



Annex III

*East Marmara*  
*Regional Research Agenda*  
*for*  
*Intermodal transport*



*December 2012*

## Content

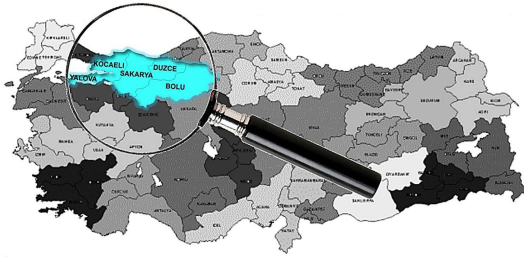
A. Overview of East Marmara and key indicators.....	3
A.1 Brief introduction of the region.....	3
A.2 Statistic and indicators .....	4
B. Political framework – East Marmara.....	5
B.1 Policy scenario influencing the RTD and economic development of intermodal transport .....	5
B.1.1 Overview on the political framework.....	5
B.1.2 Detailed analysis of 3 to 5 policies.....	7
B.2 Policy assessment .....	12
B.3 Vision for the future .....	14
C. The intermodal transport cluster in East Marmara.....	15
C.1 Indicators .....	15
C.1.1 Transport and logistics indicators.....	15
C.1.2 RTD and Innovation output indicators .....	16
C.2 The Scientific profile.....	17
C.2.1 The scientific community .....	17
C.2.2 Strategic research lines and Technology offer .....	18
C.2.3 Cooperation schemes.....	25
C.2.4 SWOT – Research perspective .....	26
C.3 The Industrial profile.....	27
C.3.1 The industrial community.....	27
C.3.2 Private research and Technology offer .....	31
C.3.3 Technology demand .....	32
C.3.4 Cooperation schemes .....	33
C.3.5 SWOT – Industrial perspective .....	35
C.4 Private financing schemes .....	36
C.5 Vision for the future cluster development in East Marmara .....	38

## A. Overview of East Marmara and key indicators

### A.1 Brief introduction of the region

The East Marmara Region is a NUTS-2 Region to the northwest part of Turkey, and literally a hub connecting Turkey's three major metropolitan areas; İstanbul (financial center of Turkey), Ankara (the capital) and Bursa.

East Marmara is the richest region of Turkey in terms of GDP per capita and second in the GVA. Furthermore, 11,6% of the Turkish foreign trade and 14% of the total tax revenue are sourced from the Region. The region is consisted of 5 provinces: Kocaeli - The Industrial Base of Turkey -, Sakarya, Düzce, Bolu and Yalova.



Total population of the region is 3.315.463. The main economic sectors of the region are “automotive and automotive supply industry, chemistry and petro-chemical industry, ship building, base metal, machinery, food products, textile and leather manufacturing and mining and quarrying”. Along with these sectors, transportation, logistics and related sectors are highly agglomerated within the region.

The transportation and logistics cluster of East Marmara mostly consists of sea and road transportation. In sea transportation, existing handling capacity of the ports is 77 million tons/year and 70% of the capacity is being utilized. The land transportation is also an important mode. Total number of “N and O category vehicles” in the region is 132.430. Total highway length is 2.222km's, where total railroad length is 255km's.

## A.2 Statistic and indicators

REGIONAL STATISTICS		Year
Area (km <sup>2</sup> )	20.122	
Population	3.315.463	2012
Population density (people/km <sup>2</sup> )	164,768	2012
GDP per capita (EUR PPP)	17.676	2011
Growth rate of GDP per capita (%)	8,5	2011
Employees (Number of employees in full time equivalent units)	1.210.000	2011
Employees growth (Growth rate of employment %)	14,9	2011
Long term unemployment rate	11,9	2011
Share of long-term unemployment in unemployment (%)	28,6	2011
RTD and innovation indicators		Year
Human Resources in Science and Technology (% of active population)	9,72	2010
Total intramural R&D expenditure (% of GDP)	1,13	2010
Public R&D expenditure over GDP (%)	0,13	2010
Business R&D expenditure over GDP (%)	0,48 (Turkey)	2010
Business R&D personnel (% of total employment)	0,203 (Turkey)	2010
Higher education R&D expenditure over GDP (%)	0,52	2010

## B. Political framework – East Marmara

### B.1 Policy scenario influencing the RTD and economic development of intermodal transport

#### B.1.1 Overview on the political framework

Table 1 – Overview on the political framework for the RTD and economic development of the intermodal transport sector

Policy (Programme/Legislative reference/Public incentive/Project/Other initiative)	Title	Short description	Sector/ Subsector	Budget/ Source of funding	Time scale
9 <sup>th</sup> Development Plan	-	National Development Plan of Turkey	General	National Treasury	2007-2013
East Marmara Regional Plan	-	Upper scale socio economic plan of the region	General / Regional	EMDA	2010 - 2013
National Transportation and Communication Strategy	-	The strategy and road map for transportation investments and related sectors	Transportation and Communication	The Ministry of Transportation, Maritime and Communication	2007 – 2023
Transport Corridor Europe-Caucasus-Asia Project	TRACECA	An international transport programme involving the European Union and 14 member States of the Eastern European, Caucasian and Central Asian region.	Intermodal transportation	European Commission, Governments	1998 - ...
National Strategy for Science, Technology and Innovation	-	The strategy and road map for science, technology and innovation investments and financial supports	Science, Technology and Innovation	TÜBİTAK	2011 - 2016
Supporting Industrial Academic Dissertations Programme	SAN-TEZ	To increase the collaboration between universities and industry, the Ministry funds the theses for innovation	R&D	The Ministry of Science, Industry and Technology	2007 - ...

Transportation Infrastructure Needs Assessment	TINA	To develop multi-modal transportation in Turkey	Intermodal transportation	EuropeAID	1996 - ...
National Transportation Public Research Programme		To finance R&D projects for transportation and logistics	R&D in transportation and logistics	TÜBİTAK	2006 - ...
Transportation Operational Programme in Turkey	OP - IPA	To develop port and railroad infrastructure and give technical assistance	Transportation and Communication	IPA, The Ministry of Transportation, Maritime and Communication	2007 - ...

### B.1.2 Detailed analysis of 3 to 5 policies

EAST MARMARA	
<b>Name of the policy/measure</b>	<b>East Marmara Regional Plan 2010-2013</b>
<b>Key actors</b>	<p>The Regional Plan is prepared by the East Marmara Development Agency (EMDA) with the delegation of the Ministry of Development (Former State Planning Institution). As the plan is the upper scale socio economic and official plan of the region, it was prepared with a high participatory process. Since the Executive Committee of EMDA is consisted of <b>Governors, Mayors, Presidents of Provincial Councils</b> and Presidents of <b>Chambers of Commerce</b> and Industry; the plan is officially the adopted by the region.</p> <p>The <b>Development Council</b>, which is consisted of 100 representatives from the Universities, Provincial Directorates, Municipalities, NGO's and private sector, played active role in the preparation of the plan as an advisory board.</p> <p>The main funding institution of the plan is the <b>East Marmara Development Agency (EMDA)</b>. Furthermore, the national public investments are being set in accordance with the plan. Thus, the plan has funding from national treasury as well.</p> <p>The sectoral analyses of the existing situation were made with the high level participation of public bodies, local authorities, non-governmental organizations and private sector representatives and their institutional stances.</p>
<b>Rationale</b>	The Regional Plan is prepared due to the 8th article of the Act of Development (3194), as a legal requirement. An important asset of the rationale of the plan is that, the financial supports from the EMDA were going to be provided according to priorities of the Regional Plan.
<b>Particular sector and subsectors</b>	Despite the Regional Plan covers all issues and sectors of the region, some of them tackled as they are agglomerated or clustered or needed to be developed. The economic sectors of these were <b>petro-chemistry, automotive side industry, transportation and logistics, machinery and equipment production, base metal production, tourism, food industry and forestry</b> .
<b>Target group(s)</b>	The target group of the plan was simply all region and all sectors. However, as the plan is both a legal policy document and a guideline for all sub-level plans and programs, it targets local administrations of the region. The plan has no legal cohesiveness for the industrial communities. However, it is still a guideline for the industrial community and indirectly effects them with spatial policies in terms of site selection and public investments. Furthermore, as the plan is the basic tool for establishing financial support mechanisms and their priorities, it defines which sector and in what terms to support, thus it targets private sector as well.
<b>Focal points and specific objectives</b>	<ul style="list-style-type: none"> <li>• Boosting Competitiveness in the Region</li> <li>• Intensifying Human Capital</li> <li>• Ensuring Environmental Sustainability and Reinforcing Technical Infrastructure</li> <li>• Promoting Development in Agriculture</li> </ul>
<b>Key activities</b>	<p>The activities of the agency and planning activities of the local administrations are being done in relation with the plan. Key activities are as follows:</p> <ul style="list-style-type: none"> <li>• Environmental Plans</li> <li>• Sectoral Master Plans</li> <li>• Zoning Plans</li> </ul>

	<ul style="list-style-type: none"> <li>• Financial Supports for local administrations, private sector and NGO's</li> <li>• Trainings for employees of local administrations, private sector and NGO's</li> <li>• Technical Supports</li> <li>• Investment Guiding</li> <li>• Sub-Strategic Plans (Regional Tourism Strategy, Regional Innovation Strategy etc.)</li> </ul>
<b>Main outcomes</b>	The East Marmara Development Agency designs financial support mechanisms according to the strategies of the plan.
<b>Performance indicators (if available)</b>	N/A
<b>Consistency with EU and national regulations/strategic guidelines</b>	During the preparation process of the plan, each sector and subject was researched
<b>Ex-post evaluation</b>	The plan period will be over by December, 2013.

<b>EAST MARMARA</b>	
<b>Name of the policy/measure</b>	<b>National Transportation and Communication Strategy</b>
<b>Key actors</b>	The <b>Ministry of Transportation, Maritime and Communication</b> is responsible with the preparation and implementation of the strategy. The plan is prepared in accordance with the reports of Specialization Commissions and the 9th Development Plan of Turkey. Thus, sectoral representatives and decision makers from Aviation, Maritime, Rail and Road Transportation sectors are included in the preparation process of the plan. Universities with specialization in transportation and communication were acted as advisory committee.
<b>Rationale</b>	The sectoral strategic plan was prepared as a complying document and a sub-plan for the 9th Development Plan (2007-2013), to define the national strategy for transportation and communication sectors.
<b>Particular sector and subsectors</b>	The plan includes Air Transportation, Maritime Transportation, Rail Transportation, Road Transportation, Mass Transit and Urban Transportation, Intermodal Transportation and Communication.
<b>Target group(s)</b>	The Plan aims to guide and govern regional and local authorities in terms of investments and national strategies and guide private sector in terms of investments and cooperation. Universities take active role in both preparation and implementation of the plan. As the R&D requirements are defined, universities work in such areas and have funds from the Ministry.
<b>Focal points and</b>	It focuses mostly on how to take action within the context of global trends. According to the vision; having strong transportation infrastructure, high ratio



<b>specific objectives</b>	of intermodal transportation, higher share for maritime and rail transportation than road transportation and efficiency is aimed in the plan.
<b>Key activities</b>	The activities of the Ministry and related directorates are being done in accordance with the plan, such as: <ul style="list-style-type: none"> <li>• Transportation Infrastructure Investments</li> <li>• Intermodal Projects and Cooperation</li> <li>• Public and Private Partnership</li> <li>• Large Scale Projects</li> <li>• Establishing balance in different modes of transportation</li> <li>• Re-using collected taxes from transportation for new investments</li> </ul>
<b>Main outcomes</b>	<ul style="list-style-type: none"> <li>• Transportation Master Plan</li> <li>• Integrated Sea Shores Management Master Plan</li> <li>• Privatization (Derince Port)</li> <li>• Hi-Speed Railways (Eskişehir – Sapanca - Köseköy – İstanbul)</li> <li>• Airport Investments (Cengiz Topel Airport)</li> <li>• Logistic Village investments (Köseköy, Muallimköy, Tavşancıl)</li> </ul>
<b>Performance indicators (if available)</b>	N/A
<b>Consistency with EU and national regulations/strategic guidelines</b>	As stated in the plan, all global, EU and national trends, regulations, guidelines are considered in the preparation process of the plan. Plan refers to European policies such as the White Paper.
<b>Ex-post evaluation</b>	The evaluation of the plan directly affects the performance of the Ministry and made in yearly basis.

<b>EAST MARMARA</b>	
<b>Name of the policy/measure</b>	<b>IPA – Transportation Operational Programme in Turkey</b>
<b>Key actors</b>	The key actors and funding bodies are the Ministry of Transportation, Maritime and Communication as well as the European Commission. The beneficiaries are the transport sector and regional institutions as they operate the rail and maritime investments.

<b>Rationale</b>	The overall objective of the "Transport" programme is to improve the competitiveness, safety and quality of the transport infrastructure sector in Turkey. This covers interconnection, interoperability and intermodality of national networks, as well as connections with the trans-European networks. The programme aims to rebalance freight transportation in favour of rail. The Trans European Network for Transport study (TINA) is the key background study for the identification of investment priorities in the transport sector.
<b>Particular sector and subsectors</b>	The programme focuses on interconnection, interoperability and intermodality of national networks, as well as connections with the trans-European networks. As East Marmara Region is located over main international transportation routes, the region has importance within the programme and receives investments and funding from the programme.
<b>Target group(s)</b>	It targets administrative bodies in terms of institutional capacity increasing assistance and the transport sector by investing on intermodality. The beneficiaries can be considered as the transport sector and regional institutions as they operate the rail and maritime investments, and after the investments are completed they will concentrate on and adapt themselves according to new transportation and intermodality investments as they will provide new opportunities.
<b>Focal points and specific objectives</b>	<p><b>Priority 1: Improvement of Railway Infrastructure.</b> This priority axis aims to:</p> <ul style="list-style-type: none"> <li>• Modernize the railway infrastructure of Turkey to meet the increasing demand in both passenger and freight transport.</li> <li>• Ensure safe transportation, better services and integration with TEN-T network.</li> <li>• Promote international and transit movement of passenger and freight in Turkey by providing effective connections with the EU corridors.</li> <li>• Complete missing links of Turkish rail transport network connecting to TEN-T.</li> </ul> <p><b>Priority 2: Improvement of Maritime Infrastructure:</b> This priority aims to modernize the port infrastructure in Turkey in order to improve the capacity of some strategic ports to meet the increasing demand and rationalize modes of transport in Turkey according to EU Motorways of the Sea objectives; to promote international and transit movement of freight in Turkey by providing effective connections with the EU maritime routes through the modernization and development.</p> <p><b>Priority 3: Technical Assistance:</b> This priority axis aims to ensure a sound and efficient management and implementation of the programme, by improving the administrative capacity of the institutions concerned and supporting implementation, monitoring, evaluation, control and communication activities, as well as to prepare projects for current and subsequent programmes.</p>
<b>Key activities</b>	
<b>Main outcomes</b>	Ankara-Istanbul High Speed Line Project / Köseköy-Gebze section: Construction of high speed railway between Istanbul and Ankara will provide a time-efficient, comfortable and safe transportation opportunity. The project will improve travelling time between Ankara and Istanbul passing by the segment Köseköy/Gebze (EU contribution EUR 120 million).
<b>Performance indicators (if available)</b>	N/A
<b>Consistency with EU and national regulations/strategic guidelines</b>	The programme, as an IPA project, is totally in accordance with EU regulations and other programmes and projects.

<b>Ex-post evaluation</b>	N/A
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<b>EAST MARMARA</b>	
<b>Name of the policy/measure</b>	<b>National Strategy for Science, Technology and Innovation</b>
<b>Key actors</b>	The Scientific and Technological Research Council of Turkey (TÜBİTAK) is the responsible governmental body of the strategy. TÜBİTAK also provides financial supports according to the strategy.
<b>Rationale</b>	The plan was prepared according to the decision of The Supreme Council for Science and Technology (BTYK). BTYK is the responsible body for developing 2023 vision of science, technology and innovation of Turkey.
<b>Particular sector and subsectors</b>	The plan is focused on R&D and innovation at all. However, some sectors are specified as they are considered as priorities, which are automotive, machinery production, IT, Defense, Space, Energy, Water and Food.
<b>Target group(s)</b>	Industrial community, universities and public research institutes are the main target group of the plan.
<b>Focal points and specific objectives</b>	<ul style="list-style-type: none"> <li>• Developing human force in info, tech and innovation fields.</li> <li>• Reinforcing research results convert into commercial goods.</li> <li>• Extending multi partner and multi-disciplinary cooperation.</li> <li>• Increasing the role of SMEs within national innovation system.</li> <li>• Increasing the contribution of research infrastructure to TARAL (Turkish Research Area)</li> <li>• Activating international cooperation in information, technology and innovation.</li> </ul>
<b>Key activities</b>	N/A
<b>Main outcomes</b>	Financial support mechanisms for target groups, guiding regional policies, guiding academic institutions and education activities.
<b>Performance indicators (if available)</b>	N/A
<b>Consistency with EU and national regulations/strategic guidelines</b>	Being a national strategy, the plan was prepared in accordance with both European and global trends and policies.
<b>Ex-post evaluation</b>	N/A

## B.2 Policy assessment

Almost all of the policy makers position themselves in the industrial ecosystem by considering the relationship between knowledge, innovation and regional characteristics.

If the regional innovation processes are regarded, most of them follow the strategy “connecting globally” in terms of internal and external connectivity. However, there are some entities that are in the process of integrating themselves into the cluster and improving their current situations.

Especially, improvement of the hinterland connectivity, planning inland port, focus on cost effectiveness and rehabilitation of intermodal transport infrastructure are the key policies that might support the economical and innovative development of the intermodal transport industry in the Marmara region.

According to the participants, the Marmara region has no elaborated regional innovation strategy. Having no detailed regional innovation strategy, such strategies are said to be officially recognized in the Regional Plan of the region as priorities.

Most of the policy makers concentrate with the regional policy planning, public resources and actions into prioritized areas. They determine their prioritized areas, which have competitive advantages and potential for excellence with regard to the future, against the framework of an international context / the global scene. Their policy planning can also set on the basis of existing strengths and the region’s capabilities and competences.

After evaluating the aggregate employment, professional and skilled work force, finance requirement, the connectedness of the new domain in their policy planning, the most of the policy makers think about that their regional policy planning will play an important role in development of a new domain of specialization / new branch of activities.

More than half of the participants are considering creating new interactions between the different policy domains and cross-sectoral cooperation in regional innovation policies.

In addition to this, there is a balance between the demand and supply of the research side and industrial processes. Also, most of them implement programs, which are related to the development of human capacities and resources through higher education, professional training and research programs.

Half of the participants consider there is also an innovation in both their services and public sectors. And they reflect this tendency into their procurements and services.

Unfortunately, there is no evaluation component and monitoring process in the regional innovation strategy. Before the creating or publishing the final innovation strategy, there are sometimes pilot projects launching to test the results.

According to the most of the participants, regional strategy has to be flexible. That means that there might be some changes happening during the course of time.

All regional key stakeholders who can be public, private and non-profit involve in construction of regional innovation strategy (e.g. public authorities, universities, other knowledge-based institutions, investors and enterprises, civil society experts, external experts).

Most of the innovation is driven by universities/ public research institutes in the region. All of the policy makers are consulting with clusters to create regional innovation strategy. There is very limited participation of industrial organizations in the innovation activities.

In addition to increase participation in innovation activities, agglomeration has also been done by the governmental side. Due to Marmara region has special potential for the R&D based production, infrastructure of innovative and creative sectors have to be developed in the region. The Marmara region is playing very crucial role in high technology industry and world market leader production. This region requires high volume industrial infrastructure.

There is tendency of well designed urbanization and minimization of the environmental problems in this region. Main actors of this change will be industrial parks. There is serious number of industrial parks in this region. This means that importance and potential of industrial parks for regional development has not been exploited yet, although there are many industrial actors.

Unfortunately, there are no models that assess the potential of projects before funding. The Turkish State gives special priority to major infrastructure projects, especially in the transport sector. The Ministry is in the process of building new airports and highways, thanks to an increased public investment budget. The government realizes many of these projects by utilizing the build-operate-transfer (BOT) model.

Although there are sources of financing innovation through public research funds, less than half of industrial communities cannot give support the partnership between universities / R&D centers and government through funds. Also, they are not supporting development of clusters financially. It should not be forgotten that, there exist some governmental bodies financing innovation activities such as TÜBİTAK and the Ministry of Science, Industry and Technology, to which the questionnaire had not been conducted.

There is no fiscal support to create or grow new technology based firms. Entrepreneurs who are taking the risk of experimenting in new activities sometimes take some incentives through entrepreneurship courses and financial support programs.

However, financing of the innovation will increase by regional innovation strategy. The main instruments which are getting common to support these activities are technology funds, R&D incentives/grants, supports for scientific research, technology centers and public-private partnership for innovation, support for infrastructure development. Main source of financing innovation in the region is the public research funds.

Regional policy involves relevant key stakeholders ('broad regional constituency') and is influenced by interest groups and locked in traditional activities. Therefore, it will be regionally business-driven.

Regional innovation strategy is based on entrepreneurial know-how collected from entrepreneurs/ universities/ public research institute. That's why; regional innovation strategy is mostly localized or imported/adopted from other regions. This means that the knowledge collected from entrepreneurs/ universities/ public research institutes from regional level may not be enough to leverage the innovation level in the region but it will include also actors outside of the Region to complete the missing parts based on existing strengths and the region's capabilities and competences.

On the other hand, there are some major problems in the region. There is lack of international and trans-regional perspective, a sound analysis of the assets of the region. The regional innovation system is not in tune with the industrial and economic fabric of the globalized community at large.

### **B.3 Vision for the future**

The players have a vision on the economic and innovation development potential of region and the main direction for its international positioning until the year 2020 and also they are sharing this vision with the regional key stakeholders in the Turkish economy.

Especially, half of the participants have the same vision on intermodal transport sector. And they consider that transport related software and ICT, container transport systems and effective modeling of logistic centers are the main specialization fields/ niches for the competitive development of intermodal transport.

All experts agree that there is an excellent potential for supporting further development and economic growth of the intermodal transport sector in Marmara Region.

They are considering that there is low efficiency of regional innovation support infrastructures for supporting a positive development. That's why; there are search for the innovative strategy for the region on the basis of existing strengths, the region's capabilities and competences.

Regional entrepreneurs will play key roles in realization and application of the regional innovation vision for the intermodal transport sector. Also universities and public authorities will support them in this process.

## C. The intermodal transport cluster in East Marmara

### C.1 Indicators

#### C.1.1 Transport and logistics indicators

		Year
No. of companies*	765	2010
No. of employees**	32.389	2010
Turnover of the sector (million EUR)	1587,6	2011
Contribution of regional transport sector to the GDP (%)	14	2009
- Road transport share (%)	5,89	2009
- Rail transport share (%)	0,19	2009
- Water transport share (%)	6,51	2009
- Air transport share (%)	1,41	2009
Container handling volume (million TEU)*	0,517	2012
Average growth rate of container handling volume (%)**	16,57	2011
Export volume (in million Euros)	10480	2010
Modal split of freight transport		
- Road (% of tonne-kilometres)	80,6	2010
- Rail (% of tonne-kilometres)	4,76	2010
- Inland waterways (% of tonne-kilometres)	N/A	2010
Passenger volume (million)	9.675	2010
Modal split of passenger transport		
- Passenger cars (% of passenger-kilometres)	57	2010
- Buses and coaches (% of passenger-kilometres)	41,3	2010
- Trains (% of passenger-kilometres)	0,88	2010

\*6 out of 34 ports are handling container, most of the share is consisted of dry cargo, bulk, liquid and ro-ro.

\*\*With the existing port investments, container capacity is expected to increase by 1,97%

### C.1.2 RTD and Innovation output indicators

		Year
Patents per million habitants	12,67	2011
Patents per million habitants (HiTech)	No data available	
Patents per million habitants (ICT)	No data available	
No. of start-ups	No data available	
No. of spin-offs	No data available	
No. of start-ups in transport and logistics	No data available	
No. of spin-offs in transport and logistics	No data available	
No. of patents in transport and logistics	2 (1 Patent + 1 Utility Model)	2000-2011



## C.2 The Scientific profile

### C.2.1 The scientific community

	Organisation/ Department	Acronym	Research sector	Website	Contact person (Surname, Name, Email)
Main regional research actors	ITU Faculty of Naval Architecture & Ocean Engineering	ITU	Naval Architecture & Ocean Engineering	<a href="http://www.itu.edu.tr">http://www.itu.edu.tr</a>	Nil Güler
	ITU Maritime Faculty	ITU	Maritime	<a href="http://www.itu.edu.tr">http://www.itu.edu.tr</a>	Nil Güler
	Kocaeli University Barbaros Maritime Academy		Maritime	<a href="http://www.kocaeli.edu.tr">http://www.kocaeli.edu.tr</a>	
	Kocaeli University School of Civil Aviation	SHMYO	Civil Aviation	<a href="http://www.kocaeli.edu.tr">http://www.kocaeli.edu.tr</a>	
	ODTÜ Faculty of Civil Engineering Department of Transportation	METU	Civil Engineering	<a href="http://www.metu.edu.tr">http://www.metu.edu.tr</a>	
	Koç University	KOC	Industrial Engineering	<a href="http://www.ku.edu.tr">http://www.ku.edu.tr</a>	Metin Turkey
	The Scientific and Technological Research Council of Turkey	TUBITAK	Energy – Transportation – Telecommunication	<a href="http://www.tubitak.gov.tr">http://www.tubitak.gov.tr</a>	-

## C.2.2 Strategic research lines and Technology offer

Their researches are aimed at the development of systematic approaches to systems engineering problems. They address development of approaches to integrate data (both qualitative and quantitative) with physical models and development of mathematical programming algorithms to optimize system performance. Also, effects of human factor to sea transportation and navigation, detecting ship based sea and air pollution effects and working for preventing them, firefighting techniques in ports and dockyards, monitoring port operations are studying by the communities.

Setting their vision as to be an innovative, guiding, participating and cooperating institution in the fields of science and technology, which serves for improvement of the life standards of society and sustainable development of region, research activities not only support innovation, academic and industrial R&D studies but also in line with national priorities develop scientific and technological policies and manage R&D institutes, carrying on research, technology and development studies. Furthermore, by the help of both international and national fund, research projects carried out in universities and other public and private organizations, conduct research on strategic areas, publish scientific journals, popular science magazines and books, organize science and society activities.

There are some special topics listed as below:

- Discrete-Continuous Optimization Models and Algorithms for Multi-Echelon Supply Chains
- Environmentally Conscious Supply Chain Management
- Sustainability in Supply Chain Management and Logistics
- Transportation Planning and Scheduling
- Inter-Modal Logistics
- Risk Assessment in Narrow Seaways
- Ship based sea pollution
- Port management

In the following some samples of projects, journals, patents and other research results.

### 1. KOC UNIVERSITY

#### A-Journal Articles

- Kaplan, U, **M. Turkay**, B. Karasozen and L.T. Biegler, Optimization of Supply Chain Systems with Price Elasticity of Demand, *Inform Journal on Computing*, 23(4) 557-568 (2011).
- Atalay, S., M. Canci, G. Kaya, C. Oguz and **M. Turkay**, Intermodal Transportation in Istanbul via Marmaray Project, *IBM J. Res. & Dev.*, 54(6) 9:1-9:10 (2010).
- **Turkay, M.**, B. Karasozen, L.T. Biegler, T.J., McAvoy, Hybrid systems: Modeling, simulation and optimization, *Journal of Process Control*, 19(8), 1217-1217 (2009). (editorial for Special Issue).
- Yucel, E., F. Karaesmen, F. S. Salman and **M. Turkay**, Optimizing Product Assortment Under Customer-driven Demand Substitution, *European Journal of Operational Research*, 199(2009), 759-768 (2009).
- Mestan, E., **M. Turkay**, and Y. Arkun, Optimization of Operations in Supply Chain Systems Using Hybrid Systems Approach and Model Predictive Control, *Ind. Eng. Chem. Res.*, 45(19), 6493 - 6503 (2006).
- Uney, F. and **M. Turkay**, A Mixed-Integer Programming Approach to Multi-Class Data Classification Problem, *European Journal of Operational Research*, 173(3), 910-920 (2006).

- Saglam, B., F.S. Salman, S. Sayin, and **M. Turkay**, A Mixed-Integer Programming Approach to the Clustering Problem with An Application in Customer Segmentation, *European Journal of Operational Research*, 173(3), 866-879 (2006).
- Soylu, A., C. Oruc, **M. Turkay**, K. Fujita, and T. Asakura, Synergy Analysis of Collaborative Supply Chain Management in Energy Systems using Multi-Period MILP, *European Journal of Operational Research*, 174(1), 387-403 (2006).
- **Turkay, M.**, C. Oruç, K. Fujita, and T. Asakura, Multi-Company Collaborative Supply Chain Management with Economical and Environmental Considerations, *Comput. Chem. Eng.*, 28(6-7), 985-992 (2004).
- **Turkay, M.**, and I.E. Grossmann, Tight Mixed-Integer Optimization Models for the Solution of Linear and Nonlinear Systems of Disjunctive Equations, *Comput. Chem. Engng.*, 22(9), 1229-1239 (1998).
- **Turkay, M.**, and I.E. Grossmann, Structural Flowsheet Optimization with Complex Investment Cost Functions, *Comput. Chem. Engng.*, 22(4-5), 673-686 (1998).
- **Turkay, M.**, and I.E. Grossmann, Disjunctive Programming Techniques for the Optimization of Process Systems with Discontinuous Investment Costs-Multiple Size Regions, *Ind. Eng. Chem. Res.*, 35(8), 2611-2623 (1996).
- Grossmann, I.E. and **M. Turkay**, Solution of Algebraic Systems of Disjunctive Equations, *Comput. Chem. Engng.*, 20(S1), S339-S344 (1996).
- **Turkay, M.**, and I.E. Grossmann, Logic-Based MINLP Algorithms for the Optimal Synthesis of Process Networks, *Comput. Chem. Engng.*, 20(8), 959-978 (1996). (1997 AIChE/CAST Division Ted Peterson Award)
- **Turkay, M.**, T. Gurkan, and C. Ozgen, Synthesis of Regulatory Control Structures for a Styrene Plant, *Comput. Chem. Engng.*, 17(5-6), 601-608 (1993).

#### B- Books, Book Chapters

- **Turkay, M.** and M. Canci, Planning Automotive Logistics in Marmara Region, OSD Publications, Istanbul, Turkey (2008). (in Turkish)
- **Turkay, M.** and F.Uney-Yuksektepe, Multi-class data classification via mixed-integer optimization, *Encyclopedia of Optimization*, 2nd ed., C.A. Floudas and P.M. Pardalos (Eds.), 2348-2354, Springer, Dordrecht, The Netherlands (2008).
- **Turkay, M.** and U. Kaplan, Integrated Planning and Scheduling, *Encyclopedia of Optimization*, 2nd ed., C.A. Floudas and P.M. Pardalos (Eds.), 2348-2354, Springer, Dordrecht, The Netherlands (2008).
- F.Uney-Yuksektepe and **M. Turkay**, Multi-Group Data Classification via Mixed-Integer Linear Programming Based Hyper-Box Enclosure Approach, *Encyclopedia of Data Warehousing and Mining*, 2nd ed., J. Wang (ed.), Information Science Reference, Hershey, PA (2008).
- **Turkay, M.** Environmentally Conscious Supply Chain Management, *Process Systems Engineering*, vol 3: Supply Chain Optimization, L. Papageorgiou and M. Georgiadis (Eds.), Chapter 3, 45-86, WILEY-VCH, Weinheim (2008).
- Eraslan, I.H., M. Bulu. and **M. Turkay**, Clustering Analysis of Networked Organizations, *Encyclopedia of Networked and Virtual Organizations*, G.D. Putnik and M.M. Cunha (Eds.), vol. I, 199-208, Information Science Reference, Hershey, PA (2008).
- **Turkay, M.** Optimization Models and Solution Algorithms, *New Frontiers in Total Quality and Strategic Management*, S. Kingir (Ed.), 309-328, Gazi Publishing, Ankara (2006). (in Turkish)
- Uney-Yuksektepe, F. and **M. Turkay**, Data Mining, *New Frontiers in Total Quality and Strategic Management*, S. Kingir (Ed.), 141-152, Gazi Publishing, Ankara (2006). (in Turkish)

- **Turkay, M.** and A. Soylu, Synergy Analysis of Collaboration with Biofuel Use for Environmentally Conscious Energy Systems, Computer-Aided Chem. Eng., vol 21B: ESCAPE-16, W. Marquardt and C. Pantelides (Eds.), 1827-1832, Elsevier, Amsterdam (2006)
- **Turkay M.**, T. Asakura, K. Fujita, C.W. Hui, Y. Natori, Y. Masaiwa, H. Oonishi, and I.B. Tjoa, Total Site Optimization of a Petrochemical Complex, AIChE Symposium Series, vol. 94, G. Blau and J. Pekny (Eds.), 185-189 (1998).
- **Turkay, M.**, and I.E. Grossmann, Logic-Based Outer-Approximation and Benders Decomposition Algorithms for the Synthesis of Process Networks, State of the Art in Global Optimization: Computational Methods and Applications, C.A. Floudas and P.M. Pardalos (Eds.), 585-607 (1996).

### C- PATENTS

- Asakura, T., **M. Turkay**, Y. Masaiwa, H. Oonishi, and T. Takeshita, Optimization System for Production Planning, Japanese Patent Office, P2000-066886.
- Asakura, T., **M. Turkay**, Y. Masaiwa, H. Oonishi, and T. Takeshita, Optimization System for Plant Maintenance Scheduling, Japanese Patent Office, P2000-066887.

### D-PROJECTS

<b>Title</b>	<b>Seed Project on Energy Efficiency Technologies</b>
<b>Funding source</b>	Koç University-TUPRAS Energy Center
<b>Role</b>	co-Principal Investigator
<b>Budget</b>	\$20.000
<b>Dates</b>	01.04.2012-31.03.2013

<b>Title</b>	<b>OSIRIS-Energy consumption reduction in urban rail systems (284868)</b>
<b>Funding source</b>	European Commission FP7 Program THEME [SST.2011.1.1-4. SST.2011.1.1-4.] + İstanbul Ulaşım A.Ş.
<b>Role</b>	Principal Investigator at Koç University
<b>Budget</b>	107.000 €
<b>Dates</b>	01.01.2012-31.12.2014
<b>Description</b>	<p>Osiris started on the 1<sup>st</sup> of January. Osiris will finish in December, 2014. Osiris has 17 project partners, including all major stakeholders: public transport operators, railway manufacturers and universities.</p> <p>For many transport modes, energy reduction strategies can be effectively formulated at the level of the vehicle. New technologies can therefore be introduced to a vehicle and the direct energy savings can be readily quantified. However, this approach is not suitable for urban rail, where it is not sufficient to consider only the energy performance of vehicles; the energy associated with the infrastructure, as well as the influence of the mode of operation are to be considered too. In other words, urban rail systems are complex environments and their energy consumption is characterized by a wide range of inter-dependent factors. For example, whilst a new technology might yield improvements in certain respects, it might also compromise other aspects of system performance. This means that it is often extremely difficult to assess the net benefits of introducing new energy saving technologies.</p>

	OSIRIS is expected to bring positive benefits to the urban rail sector (i.e., operators and manufacturers), as well as to the community as a whole.
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<b>Title</b>	<b>Finest-Future Internet enabled Optimization of Transport and Logistics Business Network (285598)</b>
<b>Funding source</b>	European Commission FP7 Program on Future Internet PPP + KoçSistem Information Communications Services Inc.
<b>Role</b>	Principal Investigator at Koç University
<b>Budget</b>	38.000 €; 104,326 €
<b>Dates</b>	01.04.2011-31.03.2013; 01.01.2012-31.12.2014
<b>Description</b>	The ultimate aim of the Finest project is to develop a Future Internet enabled ICT platform for better supporting and optimizing the collaboration and integration within international transport and logistics business networks. This shall be realized as a domain-specific extension of the FI PPP Core Platform.

<b>Title</b>	<b>Analysis of the Effects of Sustainable and Renewable Energy Technologies on Manufacturing, Service, Transportation and Logistics Sectors</b>
<b>Funding source</b>	Yapı Kredi Bank Renewable Energy Scholarship Fund
<b>Role</b>	Principal Investigator
<b>Budget</b>	25.000 €
<b>Dates</b>	01.10.2012-30.09.2014
<b>Description</b>	Analysis of the Effects of Sustainable and Renewable Energy Technologies on Manufacturing, Service, Transportation and Logistics Sectors. (Especially based on Wind Energy)

<b>Title</b>	<b>Development of Technologies for Reuse and Disposal of Batteries (108G063)</b>
<b>Funding source</b>	TÜBİTAK-TARAL Project
<b>Role</b>	Principal Investigator at Koç University
<b>Budget</b>	\$340.752
<b>Dates</b>	01.08.2009-15.12.2013
<b>Description</b>	The aim of the studies is to draw out innovative, market-focussed research which has the potential to increase valuable battery life and enable cost- effective recycling, address concerns around the sustainable use and recovery of raw materials within industry and home usage and contribute to the development in the Turkey of a battery recycling industry.

<b>Title</b>	<b>Optimization with PDE Constraints (OPTPDE)</b>
<b>Funding source</b>	Funding Source: European Science Foundation (ESF) Research Networking Program

<b>Role</b>	Member of the Researcher Network
<b>Budget</b>	546.000 € (for the entire network)
<b>Dates</b>	01.10.2008-30.09.2013
<b>Description</b>	This project is concerned with the development, analysis and application of new, innovative mathematical techniques for the solution of constrained optimization problems where a partial differential equation (PDE) or a system of PDEs appears as an essential part of the constraints. The efficient and robust solution of PDE constrained optimization problems has a strong impact on more traditional applications in, e.g., automotive and aerospace industries and chemical processing, as well as on applications in recently emerging technologies in materials and life sciences including environmental protection, bio- and nanotechnology, pharmacology, and medicine.

<b>Title</b>	<b>Modeling and Optimization of Sustainable Supply Chain and Logistics Systems</b>
<b>Funding source</b>	IBM
<b>Role</b>	Principal Investigator
<b>Budget</b>	\$240.000 (total value of hardware, software and services provided to establish Koç-IBM Supply Chain Research Center as part of SUR Award)
<b>Dates</b>	01.08.2007-31.07.2012
<b>Description</b>	The goal of the Supply Chain Research project is to develop novel approaches to supply chain management and logistics that include consideration of sustainability and humanitarian aspects in addition to traditional financial objectives.

<b>Title</b>	<b>Integration of Facility Location and Layout of Intermodal Transportation System with Scheduling (106E208)</b>
<b>Funding source</b>	TÜBİTAK
<b>Role</b>	co-Investigator
<b>Budget</b>	\$50.764
<b>Dates</b>	01.01.2007-31.03.2008
<b>Description</b>	This paper reviews IMT and proposes a system in which the facility layout problems are solved simultaneously with the scheduling problems arising in Ro-La transportation. In that context, first, the best station layouts are obtained by applying a layout improvement algorithm to several initial layouts with respect to different scoring functions. One of the important questions to answer in the IMT problem pertains to the number of loading and unloading platforms.

<b>Title</b>	<b>Development of Planning, Scheduling and Optimization Software for Discrete Manufacturing Industries</b>
<b>Funding source</b>	KoçSistem Information Communications Services Inc.
<b>Role</b>	Principal Investigator

<b>Budget</b>	\$50.850
<b>Dates</b>	14.02.2005-31.03.2006
<b>Description</b>	Main purpose of this project is to create development of Planning, Scheduling and Optimization Software for Discrete Manufacturing Industries.

<b>Title</b>	<b>Logistics systems modeling and optimization</b>
<b>Funding source</b>	Mitsubishi Corporation, Japan
<b>Role</b>	Principal Investigator
<b>Budget</b>	¥2.000.000
<b>Dates</b>	01.03.2001-28.02.2002

## **2. ISTANBUL TECHNICAL UNIVERSITY FACULTY OF NAVAL ARCHITECTURE & OCEAN ENGINEERING and MARINETIME FACULTY**

### **A-Journal Articles**

- Kirval, Levent, International Security Through Further Modernity: A Theoretical Approach to Inland and Maritime Security, Journal of Maritime Law and Commerce, Volume 42, No: 1, 2011. (SSCI)
- Kirval, Levent, European Union's Stance on the Rotterdam Rules, in Weintrit, A. and Neumann, T. (Eds.), Transport Systems and Processes, London: Taylor and Francis, 2011.
- Kirval, Levent, 'The European Union: A Regional Political Laboratory for Co-existence of Multiple Civilisations And Implementation of Social Policies/Sustainable Development?', Istanbul University Faculty of Economics Journal, Volume 59/2, Istanbul, 2009.
- Kirval, Levent, 'Free Movement of Services (and the liberalisation of maritime service sector) in the European Union: Limits of Institutional Steps from Above', Constanta Maritime University Annals, Constanta Maritime University, Constanta-Romania, 2009.
- Yavuz Keceli, Hyung Rim Choi, Nam Kyu Park, "Analysis of Success Factors of Information Systems Development in Kumpport and Implications for Other Turkish Ports", WSEAS Transactions on Information Science and Applications, Vol. 4, No. 5, 05/2007, s. 1014-1047, ISSN: 1709-0832, WSEAS, <http://www.worldses.org/journals/information/index.html>, Engineering Index
- Yavuz Keceli, Hyung Rim Choi, "Level of information systems in Turkish public ports and direction of improvement", International Journal of Logistics Systems and Management, Vol. 4, No. 6, 06/2008, s. 673-691, ISSN: (Online): 1742-7975, (Print): 1742-7967, Inderscience, <http://www.inderscience.com/browse/index.php?journalID=134>
- Volkan Aydođdu, Jin Soo Park, Yavuz Keceli, Young Soo Park, "Analysis of Marine Traffic Feature for Safety Assessment at Southern Entrance of Istanbul Strait-I", International Journal of Navigation and Port Research, Vol. 32, No. 7, 07/2008, s. 521-527, ISSN: 1598-



5725, Korean Society for Navigation and Port Research

- Yavuz Keceli, Hyung Rim Choi, Yoon Sook Cha, Y.Volkan Aydogdu, Hansu Kim, "A Study on User Evaluation of PORT-MIS", Entrue Journal of Information Technology, Vol. 7, No. 2, 2008, s. 165-175, ISSN: 1598-6330, LG CNS, <http://www.entrue.com/>
- **Celik, M.**, 2008: Setting the concept of integrated contingency management execution plan (ICMEP) for shipping business. Proceedings of the 2<sup>nd</sup> international online conference on business and management, August 15-16, 2008. (Best Student Paper Award)
- **Arslan, O., Guler, N., Durucu, M.**, Design of a training room for a tanker company with respect to ergonomic considerations, 13<sup>th</sup> Congress of International Maritime Association of Mediterranean IMAM 2009, pp:935-939 Istanbul, Turkey
- **ARŞ.GÖR. PELİN YILMAZ BOLAT, PROF. DR. JİN YONGXING** “A Risk Assessment Framework of Maritime Transport of High Level Radioactive Wastes and Spent Fuel Through Turkish Straits”
- **Celik, M.**, Bonsall, S., and Wang, J., 2008: Measurement of long-term sea training performance for marine engineering cadets via AHP-TOPSIS. Proceedings of the international maritime lecturers association 16<sup>th</sup> conference on MET - IMLA 2008, October 14 - 17, 2008 Izmir, Turkiye.
- **DURU, O. And YOSHIDA, S.** (2010). Long term freight market index and inferences. Journal of Logistics and Shipping Economics 44, 39-48, <http://ci.nii.ac.jp/>
- **Y.Doç.Dr.Tanzer SATIR**, Ship Ballast Water Management In Turkish Ports And Water Ways, Marine Techonology Society Journal vol.45,No:2, Page.23-32 ,March, 2011
- **DENİZ, C., KILIÇ, A., CIVKAROĞLU, G., 2010.** Estimation of shipping emissions in Candarli Gulf, Turkey. Environmental Monitoring and Assessment, 171, 219-228.

#### **B- Books, Book Chapters**

- Kirval, Levent, The Future of the European Union: Looking at Europe from a Political Theory Perspective, Istanbul: Der Press, 2011. (In Turkish)
- Kirval, Levent, et al. (Eds), Innovation in Marine Technology and the Future of Maritime Transportation: A Global Perspective, Istanbul: Union of Chambers of Turkish Engineers and Architects Press, 2010. (Conference Proceedings Book of the “First Global Conference on Innovation in Marine Technology and the Future of Maritime Transportation”, Istanbul Technical University, Istanbul-Turkey, 24-26 November 2010.)



### C.2.3 Cooperation schemes

Most of the research communities are frequently collaborating with the national and international universities. Their interactions depend on the knowledge transfer or common projects to improve the current situations. There are many university collaborations in the region. Here are the some samples of these transactions:

University collaborations of **Istanbul Technical Universities:**

<b>Maritime College State University of New York</b>	ABD
<b>Kobe University</b>	Japonya
<b>National Korea Maritime University</b>	Kore
<b>Sanghay University</b>	Çin
<b>Technical University of Varna</b>	Bulgaristan

University collaborations of **Koc University:**

<b>University of Dusseldorf</b>	German
<b>METU</b>	Turkey
<b>Carnegie Mellon University</b>	USD

Also, there are many long term or project based partnerships with the private sector, public institutes and Koc University.

<b>İstanbul Ulaşım A.Ş.</b>	Turkey
<b>IBM</b>	USD
<b>IBM Turkey</b>	Turkey
<b>OSD</b>	Turkey
<b>Mitsubishi</b>	Japan
<b>TUBITAK</b>	Turkey

Most of the private sector relationships are based on the projects. However, this kind of relations are sustaining with the new and ongoing projects. One way by which to gauge research communities' supportiveness is to examine the pattern of expenditure. For example, investment in infrastructure, such as transport, power, water and telecommunications, directly supports and enhances the productivity of private sector investments. Cooperative and friendly public-private sector relationships are also likely to entail the sharing of information that is willing and able to assist the entire business community in complying with the nation's laws and regulations. That's why, long term relationship may be come into existence between the universities and private sectors.

Main collaborations are based on the optimization and sustainability of the supply chain systems and environmental effects in terms of air, water pollutions.

### C.2.4 SWOT – Research perspective

<b>STRENGTHS</b>
<ol style="list-style-type: none"> <li>1. Open exchange of experience in research and technology development</li> <li>2. Highly skilled personnel</li> <li>3. Strong research base</li> </ol>
<b>WEAKNESSES</b>
<ol style="list-style-type: none"> <li>1. Weak understanding between researchers and industry complicates joint projects</li> <li>2. Lack of formal collaboration between actors (e.g. networks, clusters)</li> <li>3. Low level of budget for R&amp;D</li> </ol>
<b>OPPORTUNITIES</b>
<ol style="list-style-type: none"> <li>1. Availability of EU R&amp;D funds for research</li> <li>2. Increasing demand for more/better varieties</li> </ol>
<b>THREATS</b>
<ol style="list-style-type: none"> <li>1. Funding programmes support research with content far from current research interests</li> <li>2. Few incentives for university researchers to engage in collaboration with the industry</li> <li>3. Low absorption of R&amp;D activities by regional companies</li> </ol>

## C.3 The Industrial profile

### C.3.1 The industrial community

#### *Industry's value creation (turnover)*

The estimated amount of turnover of the East Marmara transportation sector is € 154 million. Whereas, the total turnover of industry in the region is € 26.4 billion according to sales from production in 2010.

#### *Number of companies operating in transport and logistics in the region*

The numbers of companies operation in transportation and logistics are as follows:

Sector	Number of Companies
Road Transportation	68 (Freight Transportation) 271 (Passenger Transportation) – (17 local companies) 346 (Other – Taxi, Post Operations, House Moving, Minibus) <b>685 (TOTAL)</b>
Rail Transportation	3 (local railroad transportation firms)
Maritime	36 (Port Operators) 5 (Custom Clearance) <b>41 (TOTAL)</b>
Civil Aviation*	17 (Air Transportation) 15 (Maintenance and Training) 2 (Airport) 5 (Ground Services) <b>39 (TOTAL)</b>

\*Turkish companies or companies with Turkish partner those are active in Sabiha Gökçen and Cengiz Topel Airport

#### *Company size: average company size, number of SMEs/ micro-enterprises*

Most of the companies of freight transportation companies are SME's with the average employee of 32,8. Large companies mostly serving in the Maritime and Air Transportation.

#### *Number of employees (FTE) operating in transport and logistics*

According to last official data from TURKSTAT in 2002 shows 296 companies were registered within the East Marmara Region acting in transportation and logistics sector. The total employment of these firms was 1.383 in the year 2002, which is 0,45% of the total employment. As the registered employment in the region has increased by 303% in 10 years and the number of the companies has increased by 158% ,it can be seen that the company sizes are becoming larger as the employment increases faster than number of companies.

The estimated number of employees in the transportation and logistics sector is **5.445** in the East Marmara Region according to these data.

### ***Growth rate of employment in transport and logistics (%)***

The growth of the employment in transport and logistics for the last 10 years is 303%, which gives an average 16,5% growth rate annually. In 2011, the employment has increased by 10,29% from the previous year. This data shows there is a great increase in the sector.

### ***Main company characteristics (e.g. manufacturer, service providers, etc.)***

In the East Marmara region, sectoral distribution of employment is as follows:

Industry (manufacturing): 33,3%

Services: 27,4%

Commerce: 19,4%

Agriculture: 19,9%

The sector is mostly present as manufacturer. Most of the companies have their headquarters in İstanbul and provide services in the East Marmara Region. Road transportation has the biggest share in terms of total companies. It is followed by maritime transportation. In the region, with 6 customs for ports, both services and manufacturing is concentrated within the region. In rail and air transportation, most of the companies are providing services from outside of the region. Here are the tables of companies' distribution in terms of transportation types.

<b>Sector</b>	<b>Number of Companies</b>
Road Transportation	68 (Freight Transportation) 271 (Passenger Transportation) – (17 local companies) 346 (Other – Taxi, Post Operations, House Moving, Minibus) <b>685 (TOTAL)</b>
Rail Transportation	3 (local railroad transportation firms)
Maritime	36 (Port Operators) 5 (Custom Clearance) <b>41 (TOTAL)</b>
Civil Aviation*	17 (Air Transportation) 15 (Maintenance and Training) 2 (Airport) 5 (Ground Services) <b>39 (TOTAL)</b>

### ***Most important industrial players***

Here are the most important industrial players which are listed in the top 100 of the most powerful firms list for Turkey.

<b>Most Important Industrial Players</b>	<b># in Turkey</b>	<b>Net Profits (TL)</b>	<b>Active in</b>
TÜPRAŞ-Türkiye Petrol Rafinerileri A.Ş.	1	27.409.868.901	Kocaeli
Ford Otomotiv Sanayi A.Ş.	2	8.533.757.811	Kocaeli
Arçelik A.Ş.	5	6.231.566.091	Bolu
Aygaz A.Ş.	9	4.577.117.597	Kocaeli

Çolakoğlu Metalurji A.Ş.	13	2.908.181.423	Kocaeli
Toyota Otomotiv Sanayi Türkiye A.Ş.	14	2.718.757.803	Sakarya
Unilever San. ve Tic. T.A.Ş.	16	2.391.104.773	Kocaeli
Kroman Çelik Sanayii A.Ş.	17	2.279.354.024	Kocaeli
Sarkuysan Elektrolitik Bakır San. ve Tic. A.Ş.	21	2.128.788.694	Kocaeli
İpragaz A.Ş.	23	2.049.468.936	Kocaeli
AKSA Akrilik Kimya Sanayii A.Ş.	24	1.713.591.274	Yalova
Hyundai Assan Otomotiv San. ve Tic. A.Ş.	25	1.696.649.485	Kocaeli
Coca-Cola İçecek A.Ş.	27	1.637.349.428	Sakarya
Diler Demir Çelik Endüstri ve Ticaret A.Ş.	28	1.630.119.584	Kocaeli
Borusan Mannesmann Boru San. ve Tic. A.Ş.	39	1.274.927.776	Kocaeli
Yıldız Entegre Ağaç San. ve Tic. A.Ş.	40	1.265.866.351	Kocaeli
BRISA Bridgestone Sabancı Lastik San. ve Tic. A.Ş.	41	1.264.397.101	Kocaeli
Oltan Gıda Mad. İhr. İth. ve Tic. Ltd. Şti.	43	1.222.943.808	Düzce
Assan Alüminyum San. ve Tic. A.Ş.	46	1.155.762.993	Kocaeli
Kastamonu Entegre Ağaç San. ve Tic. A.Ş.	47	1.153.099.877	Kocaeli
Siemens San. ve Tic. A.Ş.	48	1.145.454.407	Kocaeli
Türk Pirelli Lastikleri A.Ş.	49	1.134.939.989	Kocaeli
Yücel Boru ve Profil Endüstrisi A.Ş.	50	1.111.038.789	Kocaeli
Enerjisa Enerji Üretim A.Ş.	51	1.098.465.236	Kocaeli
Ak Gıda San. ve Tic. A.Ş.	55	1.050.044.175	Sakarya
Hayat Kimya Sanayi A.Ş.	62	958.716.853	Kocaeli
MMK Metalurji San. Tic. ve Liman İşletmeciliği A.Ş.	72	797.676.998	Kocaeli
Goodyear Lastikleri T.A.Ş.	75	794.056.326	Kocaeli
ÇİMSA Çimento San. ve Tic. A.Ş.	78	769.814.180	Sakarya
Trakya Cam Sanayii A.Ş.	83	726.962.334	Kocaeli
Otokar Otomotiv ve Savunma Sanayi A.Ş.	86	723.855.087	Sakarya
Şenpiliç Gıda Sanayi A.Ş.	90	671.619.098	Sakarya
Tezcan Galvanizli Yapı Elemanları San. ve Tic. A.Ş.	94	662.327.520	Kocaeli
Erpiliç Entegre Tavukçuluk Üretim Pazarlama ve Tic. Ltd. Şti.	95	659.068.944	Bolu

### **Number of patents generated**

In Turkey, there are 210 patent applications for the sector. The information is taken from the State Patent Institute. total number of 42 patent were taken for the other sectors in 2011 in the region. In the field of transportation and logistics, a patent and a utility model were registered to the Turkish Patent Institute, which are:

- Dehumidifier Bentonite Production (in packages for transportation and stocking) – Patent
- Spring Brake Chambers With High Sealing Ability Which Uses Double O-Rings – Utility Model

With globalization, the development of global supply chains increased and thus put pressure on the transportation. Therefore, the functional role of firms in value chains has been changed towards providing logistics functions to capture a greater share from trade and transport market. Number of firms in the region has responded to this trend by focusing on value- added services.

Value added services and their services refer to the activities:

- Storage Management
- Port handling services
- National and international road, railroad, air transportation; storage management, car parking, air taxi services etc.
- Sea Transportation, air cargo, freighting, heavy transportation, exhibition logistics, custom services
- Port handling services specialised on automotive
- Port Handling Services (Ro-Ro; Container and Bulk); Chemical and Bulk Storage
- International transportation, customs, export and logistic services
- Logistic Management
- Container, ship, services and port tracking

To synchronize with size and dynamics of Turkey market needs, business climate, firms have to invest on innovation. That's why, most of them try to implement their internal R&D departments or develop external partnerships. However, there are no successful steps yet. There are a few firms which created or improved software for their systems as innovation.

### C.3.2 Private research and Technology offer

Almost all of the organizations have mission and vision related with innovation and they determined concrete innovation strategies which might consider of opening partial lines directly to niche markets.

They have more local connections. These firms have the greatest degree of opinion leaders who informally influence opinions, attitudes, and/or behaviors about innovation. They convey information that decreases the uncertainty about the use of a new idea and they follow with deliberate willingness in adopting innovations, but seldom lead. They follow the innovators' and early adopters' lead.

Most of them think about their services or processes are innovative in comparison with the state-of-the-art and their main competitors.

Internal R&D departments and external partnerships will be the important sources of innovation. Internal innovation activities are under responsibility of organizational structure. On the other hand, external innovation activities are driven by collaboration with both universities/research centers and other companies of the sector in the regional geographical dimension.

They are interested in the future to innovate or purchase innovation and research results in organization and marketing/strategy areas of their activities.

Less than half of firms are giving training courses/seminars/workshops to their employees.

There are some obstacles that inhibit innovation capacity of companies which are lack of funds, resources/time, market information, governmental support and specialized staff.

Most of the firms are not only moving logistics services worldwide but are also creating innovation centers close to the new centers of trade. Reliable, timely accurate data is the keystone of the new global supply chain. Software and hardware innovations that enable greater visibility of product movement to shippers and carriers have become critical to success in the logistics industry.

The nature of logistics innovation embodies two facts; technology and service innovation. In the logistics sector, where competitive edge and firm development is critical, it is believed that the issue of innovation has not been paid enough attention by firms. One of the most important inputs for innovation is information and the information generation. Logistics innovations allow for overcoming time limitations in the short term, creating values in the supply chain in the middle term and sharing of this with not only with a single company but also with other components. In the long term, these increases in value offer an opportunity for the company to raise its competitive power and extend in a way to provide sustainability. That's why firms try to search on internal / external R&D activities and partnerships, training and education and investment in infrastructure. Intelligent and sensible systems, sensing, GPS and image processing technology are the several samples of validation functionality and supporting global supply chains.

### Technology Offers

Technology Offer	Brief description
<b>Articulated lorry Simulator</b>	Company: OMSAN To be used for the driver trainings
<b>Intra-institutional special programme</b>	Company: Arkas Line To be used for unification of resources and control and also developing work processes.

### **C.3.3 Technology demand**

At the current point of state there is no technology demand data available.



### **C.3.4 Cooperation schemes**

#### **General Directorate of Hazardous Material and Combined Transportation**

Established within the Ministry of Transportation, Maritime and Communication, the general directorate aims to increase the cooperation between the companies and public bodies of different modes of transportation in both national and international level.

#### **TRACECA (Transport Corridor Europe-Caucasus-Asia)**

Traceca is an international transport programme involving the European Union and 14 member States of the Eastern European, Caucasian and Central Asian region.

At present the TRACECA countries are gradually implementing the IGC TRACECA Strategy for development of the international transport Europe-Caucasus-Asia corridor for the period up to 2015, aimed at creation of a sustainable infrastructure chain ensuring multi-modal transport with step-by-step integration of the corridor into the Trans-European Transport Networks (TENs).

The importance of the project to the region is that the cooperation activities, pilot projects, researches and forecasts positively affect the sector in the region.

#### **East Marmara Cooperation Network for EU and International Affairs**

The network was formed by the East Marmara Development Agency to inform the stakeholders of the region about the international funds. However, the network is not only for transportation and logistics or innovation, sectoral meetings, informing, presentations are done including logistics. The network also provides twinning for the stakeholders for sectoral projects.

#### **UND (International Transporters' Association)**

UND is a leading professional association in Turkey, established in 1974 by representatives from Turkish road freight transport sector with an aim to solve problems experienced by the sector at national and international levels.

Today UND represents almost all modes of international transportation and logistics, through our Membership of 902 transport and logistics companies based in Turkey.

#### **Regional Directorate of Public and Private Partnership**

Established by the General Directorate of Highways in 2011, “Regional Directorate of Public and Private Partnership” aims to coordinate the construction of Gebze-İzmir Highway, which comprises the İzmit Gulf Suspension Bridge. The 421 km long project will be completed with build-operate-transfer (BOT) model.

The regional directorate will be operative until the project ends.

#### **Commissions of Governorships**

With the request of the Governor, commissions for transportation and logistics come together which are consisted of the provincial directorates, municipalities, regional institutions, university and private sector representatives. During 2010-2011, following commissions were established:

- Commission for Port Capacity Estimation and Maritime Investments of Kocaeli: Being a natural port and having a huge handling demand, the commission was established for making predictions for port handling capacities in line with export target of Turkey for the year 2023. The required capacity increase was defined and information was provided to public and private bodies.
- Commission for Port Unification, Incorporation and Institutionalization and Rail and Road Connection Establishment and Improvement in Kocaeli: In the scope of intermodal transportation, commission aimed to define port sub-regions and made implications for which ports should be unified, incorporated or institutionalized to increase the efficiency and capacity.

- Commissions for Collaboration Networks for Innovation in Bolu and Düzce: To designate the innovation strategies for the leading sectors, commissions were formed.

#### **TRaceM (East Marmara Transport Cluster)**

The modes that are covered by TRaceM are land transport (road and rail) and maritime transport. Since the basic focus of the cluster is freight transport, the intermodal freight transport among the modes of road, rail and maritime is the main problem of the cluster in terms of research interest.

The core of cluster is formed by a strong triple helix structure. East Marmara Development Agency (EMDA) is a government authority with the aim to boost growth and development of East Marmara's economy. Representation of TRaceM among local and national public institutions and the overall management of the cluster are the main responsibilities of EMDA. Additionally, EMDA provides project based financial support for the specific actions and projects of the cluster members and private actors of the transport sector. The relationship of the cluster with the transport sector is maintained by International Transporters' Association (UND). The broad network of UND among transport sector constitutes the main source for the determination of research topics. Finally, the scientific community of the cluster is represented by the Istanbul Technical University (İTÜ), in particular by its Maritime Faculty (İTÜ-MF) and the Koç University (KOC) in particular the Koc-IBM Supply Chain Research Centre. The main research areas of the cluster are listed below:

- Inter-Modal Logistics
- Discrete-Continuous Optimization Models and Algorithms for Multi-Echelon Supply Chains
- Environmentally Conscious Supply Chain Management
- Sustainability in Supply Chain Management and Logistics
- Transportation Planning and Scheduling
- Risk Analysis and Management
- Port Manoeuvring Analysis and Feasibility Reports

#### **UTİKAD (Association of International Forwarding and Logistics Service Providers)**

It was founded in 1986. Being an association, it has some 352 members which are competent forwarding and logistics companies. Amongst the member forwarders, the companies are specialized putting emphasis in certain modes of transportation, namely road, air, ocean freight, railway and increasingly in all modes of transportation, the so called multimodal transportation.

UTİKAD's objectives could be enumerated as:

- To represent, promote and protect the interests of the industry,
- To promote a high standard of professional conduct amongst its members, including ethics and financial viability by establishing and continuously updating the industry's standard trading conditions.
- Make efforts to achieve standardization in the industry
- Help improve the quality of human resources in the industry by arranging vocational training programs and publications.
- Give a helping hand in planning, development and maintenance of the international freight services industry in Turkey.
- Support the expansion of the Turkish trade worldwide.

### C.3.5 SWOT – Industrial perspective

<b>STRENGTHS</b>
<ol style="list-style-type: none"> <li>1. Market position</li> <li>2. Process quality</li> <li>3. Geographic Positioning</li> <li>4. Internationalization</li> </ol>
<b>WEAKNESSES</b>
<ol style="list-style-type: none"> <li>1. Low technology level</li> <li>2. No dedicated R&amp;D Unit</li> <li>3. Insufficient skilled personal</li> <li>4. Poor networking with public actors (universities, research centres)</li> </ol>
<b>OPPORTUNITIES</b>
<ol style="list-style-type: none"> <li>1. High quality infrastructure</li> <li>2. Strong regional/national product identity</li> <li>3. Increasing export trends</li> <li>4. Network possibilities (associations, technology platforms, fora, etc.)</li> </ol>
<b>THREATS</b>
<ol style="list-style-type: none"> <li>1. Insufficient incentives addressed to the sector</li> <li>2. Bureaucracy / regulation barriers</li> <li>3. No political long-term commitment to the sector</li> </ol>

## C.4 Private financing schemes

There are many organizations which are responsible for supporting the private sector in R&D and innovation researches.

### **TÜBİTAK (Scientific and Technical Research Council of Turkey)**

TÜBİTAK is the main body responsible for organizing research and development activities on the national level in Turkey, with headquarters located in Ankara.

TÜBİTAK is responsible for the development and coordination of scientific research in line with the national targets and priorities set by the Turkish Academy of Sciences (TÜBA). More than 2,500 researchers work at the 15 different research institutes and research centres attached to TÜBİTAK, where both contract-based and targeted nation-wide research is conducted. TÜBİTAK represents Turkey in international research efforts including memberships in European Science Foundation and the European Union Framework Programmes for Research and Technological Development.

TÜBİTAK is a public body. Nevertheless, they also provide EU funding to the private sector and public authorities with specific calls for proposals.

### **KOSGEB (Small and Medium Industry Development Organisation)**

- Established in April 1990 by Law No: 3624
- A public legal entity subject to provisions of private law with a view to preparing SMEs for global competition.
- The only body in TURKEY to promote only SMEs
- TOBB and TESK (private sector unions) are members of Executive Committee

They only provide funds to private sector, not to public bodies.

### **STATE AID AND RISK CAPITAL**

- DECREE FOR STATE AIDS IN INVESTMENTS OF SMEs

To encourage the investments of SMEs, increase production and improve quality standards, meet the demands in relation to the product development and to increase employment government support the system.

- RISK CAPITAL INVESTMENT

Investment capital for high-tech enterprises

Risk capital institutions are İŞRİSK (private), KOBİ YATIRIM ORTAKLIĞI A.Ş (10% public share), VAKİFRİSK (private).

#### **a) İŞRİSK:**

İş PE and management jointly develop strategies for value creation, which can take many forms. We partner with Turkish companies where we help them not only in Turkey but also globally compete in their respective industries by sourcing acquisitions, enhancing operational efficiencies, facilitating new market expansions and designing the optimal capital structure to support them during the execution of their strategies.

Being one of the most active and the very few local private equity houses with a proven track record in Turkey, we deeply understand the needs of companies at different stages of growth without getting involved in daily operations.

#### **Beneficiaries:**

- Company Size: SME's
- Stage of Development: Venture capital, expansion-stage, and later-stage companies

- Characteristics: History of increasing profitability and excellent growth prospects with a leading position or a strong potential to become leader in their respective markets
- Geographic Focus: Companies headquartered in Turkey where a global reach is preferable
- Transaction Type: Venture capital, growth equity (including industry consolidation) and restructurings
- Control: Comfortable with both minority and majority positions
- Types of Investments: Equity or convertible bonds
- Transaction Range: US\$ 5 million to US\$ 15 million per deal; larger equity requirements can be accommodated with like-minded and value-adding co-investors.
- Target Industries: Large, rapidly growing or specialized markets with high barriers to entry and that are relatively immune to cyclical and regulatory exposure
- Exit goal: Between 3-7 years

**b) VAKIFRISK:**

It was established by Vakıf Bank and acts similar with İŞRİSK

**c) KOBİ YATIRIM ORTAKLIĞI A.Ş (KOBİ Venture Capital Investment Trust Inc. Co.)**

Entrepreneurs in Turkey, just as the ones all over the world, have great difficulties in reaching the financial resources they require for putting their business ideas into practice. It is not quite possible for entrepreneurs who do not have the adequate experience, capital nor the collateral to provide the seed and initial capital required at the beginning of the business or the additional capital necessary for expanding their businesses through traditional means by utilizing various bank resources.

Apart from financing the companies in which they invest, venture capital funds and business angels offer managerial and strategic support, which in turn makes a significant contribution to each company's growth perspective.

Having seen this gap in the market, the company has adopted the following steps to support entrepreneurship from the very initial stage;

- To invest in innovative ideas from entrepreneurs with a vision, where their ideas offer high growth potential with new markets, new technology or products and designs of new ways of production or.
- To provide financial and managerial contribution to SMEs facing lack of resources and/or lack of capacity even though they have an advantage over their competitors in terms of production and/or services
- To form the necessary infrastructure necessary for development of venture capital and business angels models in our country and for increasing public awareness.

**SHIPBUILDING AND POSTAL SERVICES AIDS**

In terms of state aids shipbuilding industry can benefit from the measures stated under the general investment encouragement programme and the postal services are free of public transportation charges. This is public support for shipbuilding sector players

## C.5 Vision for the future cluster development in East Marmara

### *Industrial Communities*

Low price, fast deliveries, meeting delivery times, quality of products/services, productive capacity, geographical proximity are the most important and deterministic factors for companies strategic positioning. On the other hand, unique characteristic of products, variety of offer and quicker introduction of products/services into the market have secondary importance for companies strategic positioning.

They do not consider existing policies (at regional, national and European level) as favourable and supportive for being successfully operative in the transport sector in the region. There are no political incentives given for the transport sector in Marmara Region.

They think that international collaboration isn't incited through regional policies, in particular through regional innovation strategy and also consider that innovation and development agencies and further services (e.g. Technology Transfer offices, Liaison offices) to support innovation processes are not efficient in the region.

They expect measures / incentives from political side for supporting the competitive development of the intermodal transport industry in region that the establishing logistic villages, simplification of bureaucratic issues and custom procedures, simplification of export/import processes, destroying the barriers in front of road transportation, making the perception against transporters and logistic workers positive, financial and political support to focused innovation activities.

They have a vision on the economic and innovation development of the regional intermodal transport industry, also with regard to its international positioning. Especially, maritime freight transportation and logistics villages will be supportive fields/niches for the future competitive development of intermodal transport. Sabiha Gökçen and Cengiz Topel airports will be used by the private sector (MNG cargo) in the region. Also there are some changes in the educational system. There will be new vocational high school related with the civil aviation.

They expect measures / incentives from political side for supporting the competitive development of the intermodal transport industry in region that the establishing logistic villages, simplification of bureaucratic issues and custom procedures, simplification of export/import processes, destroying the barriers in front of road transportation, making the perception against transporters and logistic workers positive, financial and political support to focused innovation activities.

In addition to increase participation in innovation activities, agglomeration has also been done by the governmental side. Due to Marmara region has special potential for the R&D based production, infrastructure of innovative and creative sectors have to be developed in the region. The Marmara region is playing very crucial role in high technology industry and world market leader production. This region requires high volume industrial infrastructure.

There is tendency of well designed urbanization and minimization of the environmental problems in this region. Main actors of this change will be industrial parks. There are serious numbers of industrial parks in this region.

### *Research Institutions*

Existing policies will be (at regional, national and European level) favorable and supportive for being successfully operative in the transport sector in region. Also, there are some political incentives given for the transport sector in region; however none of these incentives are particularly efficient for motivating research and innovation activities.

International collaboration (incl. researchers' mobility) will be incited through regional policies, in particular through regional innovation strategy. In addition to international collaborations, innovation and development agencies and further services (e.g. Technology Transfer offices, Liaison offices) are supporters of innovation processes in region.

Success of main R&D projects, starting projects with implementation and testing pilot projects might be considered by political side for supporting the competitive development of the intermodal transport industry in region.

There are many advantages of regional research source. Especially, there are really over-qualified personnel and research base in universities and research centers. Also they are really open exchange of their experiences in research and development perspective. On the other hand, there is trouble in terms of funding and collaborations. Industry and research communities cannot support each other and participate in joint projects. In addition to these obstacles, funding programs support research with content far from current research interests. They are mostly spent on non-popular and old research topics.

They have a vision on the economic and innovation development of the regional intermodal transport industry, also with regard to its international positioning. Especially, maritime freight and rail transportation and logistics villages will be supportive fields/niches for the future competitive development of intermodal transport.

In air transportation, recently developed regional airport that will be used for logistics, is an important field of application for the existing department of Civil Aviation. Usage of air transportation is considered to increase in the region.

Especially, research communities have the same vision on intermodal transport sector. And they consider that transport related software, container transport and handling system, effective modeling of logistic centers and sustainability in supply chain management and logistics are the main specialization fields/ niches for the competitive development of intermodal transport.

However, there is really limited cooperation and national / international projects which might support and improve the intermodal transportation in the region. Data collection and two-way interaction between research communities and the government or industrial players are not sufficient. To create and accelerate the research activities in the region, interactions have to be made better.

Moreover, even though the existence of universities could contribute to economic development, this contribution would not be able to expand to a macro level. In order for the universities to effect the economic growth in the region, there should be strong links and interactions between universities, government and the private sector. Being the source of knowledge, universities and their research facilities could be a major contributor to the enhancement of the production via research and innovations. In addition to this, clusters which have this kind of a structure are comparably more successful than the rest. In the case of an analytical (science- based) knowledge-based cluster, it is a question of promoting new economic activity, requiring close and systemic industry–university co-operation and interaction in the context of, e.g. science parks and incubator centers.