis, some of the opportunities, strengths, weaknesses and threats are the same in all three countries, but there are also factors that are specific only to one country or two. As a result, the developed mission, vision and strategic goals are a response to the indicated challenges and the need for a coherent, based on cooperation between stakeholders of all countries, development of multimodal transport as an ecosystem focused on the sustainable development of the TRITIA region. In this spirit, the goals have been refined in the strategic scorecard perspectives. The projects necessary for its implementation correspond to each goal.

Research has shown that initiating activities aimed at the development of multimodal transport in the cross-border area requires the involvement of all participants in the process, i.e. all countries (Poland, the Czech Republic and Slovakia), as well as very different stakeholders. For a further dynamic increase in the importance of multimodal transport in the TRITIA area, it is necessary to create favourable conditions for cooperation and joint implementation of projects in the area of infrastructure development and organizational support. The challenge for the studied area is, in the first place, to remove the backlog in the expansion, modernization and revitalization of the transport infrastructure and to connect the infrastructure of the most important nodes of the European transport network, including the core TEN-T

corridors. A coherent network of high-standard highways, expressways and railways as well as a developed network of inland waterways will allow for the full use of the potential of the economy of the three analyzed countries. It should be remembered that the creation of a coherent multimodal transport ecosystem requires both the dynamic development of the missing elements of the transport infrastructure, as well as the improvement of the quality of infrastructure, its technical standards and the introduction of solutions integrating transport networks.

The basis for the development of the ecosystem is the implementation of the indicated infrastructural and organizational projects. Additionally, the implementation of infrastructure projects focused on inland waterways is required. A revolutionary approach to the development of freight transport in the TRITIA cross-border area is based on the assumption of a strong development of water corridors: D-O-L and the Silesian Canal. The Danube-Oder-Elbe water corridor (D-O-L) is one of the largest projects for the development of European transport infrastructure. It is not only the missing link in the interconnected European system of inland waterways, but is also a multifunctional water project of great importance for Poland, the Czech Republic and Slovakia as well as for the whole of Europe. The Silesian Canal, on the other hand, as the planned waterway connecting the Odra with the Vistula and the Upper Silesian Industrial District and the Rybnik Coal District with Krakow, should become a critical point in the implementation of infrastructure projects in this scenario. It is to constitute not only an important element of the entire water system in Poland, but also in the future to enable the connection of the Vistula with the Danube.