TRANSPORT POLICY FROM PERSPECTIVES OF PASSENGERS, CARGO, ENERGY: CROATIA VS EUROPEAN UNION COUNTRIES

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Abstract

The concept of transport has more than one meaning, it can signify social, financial, or cargo traffic, or the transport of on object from its point of origin to its destination. The last meaning has great importance for the modern economy and the day-to-day life of individuals. The mobility of capital, goods, services, and people is one of the foundations of the European Union. As the economy of the European Union is developing, the quality of life and the comfort directly resulting from the continuous development of transport technologies, along with the volume of passenger and cargo transport, is growing with it. The consequence of the growth of passenger transport is the increased energy consumption, if the same technology is used, which is definitely not an option for the sustainable development of the European Union. The goal of the paper is to investigate the transport policy of the European Union and determine the position of Croatia regarding that field, when compared to the other members of the European Union. The European Union has opened many doors for Croatia, and one of these numerous benefits is the possibility for the development of transport policy and infrastructure. With that in mind, the authors observed the TEN-T network as the centre of the transport policy, along with the transport trends and projections within the European Union, which they used to determine the development of transport in each country. Furthermore, they observed the data related to the transport of persons and cargo, and the data on the consumption of energy for the transport economic activity. The research and analysis results are presented in the paper.

Key words: transport policy, TEN-T network, Croatia, European Union

1. INTRODUCTION

Things viewed as science fiction only a century and a half ago are conceivable and possible today. The twentieth century definitely represents a turning point in human history. Aside from the development of the Internet and the growing globalisation, there are strong social initiatives for connecting countries on the basis of economy. The European Community developed in Europe, with the primary goal of preventing conflict and increasing economic cooperation. The result of that is a single market without customs duties. The reduction and cancellation of customs duties resulted in the increase of international trade, which only confirms various international economics theories (theory of absolute advantage, theory of comparative advantage, etc.), and the economy grew at an accelerated rate. The transport network and the multimodal forms of transport enabled the faster traffic of goods. Today, goods can travel for several thousand (even over ten thousand) kilometres in only a few days. This results in the availability of goods from almost all the parts of the globe.

The subject of the paper is research into transport and transport policy in the extraordinarily complex and dynamic environment of the European Union. The paper has two goals, which are also open questions of this paper: first, to identify and understand the transport in Croatia, as a full and equal member of the European Union, and second, to compare and analysis transport policy from perspectives of passengers, cargo and energy between Croatia and other European Union countries. The methods used in the paper were descriptive analysis, comparative analysis, deductive method, and the classification method. The authors used secondary data and observed the TEN-T network as the centre of the transport policy, i.e. the Trans-European Network "of the project for the establishment of common European network infrastructures in energy economics, transport, and telecommunications" (Kandžija & Cvečić, 2008:154). The TEN-T network can simply be described as the "master plan" for connecting Europe.

2. THE CONCEPT AND FEATURES OF MODERN TRANSPORT

It is extremely difficult to define the concept of transport because it is highly integrated into several scientific disciplines. The same is true for interdisciplinary approach and the methods used by scientists to approach a topic. Furthermore, it can be interesting to observe how the theoretical basis changed in the not so distant past. Various authors assigned various definitions to it. One of those is that transport can be defined as a "complex and dynamic system with a large number of internal composition elements, which, depending on the related subsystems, determine its dynamic development, and at the same time define transport as a single unit for the realisation of its functions, i.e. the coverage of space by people, goods, news, and energy, and the regulation of mobility of the means of transport in an area" (Vasilj & Činčurak-Erceg, 2016:19). The first item of the definition points out that transport is a system that contains a large number of elements that determine and affect transport, and the essence of transport is emphasized: Covering space using the means of

transport in an area. Furthermore, the authors state that specific terms denoting transport "traffic, transfer, communication, telecommunication, connections – are defined differently by specific authors, and always defined specifically, in relation to the problem being examined".

Transport is an extremely complex and wide social, as well as a scientific, field. The cause of the complexity is certainly the large number of participants in the system, and from the scientific perspective, the problem can be observed from many angles. It is an unavoidable component of society, subject to transformations and continuous advancement, and it has enormous economic importance, as well as social, cultural, and political and legal significance. Transport is one of the key components of international trade. In order for a county to establish itself on the transport market, it is important to for it to develop a transport policy. In order to maintain the "satisfactory level of participation in international trade, it is very important to protect and strengthen the transport policy and infrastructure, hereby lowering the pressure experted by competitive international trade powers" (Keser, 2011:272).

Also, the terminology is often confused because of the meaning or the context in which it is used. So, we can find the term transport in three different contexts (Vasilj & Činčurak-Erceg, 2016:19):

1. In the broadest terms, transport signifies the relationships between people, and we talk about social traffic.
2. In the somewhat narrower sense, we talk about economic transport: financial traffic, transport of goods.
3. In the narrowest sense of the word it means the transport of people, luggage, news, or energy from one place to another:
    a. The narrow definition of transport (includes the transport of persons, animals, items, goods, news, and other from one place to another)
    b. A wider definition of transport (includes communication)

Transport is often equated with the term traffic, but "transport has a wider meaning than traffic, because along with traffic, it includes the concept of communication". Furthermore, the same authors state that "traffic is a common activity in which specific means of transport and specific organisation are used to cover distances in space by transporting people, goods, and energy from one place to another. Transport means to carry across (from the Latin word "*transportare"* – to carry across)" (Vasilj & Činčurak-Erceg, 2016:19-20) and it is defined as the activity used to cover distances in space using means of transport, in which the objects are people, goods, and energy.

3. TRANSPORT POLICY

"Transport policy is a collection of goals and measures aimed at the development of transport as an economic activity. It is an integral part of general economic policy. The main goals of the transport policy include: transport – geographical valorisation of the state territory, optimal fulfilment of the demand for transport, lowering transport costs, optimising the transport network and traffic flows, etc." (Čavrak, 2015). Padjen (1996:31) stated four global goals, which are: (1) contributing to the

economic growth and national well-being, (2) increasing the efficiency and cost-effectiveness of the transport system, (3) satisfying the transport requirements of the society, and (4) removing and mitigating he unfavourable effects created as a consequence of transport (traffic accidents, spillage of fuel, converting arable land for the construction of transport lanes, preserving the environment). Hlača (2007) described that the purpose of the transport policy is to ensure the free and efficient transport of people, goods, and services in a safe and ecologically sound way. The author also stated that the transport policy aims to achieve, aside from eliminating physical, technical, and fiscal borders, the integration of means of transport with the national transport networks. The transport policy of a single transport area results in advantages which are difficult to quantify. So, Debelić et al. (2015) stated that the logistical performances of a corridor are one of the key elements of competitiveness. The authors stated that the logistical performances, i.e. efficiency, can be observed as the level of intensity of the desired logistical goals or achievements.

3.1. Transport policy of the European Union

The transport policy of the European Union is the result of constant work of the European institutions in the second half of the 20th century. The Treaty of Rome from 1957 contained the "idea of establishing a common transport policy" (Kersan-Škabić, 2015:441). According to Kandžija and Cvečić (2008), the next major step in the development of the transport policy was the Single European Act and the White Paper on the establishment of the internal market, where three basic legislative measures were accomplished: the elimination of physical, technical, and fiscal borders. These documents and strategies were created in order to create a "single European transport area which will be used to help Europe to stay competitive by increasing the efficiency of the entire transport sector for the common benefit" (European Commission, 2014:6). In the White Paper, the European Commission stated ten goals for the competitive and efficient transport, for the purpose of reducing pollution, implemented through three goals: (1) development and implementation of new and sustainable fuels and drive systems, (2) optimisation of the performances of multimodal logistical chains, including a more extensive use of energy efficient modes, and (3) increasing the efficiency of transport and using the infrastructure with information systems and market incentives (European Commission, 2011:9-10).

In 2011, the European Commission (2011) adopted the 40 key initiatives for the following decade. The main goals before 2050 are:

- Eliminate the cars with conventional engines from cities
- The share of sustainable fuel use in aviation of 40%
- Transfer 50% of the cargo from railroads and roads to sea and river transport
- 60% reduction in greenhouse gas emissions.

The European Commission is conducting detailed monitoring of all the indicators for each member of the European Union and creating models for projecting transport fluctuations in the future. Also, Vilke et al. (2015) stated that one of the basic goals of the sustainable transport policy of the European Union is to emphasize the protection of the environment. The methods for the realisation of goals in reducing pollution include technical advancements in vehicles, alternative forms of energy,

various taxation policies, incentives, and defining the environmental protection standards.

Some authors explored the transport policy and showed the problems of certain modes type of transport in many countries. So, the Lodge (2003) compares different approach to rail market reform in UK and Germany and De Jong and Geerlings (2005) compare transport infrastructure policies in Denmark and the Netherlands. Also, some countries take over the concept of transport policy from other countries to develop and improve transport infrastructure policy. For example, Stead et al (2008) showed how Wroclaw and Riga transferring concepts from German regional transport authorities. Ogorlec (2003:199,200) gives some challenges of the transport system brought about by the future development of the EU: "economic growth will automatically cause an increase in the need for mobility, EU expansion will cause an explosion of traffic flow in the new member states and huge investment in infrastructure due to saturation of main transport roads in EU caused by the less developed new member states".

3.2. Croatian Transport Policy

Croatia, as a participant in international integration, of which the membership in the European Union stands out, has resolutely accepted the trends in the world and gradually liberalised (even though not completely) its transport market. Despite its size, Croatia's geographic position within the European Union grants it great potential, and its membership in the European Union provides it with the opportunity to take advantage of the benefits of the transport policy offered by the European Union and establish transport connections with all the key destinations that would be very important for them. The territory of Croatia is relatively small when compared to France, Germany, or for example Poland. Raw material and finished products could be transported by road in a relatively short time, and people could also be quickly transported from their departure point to their destination in the same way. So it is not surprising that "the area of road transport, as a carrier of transport activities in Croatia, also has the most important role in Croatian tourism, especially after the construction of modern motorways toward the Adriatic destinations". (Šolman, 2010:232). Poletan Jugović (2006) stated that Croatian traffic valorisation and stride lay within the European traffic environment.

Knezović (2015) pointed out that Croatia has potential in the following aspects:

- Good transport connections via the network of motorways and connecting with the neighbouring countries, which enables a new incentive for development
- Better utilisation of ports and connecting with the Adriatic Sea and the rivers (which would additionally enhance the development and connections to the islands)
- Air transport (airport and cargo transport) is not being used sufficiently
- The rail network is neglected and underutilised

All of the mentioned factors indicate potential and represent opportunities where Croatia could develop further, for the purpose of additional development of the country, connecting with other (non)members of the European Union, and creating a comparative advantage which would enable them to become more included in the transport system. Along with the stated problems, Mirković (Čavrak, 2015) further

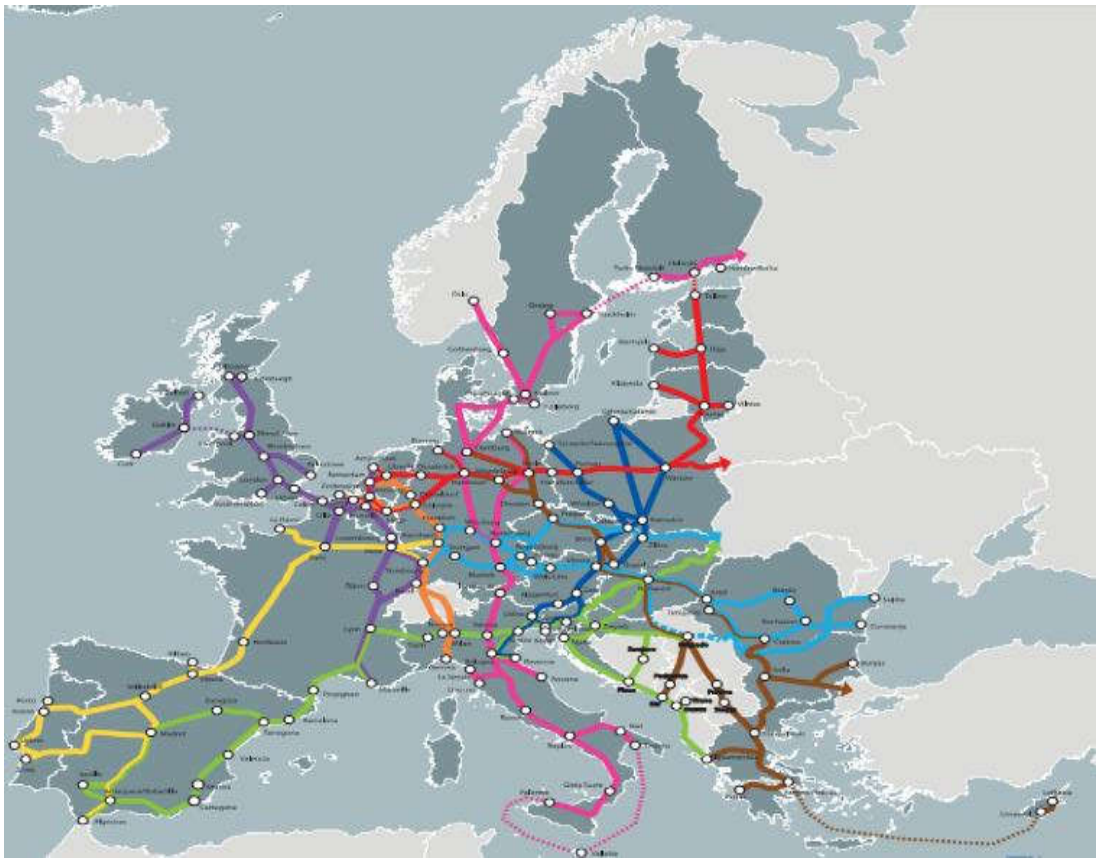
states that there is a problem of insufficiently precise and sharply formed principal issues, and the increasing conflict on the relation between the state financial interests and the private interests of economic interest groups. Furthermore, he believes that the progress in the period of 1918-1941 was very low in general, and that the necessary coordination between the needs of the economy and the development of means of transport was not present. Just because of the reasons stated here, Croatia is still suffering the consequences of poor and insufficiently precise decision making in the area of transport policy, where the transport policy was used as a tool for the realisation of foreign (alien) interests, which were mostly in opposition to the interests of the Croatian areas. Aside from that, many changes that occurred in the Croatian territory were caused by political, war related, or some other social and historical changes, which greatly affected the development of the transport policy. Also, Mihić et al (2011) presented the potential of Danube River like a waterway transport, which is inadequately used in all countries through which is passes. Croatia also doesn't stimulate a new projects of long-term sustainable development transport of Danube. Puškec et al (2013:176) showed the simulation model of energy demand predictions developed and tested with Croatia. They said how "electric vehicles will play a key role in future transport systems, allowing for significant savings in final energy demand, which means more vehicles and kilometers driven with lower final energy demand. "

4. TEN-T NETWORKS OF TRANSPORT CORRIDORS IN THE EUROPEAN UNION

Before showing the transport trends and projections within the European Union, the authors have shown the TEN-T networks (Trans-European Transport Networks) of important road, air, sea/river, and rail transport corridors in the European Union. The goal of the construction of TEN-T is to create a long-term and ambitious project for the modernisation and reduction of the existing separate national networks into a functional network that would connect all the parts of Europe while utilising the various modes of transportation in the best possible way (European Commission, 2014:6).

TEN-T network of the most important road corridors is shown in Figure 1. The corridors are shown in different colours and there are 9 in total. The Atlantic corridor is shown in yellow, the Mediterranean corridor in green, the Baltic-Adriatic in blue, the Scandinavian-Mediterranean in pink, the North Sea-Mediterranean in purple, the North Sea-Baltic in red, the Rhine-Alpine in orange, the Rhine-Danube in light blue, and the Orient-East Mediterranean in brown. Those important for Croatia are the Baltic-Adriatic, the Mediterranean, and to a lesser degree the Orient-East Mediterranean corridors.

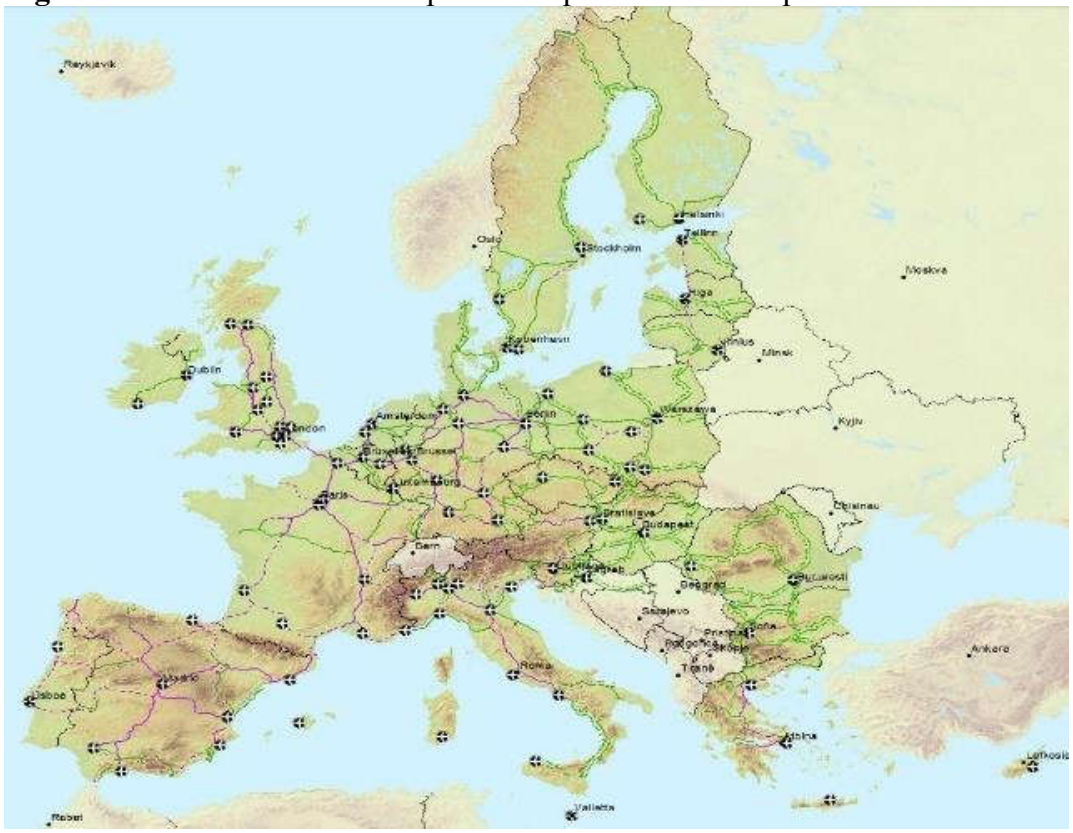
Figure 1. TEN-T network of important road transport corridors in the European Union



Source: http://ec.europa.eu/transport/infrastructure/tentec/tentec-portal/map/maps.html [access February 17, 2018]

Figure 2 shows all the main airports relevant for the TEN-T network in air transport. Croatia has only one key airport (the airport in Zagreb "Dr. Franjo Tuđman"). Despite the fact that Croatia has several high-frequency airports like Zadar, Pula, Split, or Dubrovnik, none of those was included in the TEN-T network as a "key" airport. The mentioned airports are distinctly seasonal, which is manifested in the summer months when the tourism season starts bringing an exceptionally high number of arriving passengers. This is of course also true for other European countries. The figure shows that Northern Europe is much more concentrated than the rest of Europe. The most concentrated areas are in Belgium, the Netherlands, Luxembourg, Germany, and the United Kingdom. On the other hand, the least concentrated areas are in France, Italy, Romania, and Bulgaria.

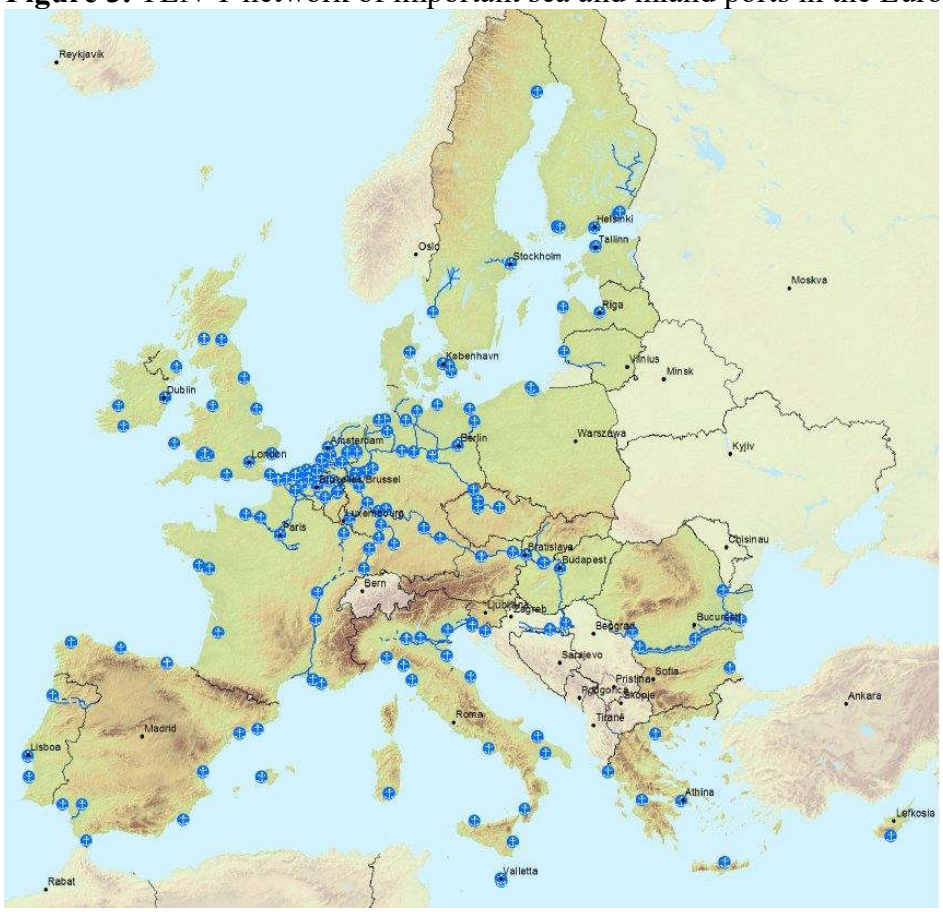
Figure 2. TEN-T network of important airports in the European Union



Source:http://ec.europa.eu/transport/infrastructure/tentec/tentec-portal/map/maps.html [access February 17, 2018]

Figure 3 shows all the sea and inland ports significant enough for the TEN-T networks. Croatia has three ports that are included in the network. They are the sea port of Rijeka, and the river (inland) ports of Slavonski Brod and Vukovar. The Port of Rijeka is considered as the most important sea port in Croatia, and after the completion of the road corridor VC, the influence of the Port of Ploče will surely increase. Slavonski Brod is on the river Sava, and the Port of Vukovar is on one of the main inland corridors, the river Danube. Same as for airports, Northern Europe is much more concentrated than the rest of Europe.

Figure 3. TEN-T network of important sea and inland ports in the European Union



Source: http://ec.europa.eu/transport/infrastructure/tentec/tentec-portal/map/maps.html [access February 17, 2018]

Figure 4 shows the TEN-T network of important rail corridors in the European Union. The railroad infrastructure is extremely important for the European Union because it has the potential to reduce the quantities of expended energy, for passenger, as well as for cargo transport. The figure shows the rail network (marked in green). Croatia is connected by rail connections but those connections are insufficient, the problem is in obsolete infrastructure which requires large amounts of money for restructuring.

Figure 4. TEN-T network of important rail corridors in the European Union

Source: http://ec.europa.eu/transport/infrastructure/tentec/tentec-portal/map/maps.html [access February 17, 2018]

4.1. Trends and Transport Projections within the European Union

The European Commission regularly issues various data and statistics for every member of the European Union. Keeping the citizens of this international community informed is very important to them. Great emphasis is placed on efficient energy management, as the result of special care about sustainable development and the legacy for future generations. Transport is one of the sectors of economy that uses a large percentage of generated energy, so it is not an accident that special attention was given to energy efficiency in this particular sector. Energy independence is an important matter for the European Union, especially in the recent period of tension with the leading producer of fossil fuels, the Russian Federation. Considering that Europe partly depends on those fuels, it is logical to stimulate the alternative forms of energy supply (which also includes clean forms of energy) by the European politicians.

The European Commission observes transport through certain factors, or from three different perspectives: (1) passenger transport activities, (2) cargo transport activities, and (3) energy demand. Each of the mentioned factors will be further elaborated.

4.1.1 Passenger Transport Activities

The European Commission offers data on the passenger transport activities from the member states of the European Union for the period from 2000 to 2050. The data up to 2015 is officially confirmed and achieved. On the other hand, data from 2020 all the way to 2050 is projections[1]. Table 1 shows data and projections for passenger activity according to the previously mentioned characteristics.

Table 1. Passenger transport activities in the member states of the European Union (2000 – 2050)

Country / Year	2000	2005	2010	2015	2020	2025	2030	2035	2040	2045	2050
Austria	95,55	101,49	107,02	112,42	118,93	124,65	129,66	134,77	140,07	144,84	148,88
Belgium	137,13	144,96	153,89	157,55	169,28	177,79	185,68	194,08	203,33	212,25	220,13
Bulgaria	47,67	55,96	65,43	71,68	75,53	80,13	84,15	87,64	91,30	94,02	96,41
Croatia	26,74	31,34	34,29	36,42	39,21	41,19	43,30	45,44	47,80	49,78	51,39
Cyprus	12,12	13,86	14,59	15,32	18,34	20,53	22,33	24,10	26,04	27,59	28,95
Czech Republic	103,36	111,93	108,26	113,02	124,44	134,64	145,53	155,38	164,74	174,41	183,50
Dennmark	75,32	76,35	78,45	82,96	89,53	94,24	99,00	102,32	105,60	109,10	112,53
Estonia	10,32	14,17	13,62	15,12	15,94	16,56	17,27	18,03	18,77	19,35	19,81
Finland	80,03	87,19	90,52	94,30	97,43	100,69	104,29	107,07	110,04	112,79	115,19
France	950,33	997,59	1032,63	1091,35	1167,46	1214,10	1265,12	1312,47	1365,91	1399,47	1436,17
Germany	1065,52	1098,88	1129,97	1187,41	1207,33	1240,80	1273,47	1295,47	1322,83	1346,67	1367,60
Greece	128,68	153,27	160,61	163,78	172,08	177,33	184,45	193,09	200,33	206,77	212,64
Hungary	80,10	84,21	84,16	85,99	95,46	103,56	110,95	118,79	126,47	133,17	140,15
Ireland	50,27	65,41	69,91	69,27	78,02	85,74	92,10	97,31	101,91	106,32	110,97
Italy	942,98	931,25	952,08	967,38	1019,69	1052,28	1091,00	1123,38	1133,32	1184,08	1202,53
Latvia	15,40	17,35	17,90	18,27	19,69	20,95	22,19	23,31	24,88	26,10	27,10
Lithuania	30,00	40,11	37,59	38,71	41,34	43,64	44,71	44,92	45,62	46,36	47,19
Luxembourg	7,31	8,15	8,54	9,40	10,44	11,55	12,78	14,09	15,46	16,52	17,46
Malta	4,77	4,80	5,39	5,72	6,73	7,25	7,61	8,21	8,33	8,74	9,02
Netherlands	184,36	194,83	182,66	190,50	199,69	207,74	215,58	222,34	230,83	237,54	244,42
Poland	224,99	232,97	267,56	301,92	344,22	377,11	410,33	438,00	462,74	482,26	497,38
Portugal	104,83	115,32	115,54	120,68	124,85	135,01	143,47	149,84	155,27	160,04	164,66
Romania	84,93	92,73	109,72	117,64	129,61	144,76	159,32	173,47	188,87	200,72	212,40
Slovakia	37,15	39,02	36,24	37,98	45,07	51,34	57,60	62,13	65,02	66,73	68,17
Slovenia	24,99	26,94	30,32	31,05	33,60	35,43	37,03	38,36	39,60	41,03	42,53
Spain	476,08	535,48	541,63	561,49	608,32	661,15	712,36	766,30	811,77	843,13	888,43
Sweden	141,85	147,52	151,41	159,64	166,41	175,47	185,65	194,18	202,73	211,27	219,34
United Kingdom	821,74	871,96	849,33	877,91	933,80	973,73	1022,77	1056,72	1097,60	1135,43	1168,23
Average (Gtkm)	213,02	224,82	230,33	240,53	255,44	268,19	281,42	292,90	303,83	314,16	323,33

Source: Created by the author using the data from the official website of the European Commission, available at: https://ec.europa.eu/energy/ [access February 10, 2018]

The data through the years show giga-passengers per kilometre[2], which represents an internationally accepted unit of transport. As the data shows, Croatia had a 50% increase since the measurements started in 2000 and the projections show that during the reference period (the observed 50 years), transport in Croatia will grow for somewhat less than 100%.

Table 2 distributes the passenger transport activities according to the types of transport (also in giga-passengers per kilometre), and the average for the European Union member states can be calculated, which is approximately 213 gpkm at the beginning of the period, approximately 240 gkpm in 2015, and 323 gpkm is estimated

[1]The data includes the United Kingdom, which should leave the European Union before 2020, so the projections should be read carefully

[2]The expression 10^9 passengers per kilometre (gpkm)

for the end of the period, which is roughly a 50% increase during the observed period. Information for Croatia has already been stated in the previous paragraph.

The European Commission includes the following methods of passenger transport in its methodology: public transport, personal vehicles, railroads, airplanes, rivers, and seas. Personal transport takes up about 80% of the total passenger transport, followed by public transport. The lowest share in Croatia is taken by railroads, airplanes, and water transport. The situation is similar in the European Union, with a somewhat higher share of railroads and airplanes than in Croatia. Rail and air transport in Croatia are of lower intensity because the infrastructure in Croatia is less developed.

Table 2. Passenger transport activities according to the types of transport in the member states of the European Union

	2000	2005	2010	2015	2020	2025	2030	2035	2040	2045	2050
Croatia	26,74	31,34	34,29	36,42	39,21	41,19	43,30	45,44	47,80	49,78	51,39
public transport	3,33	3,40	3,25	3,43	3,61	3,74	3,86	4,04	4,22	4,31	4,40
personal vehicles	21,01	25,01	26,71	28,06	30,07	31,41	32,86	34,15	35,48	36,64	37,50
railroads	1,76	1,80	2,29	2,36	2,60	2,69	2,77	2,86	2,97	3,05	3,12
airplans	0,64	1,12	2,00	2,54	2,89	3,32	3,76	4,34	5,08	5,73	6,32
water transport	0,00	0,00	0,04	0,04	0,04	0,04	0,04	0,05	0,05	0,05	0,05
Average (Gtkm)	213,02	224,82	230,33	240,53	255,44	268,19	281,42	292,90	303,83	314,16	323,33
public transport	19,60	19,30	18,84	19,50	20,37	20,97	21,57	22,20	22,72	23,30	23,81
personal vehicles	159,50	168,59	172,96	178,60	187,69	194,90	202,73	208,88	214,38	219,86	224,26
railroads	16,08	16,56	17,82	19,28	21,10	23,02	24,74	26,40	28,15	29,76	31,37
airplans	16,34	18,87	19,27	21,70	24,75	27,72	30,73	33,72	36,82	39,43	42,04
water transport	1,49	1,49	1,45	1,44	1,53	1,58	1,64	1,71	1,77	1,81	1,85
Croatian share in the EU average	12,55%	13,94%	14,89%	15,14%	15,35%	15,36%	15,39%	15,51%	15,73%	15,84%	15,89%

Source: Created by the author using the data from the official website of the European Commission, available at: https://ec.europa.eu/energy/ [access February 10, 2018]

At the beginning of the observed period, the Croatian results were 13% of the European Union average, but a mild but stable growth can be observed through the years, which means that Croatia is catching up with the average. The latest results from 2015 show 15% of the member states average, and there is no expected significant growth of the share in the member states average in the following period.

4.1.2. Cargo Transport Activities

European Commission provides activity data for cargo transport in the EU member states in the period from 2000 to 2050. Table 3 shows the activity data and projections for cargo transport (shown in giga-tonnes per kilometre).

Table 3. Cargo transport activities in European Union member states

Country / Year	2000	2005	2010	2015	2020	2025	2030	2035	2040	2045	2050
Austria	50,13	54,14	61,29	65,41	69,79	74,56	79,38	84,48	88,82	91,91	94,66
Belgium	70,30	65,12	63,22	66,31	75,89	84,11	92,18	98,03	104,20	109,96	115,17
Bulgaria	10,53	16,47	18,30	19,54	22,27	24,48	26,08	27,84	29,65	31,13	32,37
Croatia	4,49	11,82	11,82	12,05	13,71	14,83	16,02	16,90	17,96	18,84	19,49
Cyprus	1,34	1,46	1,14	1,15	1,22	1,31	1,38	1,46	1,54	1,58	1,62
Czech Republic	46,21	48,55	47,73	50,18	54,81	59,20	63,81	68,08	72,26	76,24	79,96
Dennmark	21,49	21,96	22,81	24,94	28,60	30,84	32,57	34,52	36,43	38,07	39,74
Estonia	9,99	13,44	8,90	9,54	11,03	12,24	13,41	14,44	15,43	16,33	17,12
Finland	42,29	42,48	41,64	42,86	45,78	48,67	52,13	55,08	58,05	60,56	62,63
France	411,54	409,25	392,09	412,83	470,19	519,88	577,06	607,57	639,81	661,32	681,60
Germany	492,52	545,00	592,16	619,30	681,75	724,07	766,27	789,60	814,68	832,48	842,22
Greece	37,80	33,83	37,32	37,39	39,35	40,77	42,23	43,93	45,57	46,86	48,06
Hungary	26,92	34,77	33,74	34,71	37,81	41,57	45,22	48,37	51,07	53,33	55,97
Ireland	11,76	17,21	10,72	11,68	13,54	15,47	17,36	19,01	20,29	21,34	22,37
Italy	253,15	302,59	268,36	271,05	289,83	306,26	323,23	337,15	346,82	361,57	370,51
Latvia	15,47	23,58	21,02	24,00	26,04	29,56	32,38	35,06	38,41	39,92	41,19
Lithuania	11,10	16,94	18,65	20,40	24,03	26,15	26,85	27,55	29,77	31,91	33,84
Luxembourg	2,72	2,74	2,93	3,41	4,16	4,55	4,95	5,32	5,81	6,30	6,70
Malta	0,26	0,27	0,27	0,27	0,31	0,33	0,36	0,40	0,42	0,46	0,49
Netherlands	93,61	99,63	106,25	110,97	120,87	128,10	133,60	137,55	142,76	146,10	149,10
Poland	114,40	140,27	169,70	200,89	227,53	258,22	286,16	308,20	328,05	341,84	350,30
Portugal	26,04	32,28	27,41	27,62	29,88	32,45	34,30	35,87	37,24	38,28	39,25
Romania	27,24	55,86	43,17	50,91	61,00	69,31	76,23	81,95	88,24	94,21	100,43
Slovakia	19,62	21,39	21,82	22,94	26,06	28,99	32,07	34,29	35,71	36,58	37,33
Slovenia	6,40	10,75	11,03	11,96	15,19	17,85	20,00	21,86	23,56	25,07	26,65
Spain	180,37	264,53	226,53	228,47	247,11	264,99	281,90	298,01	313,04	322,49	334,63
Sweden	69,55	77,98	80,60	80,65	90,26	97,51	104,49	110,59	116,97	122,56	127,72
United Kingdom	237,30	248,01	215,79	242,40	252,82	264,03	275,84	287,92	299,41	310,10	319,48
Average (Gtkm)	81,95	93,30	91,30	96,57	106,46	115,01	123,48	129,68	135,79	140,62	144,66

Source: Created by the author using the data from the official website of the European Commission, available at: https://ec.europa.eu/energy/ [access February 10, 2018]

The table 3 shows that Croatia almost doubled its cargo transport activities in the period from 2000 to 2015, or in somewhat more than 15 years, and it is showing a projected stable growth until 2050. The latest officially confirmed data show the transport amount of 12.05 giga-tonnes of cargo per kilometre. The greatest progress can be noticed in the period when Croatia gradually liberalised its market in the pre-accession period, which was one of the conditions for European Union membership. These numbers are definitely a positive indicator of development, i.e. the economic activity of the Croatian economy.

Table 4 presents the data for Croatia in the mentioned period, along with the European Union member states average and the Croatian share in the European Union average. The unit is also giga-tonnes of cargo per kilometre.

Table 4. Cargo transport activities in Croatia, the European Union member states average, and the Croatian share in the European Union average

	2000	2005	2010	2015	2020	2025	2030	2035	2040	2045	2050
Croatia	4,49	11,82	11,82	12,05	13,71	14,83	16,02	16,90	17,96	18,84	19,49
Average (Gtkm)	81,95	93,30	91,30	96,57	106,46	115,01	123,48	129,68	135,79	140,62	144,66
Croatian share in the EU average	5%	13%	13%	12%	13%	13%	13%	13%	13%	13%	13%

Source: Created by the author using the data from the official website of the European Commission, available at: https://ec.europa.eu/energy/ [access February 10, 2018]

4.1.3. Energy Demand

The third and final indicator of trends in the European Union is the energy demand in passenger and cargo transport. The mobility of European Union citizens is a significant consumer of energy and fuel, and with that also a significant pollutant, because it is still mostly based on fossil fuels. Energy generated from non-pollutant sources is definitely a priority for every society that is planning ahead and taking care of the future for their children. The European Commission gathers and disseminates data for every individual member state regarding its consumption, reduced for fuel and energy transport through various transport media.

Table 5 shows the demand for energy in transport for each member state of the European Union. The unit of measurement is "ktoe"[3], or kilo-tonne of oil equivalent. The observed period is from 2000 to 2050. In the beginning of the period, Croatia had 1544 ktoe, and the latest recorded data shows 2074 ktoe. There are no expectations of a large increase in the consumption of energy in transport by the end of the period; it is an increase of a little less than 10%. Considering that it is expected that total transport will grow for over 50% by the end of the period, it can be concluded that energy consumption is becoming more rational.

[3] In order to explain the ktoe, or the unit used to observe energy consumption, in more detail, it can be said that one cubic metre of diesel burned is 0.98 toe, or 0.98/1000 ktoe (Eurostat, 2018)

Table 5. Energy demand in transport for each member state of the European Union

Country/Year	2000	2005	2010	2015	2020	2025	2030	2035	2040	2045	2050
Austria	6787,30	8814,90	8507,22	8480,09	8050,00	7757,12	7684,19	7817,59	7924,05	7966,98	8003,78
Belgium	9746,90	9971,50	10592,90	10178,68	10020,60	10174,20	10419,57	10665,69	11039,67	11424,68	11686,57
Bulgaria	1841,40	2682,20	2719,23	2837,01	2882,24	2935,18	2978,51	3036,81	3098,65	3135,71	3168,57
Croatia	1544,10	1920,70	2067,75	2074,06	2135,59	2116,79	2119,78	2154,83	2205,71	2235,75	2256,76
Cyprus	859,80	982,50	1050,22	915,77	965,13	978,10	988,63	1023,25	1042,91	1052,31	1065,77
Czech Republic	4252,00	5982,50	6120,92	6177,79	6317,45	6280,40	6398,76	6616,46	6790,24	6977,89	7169,69
Dennmark	4815,70	5324,40	5180,46	5008,83	4965,91	4848,40	4784,10	4776,96	4832,75	4920,13	5004,07
Estonia	579,50	766,40	780,90	811,08	795,78	769,89	762,87	767,57	773,34	777,41	776,88
Finland	4337,60	4624,30	4826,65	4895,72	4744,04	4564,23	4374,16	4346,69	4389,23	4442,70	4488,77
France	50359,60	50193,60	49346,60	50154,46	50084,93	49390,76	49006,10	48832,02	49378,21	49542,93	49741,75
Germany	65101,24	59796,84	58145,16	59790,65	56191,66	53721,55	51524,29	49979,90	49510,54	49397,02	49356,79
Greece	7286,30	8173,70	8147,41	7471,71	7257,20	6974,52	6728,36	6779,74	6806,81	6828,06	6841,00
Hungary	3309,40	4307,80	4341,10	3957,66	4122,62	4218,60	4352,34	4521,08	4633,98	4702,70	4822,36
Ireland	4082,31	5078,40	4714,56	4585,71	4767,52	4901,46	5079,45	5253,24	5363,39	5464,53	5606,79
Italy	42174,10	44376,60	41219,53	39855,62	39022,16	38024,42	37683,99	37830,84	37530,04	38303,20	38300,03
Latvia	745,70	1064,30	1200,34	1158,23	1194,42	1226,52	1214,93	1230,78	1286,45	1316,46	1336,40
Lithuania	1054,30	1413,30	1521,07	1581,99	1631,23	1632,32	1567,29	1505,95	1512,23	1517,74	1533,29
Luxembourg	1914,30	2780,70	2604,13	2697,28	2766,92	2879,12	2987,59	3181,91	3373,41	3504,11	3602,03
Malta	268,24	242,13	254,99	256,26	269,90	273,89	272,47	282,56	275,17	280,46	283,54
Netherlands	14297,20	15197,50	14985,93	14817,31	14232,59	13736,08	13376,60	13292,23	13427,04	13531,40	13643,38
Poland	9830,30	12265,30	17459,41	18690,84	19806,12	20198,71	20542,46	21261,04	21879,88	22051,46	22121,90
Portugal	6635,70	7188,20	7225,96	6867,10	6644,96	6682,25	6725,09	6804,38	6774,89	6719,76	6706,98
Romania	3336,40	4186,20	5072,86	5447,52	5733,50	6076,30	6294,00	6572,12	6907,69	7104,89	7306,59
Slovakia	1454,50	1793,60	2240,54	2205,13	2349,82	2412,52	2533,10	2629,89	2666,86	2666,39	2666,95
Slovenia	1248,90	1492,00	1805,58	1838,25	1908,29	1883,19	1843,66	1850,41	1869,40	1895,37	1932,95
Spain	33083,80	39796,60	37180,08	35033,40	34516,16	34655,76	35160,93	36154,03	37007,08	37340,79	38304,61
Sweden	8192,00	8608,80	8620,28	8259,93	7908,01	7642,51	7534,12	7582,47	7729,79	7900,19	8089,00
United Kingdom	52386,10	55500,60	51469,85	52014,25	49660,15	47943,29	46525,23	46621,32	47324,10	48231,83	49207,45
Average (ktoe)	12197,31	13018,77	12835,77	12787,94	12533,75	12317,79	12195,09	12263,28	12405,48	12544,03	12679,45

Source: Created by the author using the data from the official website of the European Commission, available at: https://ec.europa.eu/energy/ [access February 10, 2018]

Table 6 shows the consumption divided between cargo and passengers. It shows that cargo represents a smaller amount in the total consumption of energy.

Table 6. Energy demand in transport according to the object being transported and the Croatian share in the European Union average

	2000	2005	2010	2015	2020	2025	2030	2035	2040	2045	2050
Croatia	1544,10	1920,70	2067,75	2074,06	2135,59	2116,79	2119,78	2154,83	2205,71	2235,75	2256,76
cargo	215,46	581,15	553,69	539,55	592,22	609,47	626,86	647,52	675,35	692,11	701,87
passengers	1328,64	1339,55	1514,06	1534,51	1543,37	1507,32	1492,92	1507,31	1530,36	1543,64	1554,90
Average (ktoe)	12197,31	13018,77	12835,77	12787,94	12533,75	12317,79	12195,09	12263,28	12405,48	12544,03	12679,45
cargo	2686,82	3195,86	3053,74	3100,90	3245,66	3329,12	3417,67	3498,20	3568,80	3620,05	3665,21
passengers	9510,49	9822,91	9782,03	9687,04	9288,09	8988,67	8777,42	8765,08	8836,68	8923,98	9014,24
Croatian share in the EU average	13%	15%	16%	16%	17%	17%	17%	18%	18%	18%	18%

Source: Created by the author using the data from the official website of the European Commission, available at: https://ec.europa.eu/energy/ [access February 10, 2018]

The projections for energy consumption on passengers are stagnant, with a mild growth in Croatia, while in Europe they stagnate on average, but with a trend of reduction in relative shares. There is a planned three-fold increase of cargo in Croatia during the observed period, while the planned increase of energy consumption in Europe for the mentioned period is only 50%.

The exponential increase in international trade has resulted in the increase of consumption in cargo transport, despite all the efforts and technological

developments. From the aspect of the economy and international development, the increase of trade can only be viewed as positive, while on the other hand, the consumption of energy is a serious ecological threat for the planet. Sustainable development is one of the basic postulates of the European Union and it is constantly being developed by many professionals and entrepreneurs. Despite the increase in consumption for a somewhat small country like Croatia, the energy consumption average in the European Union has not increased significantly in the observed period, while trade grew significantly.

The greatest increase in the Croatian share in the European Union member states average can be seen in the first decade of the observed period. While the trend evens out and is showing a mild growth in the period from 2010 all the way to the middle of the 21st century. This data corresponds to the data on the activity of passenger and cargo transport from the previous sections of this paper.

5. CONCLUSION

Transport is a very important component of the economy. The significance of transport is clearly indicated by the fact that 10% of the total gross domestic product of the European Union comes from transport activities. The context for transport is becoming more complicated today, considering that this dynamic system is growing every year. As the standard of living increases, the society, or more accurately people, is becoming more and more used to the services provided by transport. As a consequence, individuals are becoming more and more demanding, and they are setting higher and higher standards for the service providers. When it comes to passenger transport, the transport system places special emphasis on personal safety, comfort, and availability. Considering the transport of goods, the consumer wants their goods delivered without damage and as soon as possible. All of this is the subject of study of transport law, an independent branch of legal science. During the previous century, international integration has strived toward connecting and unifying transport to make it compatible at the global level. European Union is one of those integrations and it consequently created its own transport policy, which has been maintained for several decades. The European Union placed the most emphasis on the transport policy and the energy policy, sustainable development, and energy independence from countries that are not members of the European Union.

The trends in Croatia and the European Union are similar, and they are showing growth of passenger transport, along with the growth in the transport of goods and services. Unfortunately, trends also show an increase in the expended energy. This occurrence in not surprising, considering that the growth in transport volume and the expended energy are positively correlated. The key to reducing energy consumption is the transportation of passengers in personal vehicles.

According to this paper some questions are open that are the base of future research. This paper was analysed and compared transport policy and traditional forms of transport between Croatia and other European Union countries. That would be a base for further extend research - analysis and comparison modern types of transport, like intermodal, multimodal and combined. Based on that, it will be able to

see some potential for expansion and improvement of modern type of transport of research countries. Also, there is an increasing number of papers about sustainable development in transport which open a new area of research.

6. REFERENCES

Čavrak, V. (2015). Mijo Mirković i hrvatska prometna politika [available at: http://vladimir-cavrak.from.hr/wp-content/uploads/2015/09/MIJO-MIRKOVI%C4%86-I-HRVATSKA-PROMETNA-POLITIKA.pdf access February 28, 2018]

De Jong, M. & Geerlings, H. (2005). Exchanging experiences in transport infrastructure policies between Denmark and the Netherlands, *International Journal of Technology, Policy and Management,* 5(2), pp.181-199.

Debelić, B., Grubišić, N. & Milanović, S. (2015). The cost and non-cost conditionality of transport coridor logistics preformance as determinant of port competitiveness, *15th international scientific conference Business Logistics in Modern Management*, Segetlija, Z., Mesarić, J., Dujak, D., Karić, M., Potočan, V., Rosi, B., Jereb, B., Trauzettel, V., Cyplik, P. (ed.), Faculty of Ecnomics in Osijek, Osijek, 15 October 2015, pp 145-158.

European Comission, TENtec Interative Map Viewer [available at http://ec.europa.eu/transport/infrastructure/tentec/tentec-portal/map/maps.html access February 17, 2018]

European Commission [available at: https://ec.europa.eu/energy/ access February 10, 2018]

European Commission. (2011). White paper 2011, Roadmap to a Single European Transport Area - Towards a competitive and resource efficient transport system, Official web site od European Comission [available at https://ec.europa.eu/transport/themes/strategies/2011_white_paper_en access February 15, 2018]

European Commission. (2014). The EU explained: Transport, Luxembourg: European Union

Eurostat (2018) [available at: http://ec.europa.eu/eurostat/ access February 10, 2018]

Hlača, B. (2007). Politika europske unije i morske luke. *Pomorstvo*. 21(1), pp. 221-232.

Kandžija, V. & Cvečić, I. (2008). *Makrosustav Europske unije.* Rijeka: Sveučilište u Rijeci, Ekonomski fakultet

Kersan-Škabić, I. (2015). *Ekonomija Europske unije*. Pula: Sveučilište u Jurja Dobrile u Puli, Fakultet ekonomije i turizma „Dr. Mijo Mirković“

Keser, I, (2011*).* The Common Maritime Transport Policy of the European Union – the Protection and Preservation of the Marine Environment*, Poredbeno pomorsko pravo,* 50(165), pp.269-304.

Knezović, M. (2015). Promet i prometna politika [available at: http://nacija.hr/2015/09/12/promet-i-prometna-politika/ access February 28, 2018]

Lodge, M. (2003). Institutional Choice and Policy Transfer: Reforming British and German Railway Regulation, *Governance*, 16 (2), pp.159-178.

Mihič, S., Golušin, M. & Mihajlović, M. (2011). Policy and promotion of sustainable inland waterway transport in Europe – Danube River, *Renewable and Sustainable Energy Reviews*, May, 15/4), pp.1801-1809

Ogorlec, A. (2003).European union common tranport policy, *Naše more*, 50(5-6), pp.197-203

Padjen, J. (1996). *Prometna politika*, Zagreb: Informator i Ekonomski institut

Poletan Jugović, T. (2006). The integration of the Republic of Croatia into the Paneuropean Transport Corridor network. *Pomorstvo*, 20(1), pp.49-65.

Puškec, T., Krajačić, G., Lulić, Z., Vad Mathiesen, B. & Duić, N. (2013). Forecasting long-term energy demad of Croatian transport sector, *Energy*, 57, pp. 169-176

Stead, D., de Jong, M., & Reinholde, I. (2008). Urban transport policy transfer in Central and Eastern Europe. *disP-The Planning Review*, *44*(172), pp.62-73.

Šolman, S. (2010). Uloga cestovnog prometa u turizmu Hrvatske. *Acta Turistica Nova,* 4(2), pp. 231-245

Vasilj, A. & Činčurak-Erceg, B. (2016). *Prometno pravo i osiguranje*. Osijek: Sveučilište Josipa Jurja Strossmayera, Pravni fakultet

Vilke, S., Baričević, H. & Maglić, L. (2015). The significance of the intermodal transport route through Port of Rijeka for sustainable transport, *15th international scientific conference Business Logistics in Modern Management*, Segetlija, Z., Mesarić, J., Dujak, D., Karić, M., Potočan, V., Rosi, B., Jereb, B., Trauzettel, V., Cyplik, P. (ed.), Faculty of Economics in Osijek, Osijek, 15 October 2015, pp 201-208.

Zelenika, R. (2001). *Prometni sustavi*. Rijeka: Sveučilište u Rijeci, Ekonomski fakultet