



**WBC_INCO.NET Setting of Regional Research Priorities
Consultation Session on Transport**

Transport Research Priorities for Croatia 2009 - 2013

**Prof. Dr. Sc. Ivica Smojver
Faculty of Mechanical Engineering and Naval Architecture
University of Zagreb**

Sarajevo, May 19 – 20, 2009

Scientific Experts

- Prof. Dr. Sc. Ivan Legac, Faculty of Traffic Sciences , University of Zagreb
- Prof. Dr. Sc. Joško Parunov, Faculty of Mechanical Engineering and Naval Architecture, University of Zagreb

Industry Expert

- Mišo Klarić, Grad. ME, Director Engineering Services, Croatia Airlines, Zagreb







According to the National classification of activities, transport includes the following activities of goods transportation and storage, as well as communications:

- regular and unordinary passenger and goods transport using railways, roads, water, air or pipelines
 - supporting activities at terminals and parking stations, resupply of goods, storage etc.
 - postal services and telecommunications
 - renting of transportation means and equipment
- the transportation sector makes 8.1 % of GDB and 7.1 % of total employees (data for 2001, source Central Bureau of Statistics)

Structure of Transport of Passengers by Mode of Transport, 2007

(source: Croatian Central Bureau of Statistics, Statistical Information 2008)

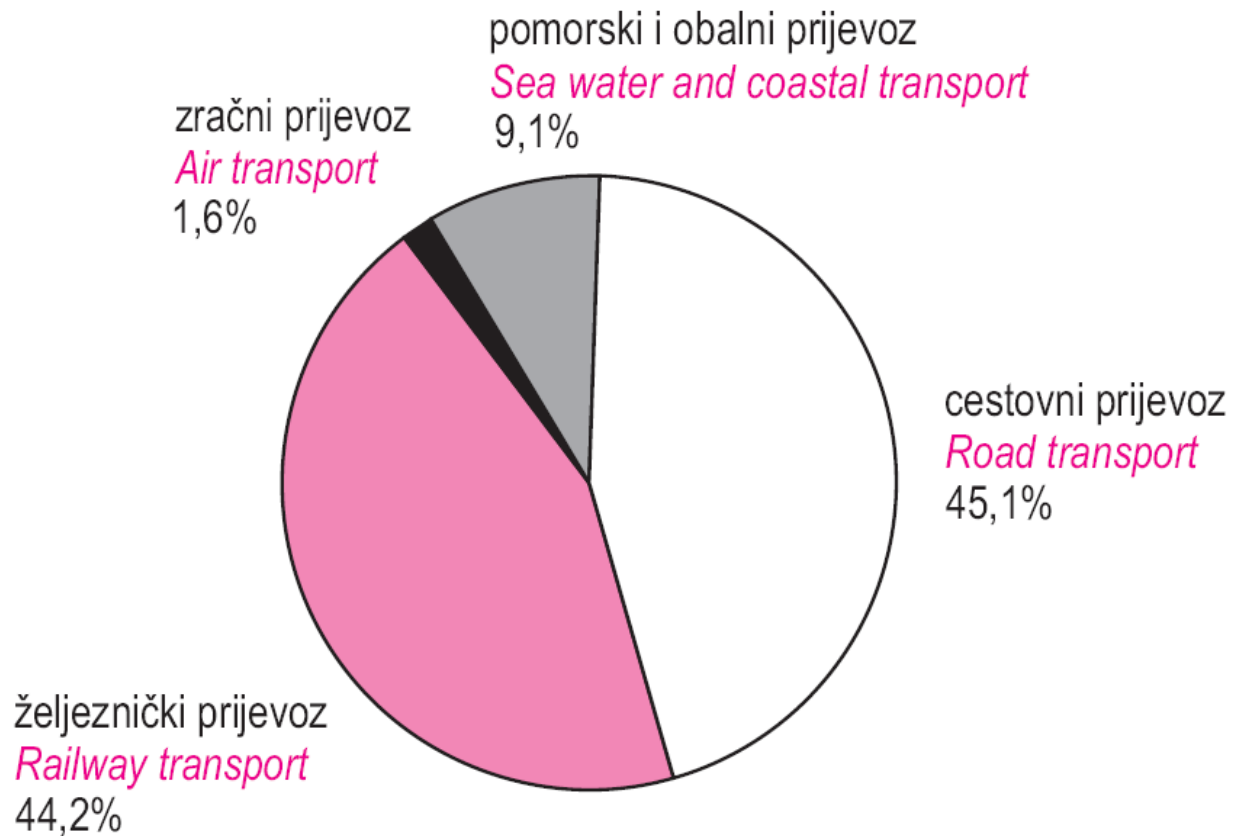
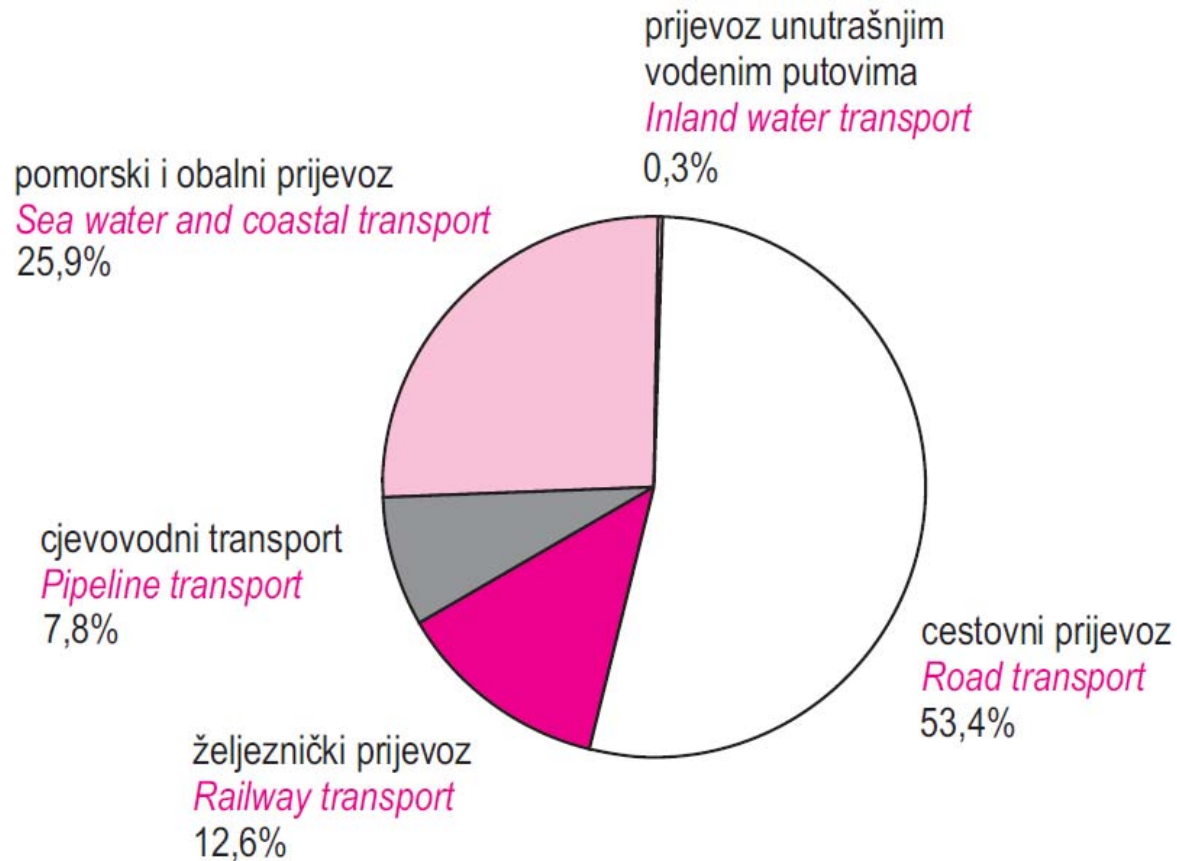


Figure: Structure of Transport of Goods by Mode of Transport, 2007

(source: Croatian Central Bureau of Statistics, Statistical Information 2008)



Main Transport Sector Trends in Croatia - Strategic Framework for Development 2006 – 2013

- use all the advantages of geographical position of Croatia and natural inclination of the country to develop all modes of transport (increased integrity and intermodality)
- enable the decreasing of differences in the quality and safety between different segments of road infrastructure
- maintenance of existing roads, as well as increase of quality and safety
- modernisation of rail infrastructure based on the complementarity with other modes of transport
- the sustainable development of transport infrastructure with the purpose of competitiveness
- efficient revival of inland waterways transport through the removal of bottlenecks at inland waterways
- the improvement of airport capacities for passenger transport and improvement of safety, security and quality of air transport

Integration of Croatia in the European Research Area in the field of Transport

The strategic tasks of the Croatia in the integration into EU research area are:

- Increasing investments into research and development, and their efficiency
- Restructuring Croatia's science system
- Strengthening cooperation between science, government and industry in the creation of new knowledge and goods
- Increasing participation of Croatian scientists and other bodies in EU Framework Programmes

Particular measures by the Ministry of Science, Education and Sports (MSES) in order to improve the:

- awareness on the significance and influence of science and research to society development
- interlinking of the research infrastructure with the purpose of more efficient use of potential (centers of excellence)
- clustering of existing scientific projects into integrated (collaborative) scientific programmes (collaborative centers of excellence) with the aim of creating internationally recognized and competitive centers of excellence

Table: Promoted Dr.Sc. at of (academic year 2005 / 2006) in fields of relevance to Transport, source: Report on the activities of University in academic year 2005/2006

Scientific fields (Technical Sciences)	Promoted Dr. Sc.
Architecture and Urbanism	1
Naval Architecture	1
Electrotechnics	24
Geosciences	1
Civil Engineering	5
Graphic Arts Technology	4
Chemical Engineering	3
Computer Sciences	7
Mining, Oil and Geological Engineering	7
Mechanical Engineering	7
Traffic Technology and Transport	3
Textile Technology	2
Total	65

Table: Resources for research and development - in thousand HRK (source: Statistical information 2008, Central Bureau of Statistics, 2008)

	2004	2005	2006
Own resources	812 731	663 432	629 197
Government and local administration	1 121 859	1 261 075	1 131 053
Private and public enterprises	565 371	326 076	265 037
Non-profit institutions	-	1 166	4 842
Other domestic resources	20 577	-	-
Foreign investors	66 148	59 963	149 031
Total	2 586 686	2 311 712	2 179 160

Table: Researchers in full-time employment (source: Statistical information 2008, Central Bureau of Statistics, 2008)

	2004	2005	2006
Business sector	1160	867	851
Government sector	2442	2120	2129
Non-profit sector	-	3	2
Higher education	5872	5238	5462
Total	9474	8228	8444

Table: Croatian participation in FP7 – Projects on the main list (source: FP7 Programme Committee Transport)

Proposal Number	FP7 Call	Applicant Total Cost (in Euros)	Applicant Requested Contribution (in Euros)
212991	FP7-SST-2007-TREN-1_05June	206.897,00	206.897,00
218362	FP7-SST-2007-TREN-1_05June	136.813,00	102.299,00
218589	FP7-SST-2007-TREN-1_28June	1.603.160,00	1.022.890,00
218954	FP7-SST-2007-TREN-1_28June	1.998.260,00	1.090.630,00
218954	FP7-SST-2007-TREN-1_28June	114.960,00	64.620,00
218954	FP7-SST-2007-TREN-1_28June	627.960,00	327.540,00
218954	FP7-SST-2007-TREN-1_28June	437.680,00	310.040,00
218954	FP7-SST-2007-TREN-1_28June	104.600,00	67.800,00
218954	FP7-SST-2007-TREN-1_28June	357.540,00	206.160,00
218954	FP7-SST-2008-RTD-1	61.813,00	61.813,00
234106	FP7-SST-2008-RTD-1	265.920,00	210.080,00
233969	FP7-SST-2008-RTD-1	178.000,00	137.500,00
234277	FP7-SST-2008-RTD-1	251.740,00	190.940,00
234070	FP7-SST-2008-RTD-1	188.380,00	141.660,00
233884	FP7-TPT-2008-RTD-1	152.800,00	100.645,00
234146	FP7-TPT-2008-RTD-1	149.760,00	99.312,00
Total		6.836.283,00	4.340.826,00

Croatian partners:

	governmental bodies, city councils and companies under their ownership
	companies, private institutes, SMEs
	Universities

Calls included within this survey:

- AAT-2007 and 2008
- SST-2007 and 2008
- TPT-2007 and 2008
- SST-2007-05June and SST-SST-2007-28June
- Galileo

Table: Financed scientific projects and programs (launched in 2006/2007), source: MSES

Scientific fields	No. of financed programs	No. of financed projects	Allocated grants (in HRK)
Natural Sciences	50	364	34.375.400
Technical Sciences (Engineering and Technology)	65	397	34.146.000
Biomedicine and Health	66	571	38.666.000
Biotechnical sciences	39	274	18.080.000
Social sciences	49	366	13.957.000
Humanities	50	336	13.005.000
Total	319	2308	152.229.400

Table: Projects related to the field of transport (financed by MSES 2006 – 2009) (source: MSES database)

Institution	No. of projects	No. of researchers
Faculty of Transport and Traffic Sciences, Zagreb	13	146
Faculty of Mechanical Engineering and Naval Architecture, Zagreb	10	57
Faculty of Maritime Studies, Rijeka	8	82
Faculty of Electrical Engineering and Computing, Zagreb	5	63
Faculty of Civil Engineering, Zagreb	3	24
Faculty of Maritime Studies, Split	2	24
Faculty of Electrical Engineering, Osijek	1	16
Croatian Academy of Sciences and Arts	1	5
Civil Engineering Institute of Croatia, Zagreb	1	9
Institute of Transport and Communications, Zagreb	1	12
Faculty of Sciences, Split	1	7
Total	46	445

Table: Technological projects related to the field of transport (financed by MSES 2006 – 2009) (source: MSES database)

Institution	No. of projects	No. of researchers (participants)	Grants in HRK
Faculty of Mechanical Engineering and Naval Architecture, Zagreb	4	29	3 782 350
Brodarski Institute, Zagreb	1	12	288 000
Faculty of Metallurgy, Sisak	1	17	200 000
Faculty of Engineering, Rijeka	1	5	1 564 040
Total	7	63	5 834 390

Strengths

- favourable strategic position of Croatia in South Eastern Europe
- successful development of new scientific instrument aimed at commercialisation of research (role of MSES)
- rapid involvement of Croatian research sector into the different instruments of EU financing and increasing awareness of necessity to do so
- strong basis in fundamental engineering sciences
- long and successful tradition in naval architecture and shipbuilding
- vast experience in production of rail vehicles
- significantly improved road infrastructure (highways)
- as a EU candidate country has particular opportunities to participate in the FP7 programs

Weaknesses

- lack of sufficient number of experienced professionals/experts
- existing societal system of values
- high regulatory barriers for investments making the climate unfavourable
- investing into R&D not appreciated enough as a vital part of the business
- although there are numerous formal acts, the real strategic focus in implementation is missing
- interest group opposition and lack of transparency
- negative attitude towards activities in the cross-sector cooperation
- target community not developed enough (industrial sector neglected and/or technologically lagging behind competition and/or unaware of R&D importance and/or financially exhausted)
- low level of innovativeness
- small productivity of Croatian research community (measured by the number of high quality research papers)

Opportunities

- research in the field of advanced materials applied in transport (e.g. composites, metal foams, new aluminium alloys)
- research in the field of advanced and special naval structures
- new power systems, engines and fuels
- development of aeronautical sector (e.g. general aviation, small UAVs) through offset programs and associated research
- research on the subject of higher impact of sustainable transport development

Threats

- global economic crisis
- high dependence on one economical branch (tourism) endangered by the global climate changes
- fluctuations of global fossil fuels prices
- very long period to refund invested money into transport infrastructure (increase of public debt)
- necessary significant decrease of governmental support in shipbuilding (as required by EC in the accession negotiations)
- necessity to invest large sums of money into development of aeronautical sector (only through governmental support)

Transport research priorities on the basis of the country's readiness

- **Ecological aspects of transport (e.g. noise, pollution) - Environmentally Sustainable Transport**
- **Safety of maritime structures regarding ecological aspects**
- **Advanced materials and structures engineering in the means of transport**
- **Ballast waters management in closed seas**
- **Intermodal transport and harmonization of various modes of transport with final goal of full integration into European transport area**
- **Traffic control, security and safety in urban areas**
- **Advanced design methodology in the development of new means of transport**
- **Integration of maritime and inland harbours**
- **Shipbuilding for inland waterways**
- **Information-communication technologies in intelligent transport systems**
- **Acquis Communautaire in transport**
- **Research on increasing efficiency and reliability of maritime and inland navigation**

Transport research priorities on the basis of future potential

- **Research on new types of fuels (e.g. hydrogen or bio-fuels) in various means of transport**
- **Advancement of aeronautical research in modelling of structural response**
- **Advanced simulations of mechanical behaviour of means of transport**
- **Development of new types of city transport**
- **Application of distant learning technologies in various fields of transport technologies**
- **The Croatian involvement and assessing to Galileo (future European global positioning system) with transport applications**
- **Research on telematic applications for freight and passenger traffic and absorption in the European telematic system**
- **Electronics and microprocessors in means of transport**





Thank you !



Strengths

- favourable strategic position of Croatia in South Eastern Europe
- successful development of new scientific instrument aimed at commercialisation of research (role of MSES)
- rapid involvement of Croatian research sector into the different instruments of EU financing and increasing awareness of necessity to do so
- strong basis in fundamental engineering sciences
- long and successful tradition in naval architecture and shipbuilding
- vast experience in production of rail vehicles
- significantly improved road infrastructure (highways)
- as a EU candidate country has particular opportunities to participate in the FP7 programs

Weaknesses

- lack of sufficient number of experienced professionals/experts
- existing societal system of values
- high regulatory barriers for investments making the climate unfavourable
- investing into R&D not appreciated enough as a vital part of the business
- although there are numerous formal acts, the real strategic focus in implementation is missing
- interest group opposition and lack of transparency
- negative attitude towards activities in the cross-sector cooperation
- target community not developed enough (industrial sector neglected and/or technologically lagging behind competition and/or unaware of R&D importance and/or financially exhausted)
- low level of innovativeness
- small productivity of Croatian research community (measured by the number of high quality research papers)

Opportunities

- research in the field of advanced materials applied in transport (e.g. composites, metal foams, new aluminium alloys)
- research in the field of advanced and special naval structures
- new power systems, engines and fuels
- development of aeronautical sector (e.g. general aviation) through offset programs and associated research
- research on the subject of higher impact of sustainable transport development

Threats

- global economic crisis
- high dependence on one economical branch (tourism) endangered by the global climate changes
- fluctuations of global fossil fuels prices
- very long period to refund invested money into transport infrastructure (increase of public debt)
- necessary significant decrease of governmental support in shipbuilding (as required by EC in the accession negotiations)
- necessity to invest large sums of money into development of aeronautical sector (only through governmental support)