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STRATEGIC FRAMEWORK OF TRANSPORT DEVELOPMENT

Summary. The topic of strategic transport planning understands targeted research of specific aspects relevant for a comprehensive systemic analysis of the transport sector. This paper treats the transport system functions in the European integration processes, correlations of transport from the economic, ecological and social aspect, contents of the transport sector harmonization – transport acquires elements of strategic transport planning and further development projection of the Trans-European transport system.

СТРАТЕГИЧЕСКАЯ ОСНОВА ТРАНСПОРТНОГО РАЗВИТИЯ

Аннотация. Тематика стратегического транспортного планирования рассматривается как целевое исследование определенных аспектов, важных для всестороннего системного анализа транспортного сектора. Статья рассматривает функции транспортной системы в процессах объединения Европы, корреляции транспорта в зависимости от экономических, экологических и социальных аспектов, содержание гармонизации транспортного сектора, обосновывает элементы стратегического планирования транспорта и проектирования дальнейшего развития европейской транспортной системы.

1. INTRODUCTION

Historically, the transport development has always corresponded to the economic growth and social and political status of the community. Since the Greek philosopher Heraclitus, who generalized his philosophy of life in two words “panta rei” which means “all things move”, there have been on the whole four revolutionary periods in the transport development most closely related to the economic transitions of Western Europe: [1]

- the Hanseatic period, from 13th to 16th century, which saw the development of waterways;
- the Golden Era of 16th and 17th centuries, with marked development of sea transport;
- industrial revolution from the mid-19th century when the invention of steam engine generated new transport modes, primarily the railway;
- information technology revolution, which marked the second half of the 20th century by introducing marketing and logistic principles into the transport sector.

Regarding the growth rate indicators of certain transport modes, the theoreticians mark the actual status of the transport development by the so-called fifth transport revolution i.e. the period of personalization and individualization of transport, a trend which does not parry the principles of sustainability.

In the context of geopolitical changes in Europe – disintegration of Yugoslavia, Czechoslovakia and the Soviet Union, as well as the enlargement of the European Union, the improvement in the transport and communication sector is the crucial assumption for more dynamic effects of integration.

The challenges of a single market of the enlarged European Union have to be accompanied by the common transport strategy implemented by adequate transport policy at national levels.

Apart from the supporting aspect of transport in the economic development, uniform physical distribution and social cohesion, transport policy also has to parry the requirements regarding alleviation of the negative dimension of transport expressed by the volume of external costs.

Beside Rio Declaration, which assumes three pillar developing concept of economic growth, ecological balance and social progress, the two main strategic directions are actualised with aim to enforce sustainability targets within Common Transport Policy of European Union:

- Kyoto protocol provision on reduction of eight percent of CO₂ pollution between 2008 and 2012 with respect to 1990 status;
- Green Paper “Towards a European strategy for the security of energy supply” provision on substitution of 20 percent conventional oil consumption with alternative fuels.

2. EUROPEAN CONTEXT OF TRANSPORT DEVELOPMENT

Since their establishment i.e. the 1957 Rome Agreement, the European Communities have the objective of conceiving a common transport policy. More concrete measures were undertaken in the middle of the 1980s, so the first White Paper on Common Transport Policy was adopted in 1992. The basic principle of this document was the opening of the transport market regarding the introduction of liberalization and free competition.

At the same time the Maastricht Agreement defined the so-called concept of the Trans-European networks (TEN) for the development of the transport infrastructure.

The thirty priority projects of Trans-European Network (TEN-T) have been accepted till now for cofinancing as support to implementation of transport development strategic objectives and EU common transport policy.

In order to satisfy the increased transport demand, during 1990s the transport policy concept spreads also to four basic principles of the development of the European Union transport systems – balancing of the differences between single transport branches, elimination of bottlenecks, users oriented of the transport policy and resolving of issues required from the transport systems under the conditions of globalization and enlargement of the European Union. In 2001 European Commission published a new White Paper [3], and in 2006 its Mid-term review.

The new White Paper titled European transport policy: time for decision, specifies a package of measures for structural reforms in the transport sector – from price formation with the aim of reviving the non-road alternatives to target investments into the Trans-European network. The package comprises 60 specific measures:

- revitalization of railways,
- qualitative improvement of road transport,
- water transport promotion,
- recognition of transport intermodality,
- upgrading of Trans-European transport network,
- safety increase,
- efficient infrastructure charging,
- postulation of the users’ rights,
- urban transport quality enhancement,
- functional research and technological development,
- globalization effects management,
- ecological optimization of sustainable transport development.

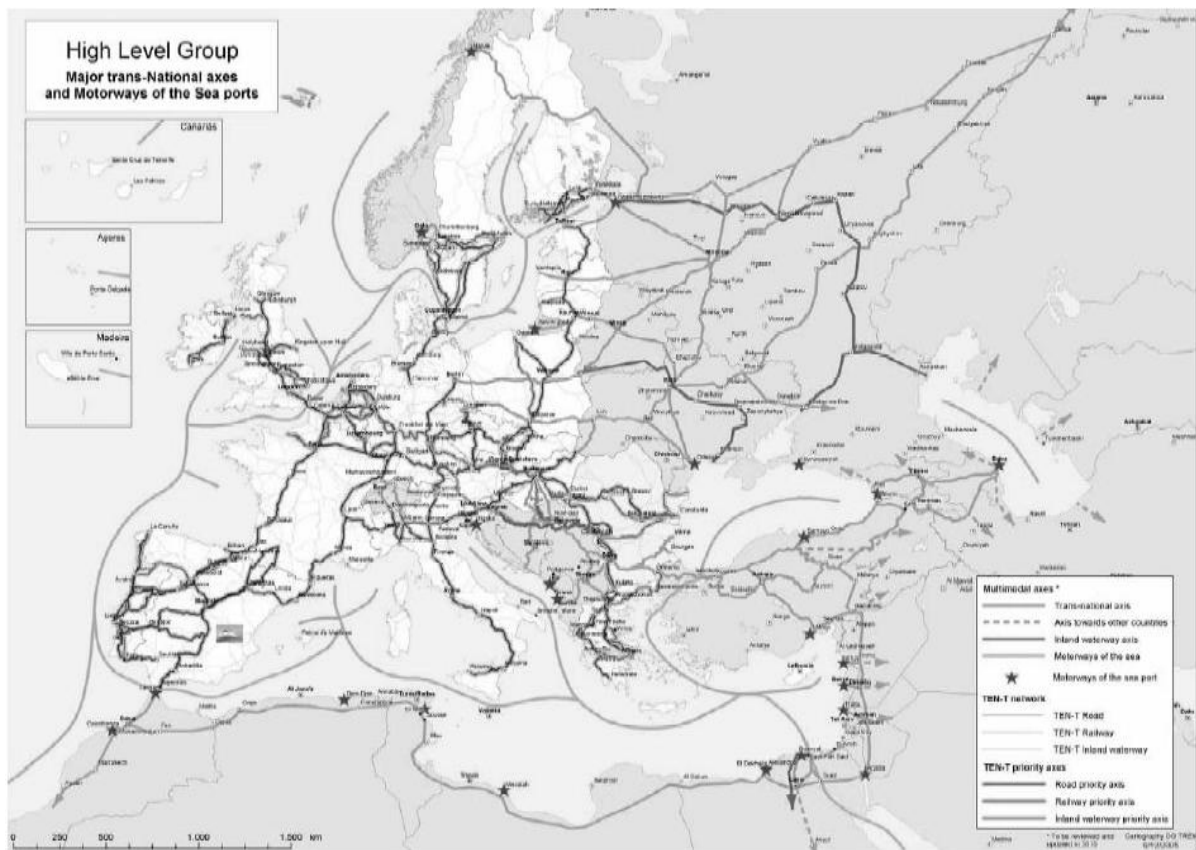


Fig. 1. Status of Trans-European transport Network [2]
 Рис. 1. Состояние Европейской транспортной сети [2]

Mid-term revision of the White Paper [4] recognizes the new conditions, such as the European Union enlargement, increase in the prices of oil, terrorism, Kyoto protocol, and remodels the development plan until 2009 with focus on:

- co-modality,
- technological plan for reducing the dependence on oil,
- application of new ITS technologies to increase the energy efficiency and flow management,
- solving of mobility problems in the cities,
- implementation of the infrastructure charging model with internalized externalities.

The term co-modality understands:

- optimization of the use of all transport modes,
- facilitating the change from one transport module to another by harmonizing standards,
- integration of different transport modules into efficient logistic chains.

3. TRANSPORT SYSTEM WITHIN THE INTEGRATION PROCESSES

The role of the transport system in keeping up with the requirements for free movement of goods, people (labour), services and capital is irreplaceable. Therefore, the main function of the transport system is to insure area integration and social cohesion, as well as economic (market) integration.

The European countries differ, in principle, to a great extent regarding the level of transport development, as well as regarding the priorities of development plans.

While developed countries in Western Europe are redefining their national policies of transport development towards stimulating demand for environmentally friendlier transport modes i.e. reducing the demand for road motor transport, and while they are introducing instruments of various operative

restrictions in roads usage in order to compensate the external costs, national plans of transport development in transition countries of Central and Eastern Europe, focus precisely on investments into road transport infrastructure.

As support to the processes of economic reforms and growth in the countries of Central and South-eastern Europe, regional initiatives of transport connections have been started. The relevant regional initiatives include:

- Initiative for cooperation in Central-Eastern Europe – SECI,
- Stability Pact – program of facilitating trade and transport in South-Eastern Europe TTFSE,
- Central-European Initiative CEI,
- Memorandum of Understanding on the development of regional transport network in South-eastern Europe – SEETO.

The transport policy of the European Union toward non-member countries has been articulated by the Pan-European corridors. As result of three Pan-European Conferences of European ministers of transport, which took place in Prague (1991), Crete (1994) and Helsinki (1997), the set of ten corridors and four areas have been defined as main multimodal arterias of international traffic flows from North to South-eastern Europe.

The basic intention of such network composition has been support to identification of investment needs for harmonisation of infrastructure standards in transition countries as well as transport projects prioritisation in process of their EU accession.

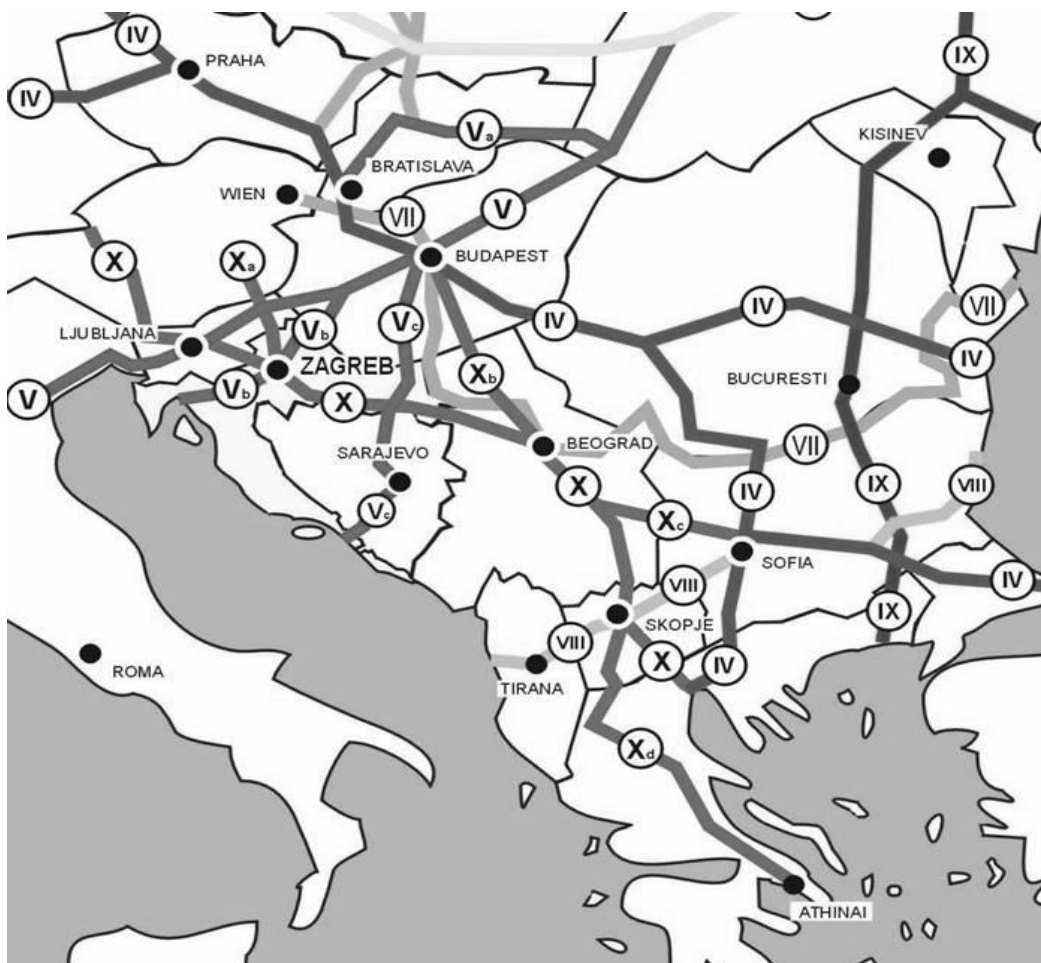


Fig. 2. Pan-European Corridors

Рис. 2. Европейские транспортные коридоры

Consequently, the accession countries and countries with benefits use financial instruments of pre-accession funds (PHARE, ISPA, CARDS, new IPA), and various types of financial support.

For the transition countries of Central Europe, in the pre-accession period, the TINA (Transport Infrastructure Needs Assessment) project was carried out, identifying the needs for investments into the transport infrastructure on corridors, in order to harmonize the technical and exploitation standards of the national transport networks.

As consequence of political changes and establishment of new states in South-eastern Europe, the European Union should have:

- formulated new transport routes;
- divided the transport routes/corridors taking into consideration new political subjects, new national borders and new economies of transition countries;
- helped in the transport and infrastructure networking of the new countries – EU accession candidates in the region, and informed them about the needs to adapt the national regulations with acquires communautaire and the standards of the European Union in the fields of transport, environmental protection, four basic freedoms and competitiveness.

The first step forward in this context was made in 1997 at the Third Pan-European Transport Conference in Helsinki, where ten multimodal corridors were supplemented by the segments in the area of South-eastern Europe.

Analogue to the TINA project, which was completed in 1999, an whole series of projects was initiated for determining the regional transport network for South-eastern Europe and the evaluation of the required investments – Transport Infrastructure Regional Study (TIRS) and Regional Balkans Infrastructure Study (REBIS) were used as the basis to start the SEETO program of defining the basic regional transport network for South-eastern Europe. Following the signed Memorandum of Understanding, a five-year plan of SEETO network development [5] has been adopted, which defines the priorities for Albania, Bosnia and Herzegovina, Montenegro, Croatia, Macedonia and Serbia. The specific feature is that this network, apart from the sections of Pan-European corridors in the region, includes also a certain number of routes of regional significance. SEETO network is the basis for prioritization of the infrastructure transport development projects, which are financially covered by the sources from pre-accession funds – ISPA strategy and the new IPA program.

4. ELEMENTS OF STRATEGIC TRANSPORT PLANNING

In the European Union the transport sector accounts for 7 percent of the share in GDP, employing 7 percent of the working population. Forty percent of all investments are related to the transport industry, and the transport sector accounts for 30 percent of the total energy consumption.

Over the last twenty years the growth rate of goods transportation keeps pace with, and the growth rate of passenger traffic exceeds the economic growth.

The negative dimension of the European Union transport sector refers to external costs of transport that are estimated at about 10 percent GDP.

A recent research [6] estimated the external costs (exclusive congestion costs) for the EU countries plus Switzerland and Norway to be on an average of 7.8 per cent of their total GDP. This amount is doubled in relation with earlier estimation noted in the 1992 White Paper.

The research results [7] and first estimates of external costs of transport in transition countries of CEI region at an average value of 14 per cent of GDP represents an alarming indication of the need for a more systemic approach to strategic transport development planning i.e. radical shift from the "demand-oriented" to "target-oriented" planning.

The role of the transport system in sustainable development has been oriented to optimization of infrastructural and natural resources usage as well as application of technical and operational solution, which maximal contribute energy efficiency.

Strategic planning of the transport development has to be in the function of the overall economic development and dynamically adapted to objective investment possibilities of the public sector. The

conceptual approach should not be nationally restricted here, but should be in the context of the development of a wider region instead.

The main principle of sustainability has to be implemented through instruments of transport policy in all aspects of strategic planning. The planning means a systemic preparation of decisions, and the attribution of strategy is designated by following characteristics [8]:

- long-term prediction,
- comprehensiveness – wider physical scope,
- manageability at the network level,
- applicability of all transport modes,
- efficiency of the entire system focused on comprehensive objectives of greatest interest.

Strategic planning understands identification of relevant goals of long-term development that serve as input-guidelines of the transport policy and the origin of adopting the development guidelines and decision-making in the governmental executive bodies.

Strategic goals of the transport development in Europe are – integration into the Trans-European transport network, fair pricing in transport, environmental protection, transport safety, social cohesion and strengthening of the transport market.

In the analysis of strategic goals of the transport development some non-transport syllabuses can be observed, e.g. ecological and social!

These are subsidiary goals that indirectly dictate the transport system development – targeted development based on the sustainability principle, concrete induction of the transport demand as function of ecological balance and poly-centricity of transport network development.

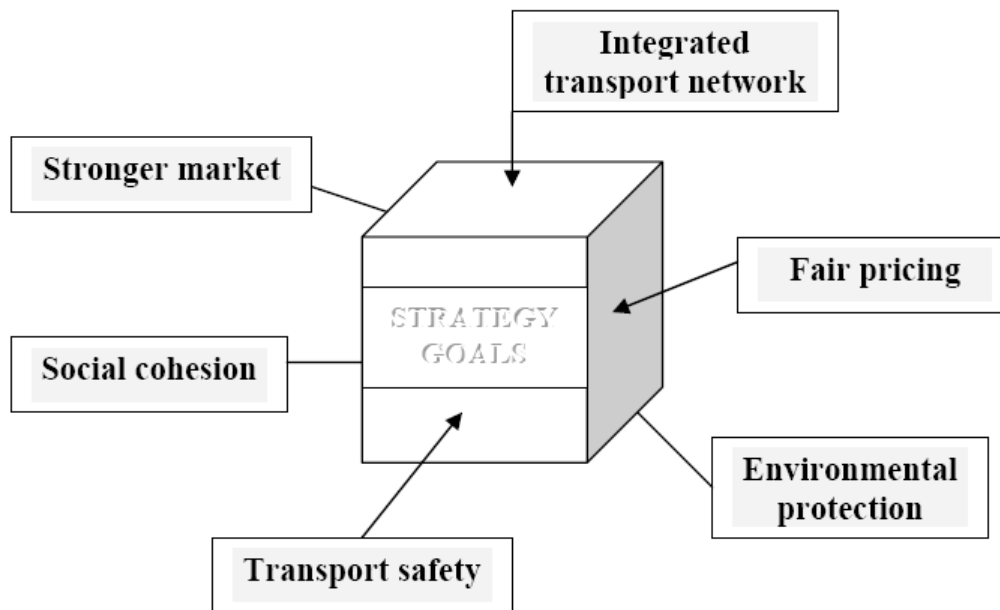


Fig. 3. Strategic objectives of European transport development [8]

Рис. 3. Стратегические цели развития европейского транспорта [8]

The problem of social cohesion was actualized in the eighties by Greece and Spain joining the European Union, so that the establishing of the so-called cohesion funds insured extra means for the transport connection of these allocated or peripherally located member countries, in order to establish equal conditions of market competition and basic movement freedoms of people, goods, services and capital.

Implementation of goals of the transport development primarily assumes regulatory autonomy of the transport sector and consistent inter-sector cooperation, in order to insure efficiency in the key aspects: regulatory policy, transport management, investment policy, tax and price policy, physical planning and social policy.

The premise of the strategic transport planning is the satisfaction of individual mobility, increasing the efficiency of transport system and the level of integration in the wider transport region. In this sense at least two qualitatively different approaches in transport planning are distinguished:

- demand-oriented planning,
- goal-oriented planning.

The first approach to planning is characterised by the focus on meeting the spontaneous, too often hypertrophied transport demand. The second uses the implementation of transport policy instruments to affect also the adaptation and even reduction of transport demand, in accordance with the objectives of transport development. Such approach is possible only under the assumption that meeting individual transport needs is not the primary criterion of optimisation, i.e. that transport infrastructure does have its negative features.

The efficiency of transport system is an extremely important element in strategic planning, distinguishing two groups of indicators – quality and productivity on one side and allocation and ecological dimensioning on the other. Mobility which does not satisfy the additional requirements of allocation and ecological efficiency, i.e. which does not fully cover the external (social) costs may be characterised as being inefficient.

Each form of mobility improves the competitiveness among regions and local communities, their production and manufacturers. This results in turn in economic growth and physical expansion, i.e. infrastructure integration. Physical interaction does not necessarily reflect also the optimal transport situation, so that in strategic transport planning, the goal-oriented approach in accordance with the physical development policy is justified. The key indicator for the evaluation of infrastructure contribution in the integration process is the availability, and the connections of regional networks are of crucial importance here. The planning principle is based on a clearly defined correlation between the accessibility of a region and the induced growth effects.

Negative effects of transport infrastructure have been observed mainly in the field of environmental protection, and gradually the term “sustainable development” has become common in transport planning. In principle, the elimination of negative transport effects is not the basis of strategic transport planning, but is inherent to the general governing system leading to internalisation of external costs, thus logically not avoiding the transport sector planning either. In this sense, an attempt can be seen in practice, that planning concepts involves forecast scenarios based on the “desired” transport demand, i.e. “desired” transport modal split.

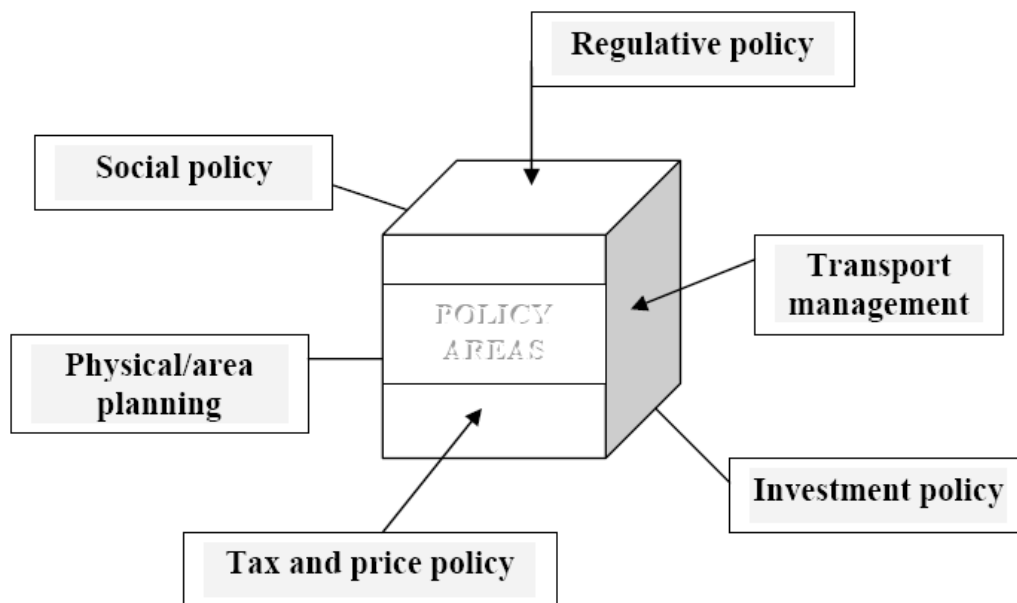


Fig. 4. Transport policy areas [8]

Рис. 4. Области транспортной политики [8]

5. PRIORITIES OF TRANSPORT SYSTEM ADAPTATION

In the integration process the accession countries have to harmonize the national regulations with the European Union *acquis*. The legal framework of regulating transport activities at the European Union level covers for all the transport branches the following relevant syllabuses – access to the transport service market, social aspects of transport, transport safety and environmental protection, and horizontal legislative regulations in relation to the transport infrastructure of the Trans-European network.

Pre-accession negotiations related to the Transport *acquis* refer to Chapter 14 – Transport policy and Chapter 21 – Trans-European networks. Harmonization of legislation in the transport sector connotes to a great extent also the management system. Market liberalization understands freedom in providing carriers' services on the entire territory of the European Union, both among the member countries and within the member countries (cabotage). Therefore, it is extremely important in the pre-accession period to implement the structural reforms in the sector, restructure the enterprises to smaller independent trade companies according to the business areas – separate the operative infrastructure from transportation. This refers primarily to railways.

Opening of the market in the future requires founding and adequate organization of agencies (bodies) for the control of access to infrastructure and market competition. This indicates the need of strengthening the administrative capacity in the pre-accession period.

Regarding economy the government interest has to be directed exclusively to the public transport sector – transport infrastructure and carriers' operative and the management system. The government interest in the sector of individual transport refers only to the control of share of this sector within the total transport structure and the control of negative impacts on the society and economy generated by this sector.

The involvement of private sector requires consideration of three key levels of activities – in policy and planning, management and financing. In the transport sector the intention is to include private sector, both in the transportation services and in the construction and maintenance of the transport infrastructure.

The notion of public-private partnership has become widely used in covering different management options – from the option of joint investment “joint venture” to BOT “build, operate and transfer” option. These options differ from others as they are usually used for the construction and exploitation of the defined infrastructure project or a defined package of services, as opposed to options of managing the entire national or regional network.

Special aspect of adaptation refers to the transport policy! The traditional concept of transport planning, the so-called “demand-oriented” concept, deep-rooted in the transition countries, was based primarily on investment policy. The transport system development with the purpose of satisfying the chaotic demand resulted in the expansion of the physical dimension of infrastructure and means, whereas the qualitative aspects of transport organization and management have been neglected.

Strict ecological restrictions of transport development dictate the implementation of a new concept of targeted strategic planning, the so-called “goal-oriented” concept. While total investments in the transport infrastructure amount to 1-2% GDP, the huge manoeuvring area of optimizing the transport system refers to the instruments of reducing external costs of transport, that are estimated at 10-15% GDP. These instruments of the transport policy are based on the implementation of operational and fiscal measures in transport management – modal shift, ITS applications, internalization of external costs by direct infrastructure charging, etc.

The priority areas of implementing the measures are urban transport management, recognition of public and non-motorized transport (cycling, pedestrians), promotion of using natural resources and intermodal options, dimensioning and optimizing of transport module interfaces, etc.

Management of transport, traffic flows and demand, apart from regulatory, investment and fiscal is one of the key areas of the transport policy, that has singular social and economic effects – on the one hand in reducing the external transport costs, and on the other hand in the recognition of intermodal transport and logistics. The social and economic benefits of implementing intelligent transport systems as infrastructure upgrade, in transport engineering are manifested in:

- reduction of transport congestion and delays,
- reduction of travel costs,
- safety increase,
- reduction of harmful emissions and fuel consumption,
- increase in carriers' efficiency,
- improvement of effectiveness of investments in the network infrastructure.

Implementation of the principles of integrity, interoperability, and sustainability in the transport policy necessarily assumes the implementation of ITS solutions in all the phases of transport engineering – from planning, designing, construction to organization and exploitation, and in all the segments of transport system – from the development of roads and vehicles, transport terminals to transport regulation system [9].

The development of the European satellite system Galileo will significantly contribute to the integration of ITS solutions in the transport sector, and affect the efficiency, safety and costs of all the transport modes. This refers especially to the implementation of the European Rail Traffic Management System/European Train Control System (ERTMS/ETCS), Single European Sky ATM Research Programme (SESAR) and River Information Services (RIS).

Social and economic efficiency of the transport system is not indicated by the technical elements of the transport network or volume of transport work only, expressed by the length and density of the transport routes or transport performance, but also through qualitative aspects of transport demand management, which are articulated by transport safety and environmental protection, and finally by spatial, demographic and economic cohesion of the region.

6. CONCLUSIONS

Considering the significance of transport sector there are two levels of influence that may be identified – one on the quality of living of the population and the other on the overall economic development of a country. Transport has direct impact on the lives of people, on the one side regarding individual mobility and accessibility, and on the other side regarding rational time usage and in the most general sense of the quality of living. Transport policy greatly determines the extent to which the influence of transport will have positive, i.e. negative effects.

There is no doubt that transport infrastructure directly contributes to the activation of economic potentials, and that transport sector revenues have a significant share in the GDP structure. A coherent transport policy can also contribute to the reduction of budgetary expenses for the transport sector, either by providing conditions for efficient infrastructure management, or by instruments to reduce external transport costs.

Negative experiences and damaging consequences of conventional transport planning indicate the need for a more radical target-oriented approach in conceiving the transport strategy. By the measures of the government policy, it is necessary to introduce appropriate models of the tax policy and the pricing policy, supporting the implementation of the strategic goals of the progressive development of railway, water, intermodal and urban public transport, and the restrictive ones for the uncontrolled development of road transport.

Modelling of the strategic transport development within the context of regional integration is based on the research of the methodologically analysed complex of adaptation of the institutional-legal frames, infrastructure network and management models in the national transport sectors.

Bibliography

1. Banister D. et al: *European Transport Policy and Sustainable Mobility*. SPON PRESS, London/New York, 2000.
2. *Networks for Peace and Development, Report from the High Level Group*. European Commission DG TREN, Brussels, 2005.

3. *European Commission White Paper "European Transport Policy for 2010: Time to Decide.* COM(01)370.
4. *European Commission Communication "Keep Europe Moving - Sustainable mobility for our continent" - Mid-term review of the European Commission's 2001.* Transport White Paper, 2006.
5. *South East Europe Core Regional Network Development Plan, Five Year Multi-annual Plan 2007-2011,* South East Europe Transport Observatory (SEETO), 2007.
6. *External costs of transport – Accident, Environmental and Congestion Costs in Western Europe.* INFRAS/IWW, University of Karlsruhe, Zürich/Karlsruhe, 2000.
7. *External costs of transport in Central and Eastern Europe.* INFRAS/HERRY, Zürich/Vienna, 2002.
8. Steiner S.: *Elements of Transport Policy.* (in Croatian). University of Zagreb, Faculty of Transport and Traffic Sciences, Zagreb, 2006, pp 56.
9. Bošnjak I.: *Intelligent Transport Systems 1.* (in Croatian), University of Zagreb, Faculty of Transport and Traffic Sciences, Zagreb, 2006.

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