Standing Committee
for Economic and Commercial Cooperation
of the Organization of Islamic Cooperation (COMCEC)

COMCEC

COMCEC TRANSPORT OUTLOOK 2014
REVISED EDITION

COMCEC COORDINATION OFFICE
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COMCEC Coordination Office
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PREFACE

COMCEC Strategy, adopted during the 4th Extraordinary Islamic Summit held in Makkah on 14-15 August 2012, envisages Working Group Meetings as one of the instruments for its implementation. Through the Working Groups, country experts get the chance of elaborating the issues thoroughly in the respective cooperation areas and sharing their good practices and experience. The Working Groups are established for each cooperation area defined by the Strategy, namely (i) Trade, (ii) Transport and Communication, (iii) Tourism, (iv) Agriculture, (v) Poverty Alleviation, and (vi) Finance.

The COMCEC Outlooks are prepared in each cooperation area of the Strategy with a view to explore the global trends and current situation in the OIC Member States in the respective area and enrich discussions during the Working Groups Meetings by providing up-to-date data.

The views expressed [and conclusions/recommendations reached] in the COMCEC Outlooks do not necessarily reflect the official views of the COMCEC or the governments of OIC Member Countries.

This COMCEC Transport Outlook 2014 is the Revised Edition of the Second Issue of the COMCEC Transport Outlook Series published by COMCEC Coordination Office. In this revised edition, statistics and tables are updated.

It is prepared by Mr. İsmail Çağrı ÖZCAN (PhD), Expert at the COMCEC Coordination Office with the objective of providing general information on the status of transport sector in the Organization of the Islamic Cooperation (OIC) Member States. It dwells on the major issues with regards to transport sector development and makes comparisons with the different country groupings to demonstrate the situation in the Member States and thus cooperation potentials.

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1. Introduction

There is a strong emphasis on the transportation sector within the OIC (Organization of Islamic Cooperation) framework. Firstly, one of three principles of COMCEC Strategy like enhancing mobility is directly related to transport and the other two are strengthening solidarity and improving governance. Secondly, transportation is explicitly declared as one of the three priority sectors together with agriculture and tourism by the COMCEC. Thirdly, it is one of the six cooperation areas specified by the COMCEC Strategy and the other areas are trade, tourism, agriculture, poverty alleviation, and finance.

Such an emphasis on the transport sector is not surprising, since it is crucial for economic and social development of the nations. From the point of view of households, we spend considerable time and money for traveling to get a wide variety of purposes such as business, education, shopping, vacation, and socializing. From economic point of view, transport infrastructure and services are essential for both the mobility of the workforce and the movement of goods. Several statistics from European Union (EU), as the most advanced integration scheme in the world, also reveal how transportation plays an important role in the economy. According to Eurostat statistics, transportation activities account for 4.6% of the EU's gross domestic product (GDP) and 4.5% of its total employment (European Commission, 2013). In addition, expenditure on transport goods and services on average correspond to 13.2% of household's budget within the EU as of 2012 (Eurostat, 2012).

But problems and challenges associated with the transport industry are just as big as the transport industry itself. Regarding transportation infrastructure, developed countries try to maintain and improve their transportation network while developing and the-least developed countries aim at developing a transport infrastructure to meet their basic needs. With respect to transportation finance and privatization, almost all the countries suffer from insufficient public budgets and inefficient provision of transport services through public ownership and management. From environmental point of view, transportation is one of the biggest sources of greenhouse gas emissions and the rate of increase in transport emissions is quite high. In addition to these problems, other outstanding challenges like increasing traffic congestion, problems associated with the transportation safety and security, the lack of transit services are also noteworthy. Revealing these current challenges facing transportation sector, this brief

outlook through a concentrated and focused approach attempts to provide an overview on how the OIC countries are performing in terms of five major policy areas: (1) transportation and trade, (2) transportation infrastructure, (3) privatization of transportation, (4) transportation and environment, and (5) transportation movements.

The analyses within this outlook include comparisons between the OIC countries and other Regions such as the European Union (EU), Latin America and the Caribbean, East Asia and Pacific, and the Organization for Economic Co-operation and Development (OECD). For more detailed analysis, we sometimes divided the OIC countries into geographical regions as OIC MENA (Middle East and North Africa), OIC Asia, and OIC Sub-Saharan Africa. Further information on this geographical classification is available at Table A.1 in the Appendix.

2. The Outstanding Challenges for Transport Industry

The increased per capita income and mobility needs of the households, trade globalization, the deregulation and privatization trends in transportation infrastructure and services, and the technological progress in vehicle technology have all contributed to the high growth rate of the transportation industry. In such a big and fast growing industry, various major challenges and trends emerge and these are summarized at Table 1.

Table 1: Notable developments and trends in transport industry

Transport Mode	Notable challenges and trends
Transport in general	Aging infrastructure Terrorism and security concerns Environmental effects of transportation The lack of public finance to sustain the transportation system Deregulation and privatization Oil dependency Need to improve urban transit operations
Air transport	Airline alliances Inclusion of aviation into EU ETS The rise of the low cost carriers Mergers and acquisitions Fall of the state-owned airlines Security concerns Airport privatizations and the rise of global airport companies Air cargo: fast, reliable, and cheaper than before
Maritime transport	Containerization Increasing vessel sizes Trade with China Trend of ECO vessels The rise of international and regional hub ports Operations of the major ports by major shipping lines Global crisis Increase of LNG and LPG trade

Road transport	Increasing greenhouse gas emissions Congestion in big cities Emphasis on road safety Car dependency
Rail transport	Deregulation of the rail industry High-speed rail Trade corridors through rail network

Each challenge/trend outlined at Table 1 requires detailed analysis and discussion. However, through a concentrated and focused approach, this brief Outlook has identified five major challenges ((1) transportation and trade, (2) transportation infrastructure, (3) privatization of transportation, (4) transportation and environment, and (5) transportation movements) and attempted do provide an outline about them.

2.1 Transportation and Trade

The logistics infrastructure, services and trade go hand in hand. Nations able to deliver their products in the cheapest, fastest and the most reliable way through their efficient logistics infrastructure and services and thereby gain competitive advantage in the global trade. That is why, as a historical fact, trade capitals of the world have been those cities and countries with better accessibility and connectivity. The rapid growth of world trade after World War II as a result of decreasing transportation costs (Hummels, 2007) is another implication of the linkage between trade and logistics.

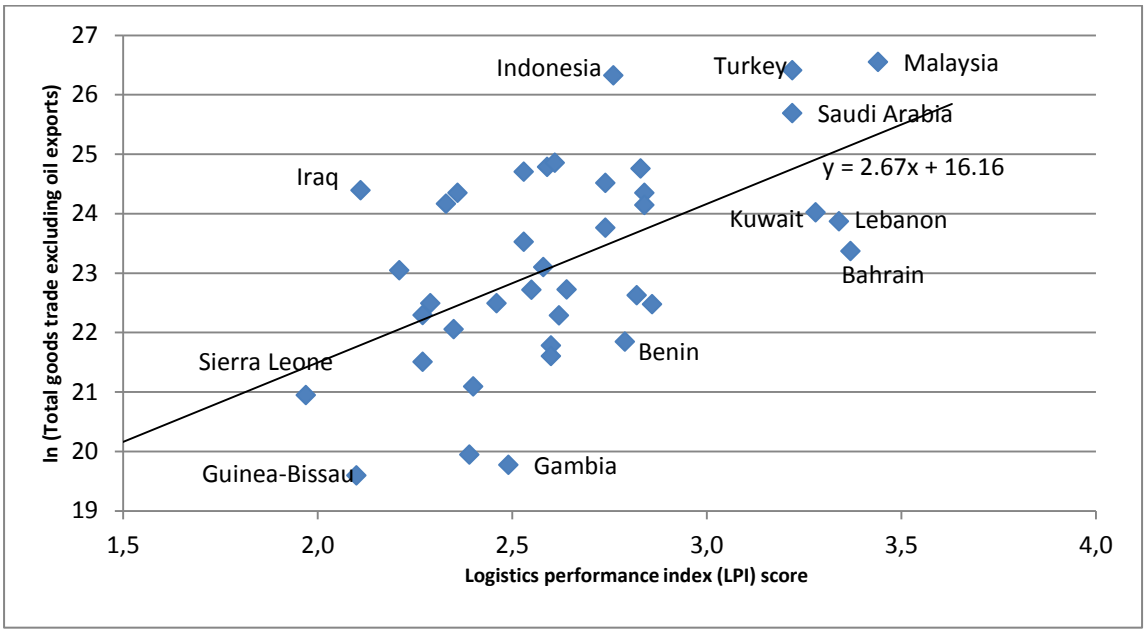
As underlined above, the quality of the logistics infrastructure and services is a major determinant in terms of shares of countries in the global trade. In this section, we will analyze some important measures to see the current situation of the OIC countries with respect to trade and logistics.

The most widely used measure for the logistics performances of the countries is The World Bank Logistics Performance Index (LPI). So far, The World Bank has prepared three LPI reports for the years 2007, 2010, and 2012. From the point of view of the OIC, past LPI scores reveal that United Arab Emirates (UAE), Malaysia, and Turkey have been the best performing

OIC countries. Table A.2 in the appendix presents the LPI scores of the OIC countries for the years 2007, 2010, and 2012.

Logistics costs have become more important over time for two main reasons. Firstly, the tendency to shift the production facilities abroad to enjoy lower labor costs necessitates more movement of goods (raw materials and final product). Secondly, with decreasing tariffs, logistics costs increase in ad valorem terms and turn into an important factor in the prices of products. That is why, the nations which have the aim of increasing their international trade should improve their logistics capabilities. As an evidence of this fact, Figure 1 shows the relation between the LPI scores of the OIC countries and their respective international goods trade (excluding oil exports) for the year 2010. Data on international goods trade and LPI scores came from The World Bank World Development Indicators and we used the EconomyWatch.com's data for the value of oil exports by countries. Figure 1 suggests that there is a positive relation between LPI scores and total trade in goods. Our further analysis documents that there is a correlation coefficient of 0.73 between LPI scores and total goods trades (excluding oil exports) of the 39 OIC countries whose data are available for 2010. In addition, using the same data a bivariate regression analysis shows that a one unit increase in LPI score of a OIC country, which takes a value between 0 and 5, leads to almost 267% increase in the international goods trade (excluding oil exports) of that country. This implies that OIC countries with higher LPI scores tend to engage more in goods trade.

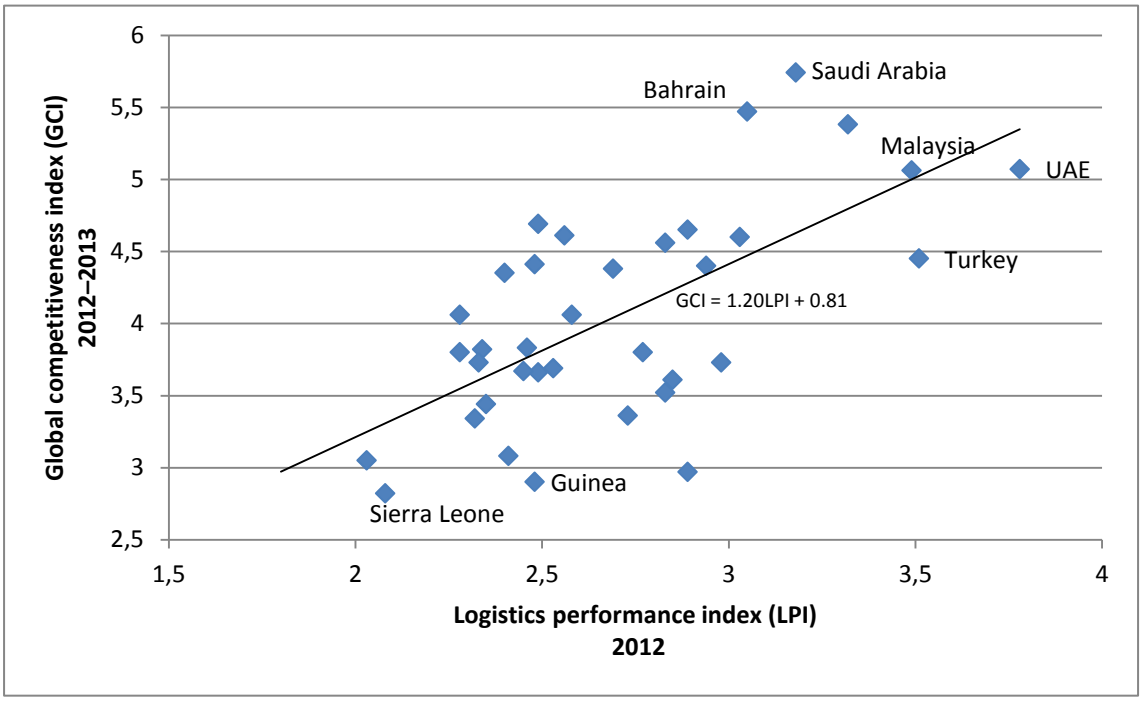
Figure 1: Total goods trades (excluding oil exports) and LPI scores in OIC countries in 2010



Source: The World Bank World Development Indicators and www.economywatch.com/economic-statistics/economic-indicators/Value_Oil_Exports/ (last access March 15, 2013)

As noted above, the OIC countries with higher LPI scores tend to engage more in international goods trade. Countries with high LPI score are more likely to gain competitive advantage over those with lower LPI scores because countries with high LPI score can facilitate their international trade easier through their enhanced logistics infrastructure and services. Figure 2 shows this relation for the 36 OIC countries where the horizontal axis exhibits the 2010 LPI scores and the vertical axis presents their Global Competitiveness Index (GCI) scores, published by World Economic Forum (2012), for the period 2012-2013. Based on these data, a bivariate regression analysis shows that a one unit increase in LPI score of an OIC country increases the GCI score, which ranges from 1 to 7, of that country by 1.2 units.

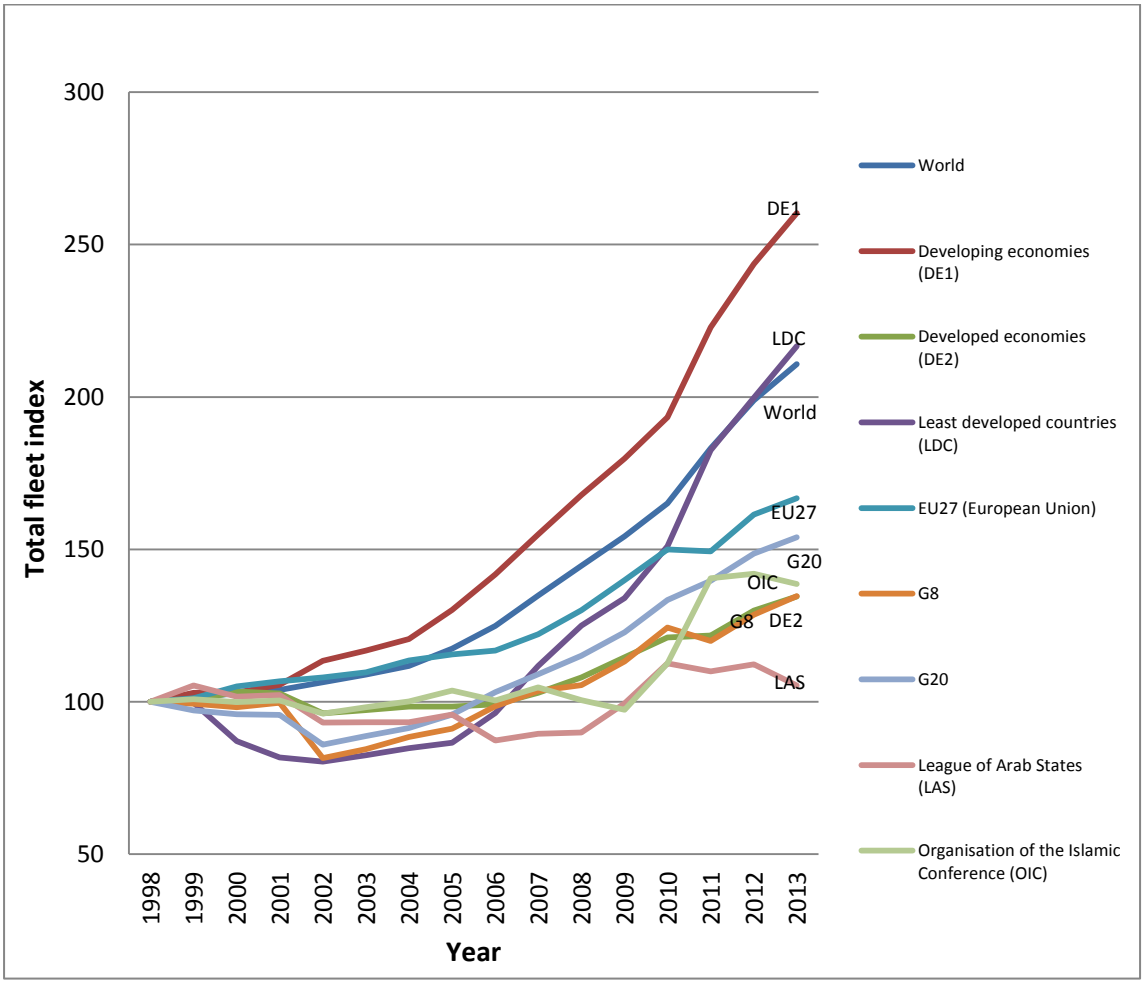
Figure 2: 2012 LPI scores and 2012-2013 GCI scores of the OIC countries



Source: The World Bank World Development Indicators and World Economic Forum (2012)

Another measure that can be used as a proxy for the international trade is the change in global fleet. Figure 3 shows, using UNCTAD data, the change in the total fleet, in dead weight tons in thousands, by flag of registration for the period 1998-2013. During this 16-year period, world fleet has increased 111% while only two subgroups, developing countries and least developed countries- among 9 international groupings classified in Figure 3–outperformed this global average. The OIC countries failed to catch up with the world average in fleet growth and increased their fleet only by 39%. Similarly, the League of Arab States (LAS) fell below the world average and grew its fleet by 5%. The changes in the fleets of other groups, such as (1) developing countries (DE1), (2) developed countries (DE2), (3) least developed countries, (4) EU, (5) group of eight (G8) nations and (6) group of twenty (G20) nations can also be seen at Figure 3.

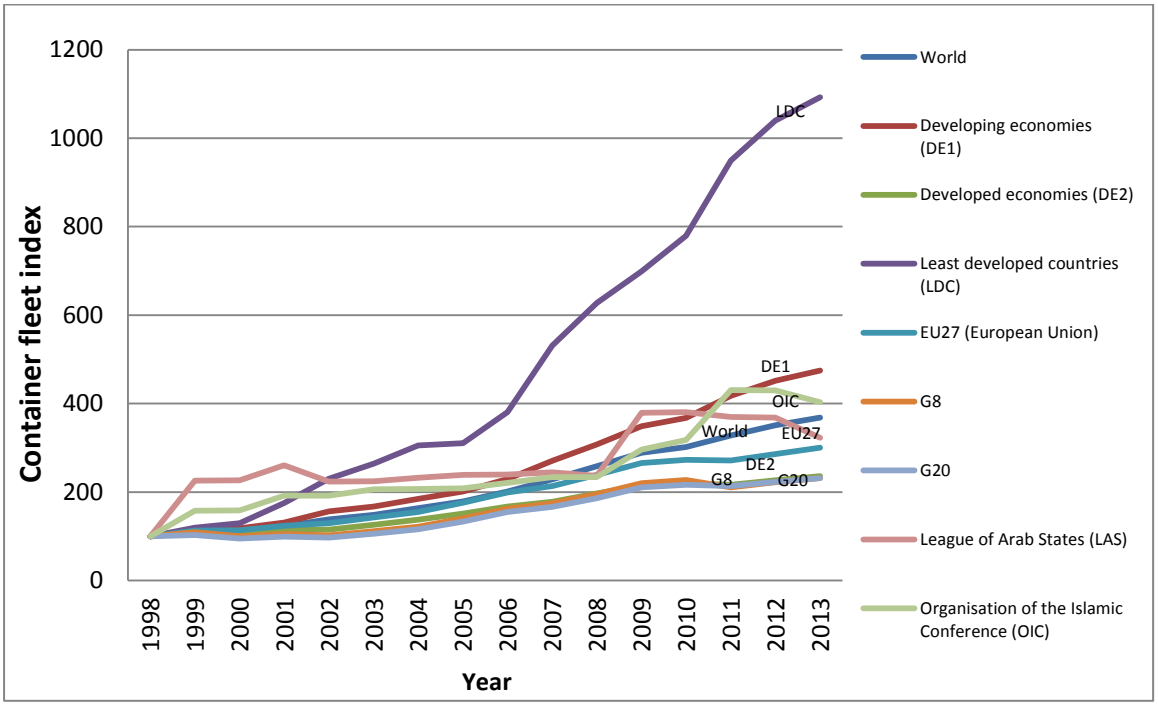
Figure 3: Change in total fleet (in dead weight tons in thousands) by flag of registration for the period 1998-2013 (value in 1998=100)



Source: UNCTAD Database

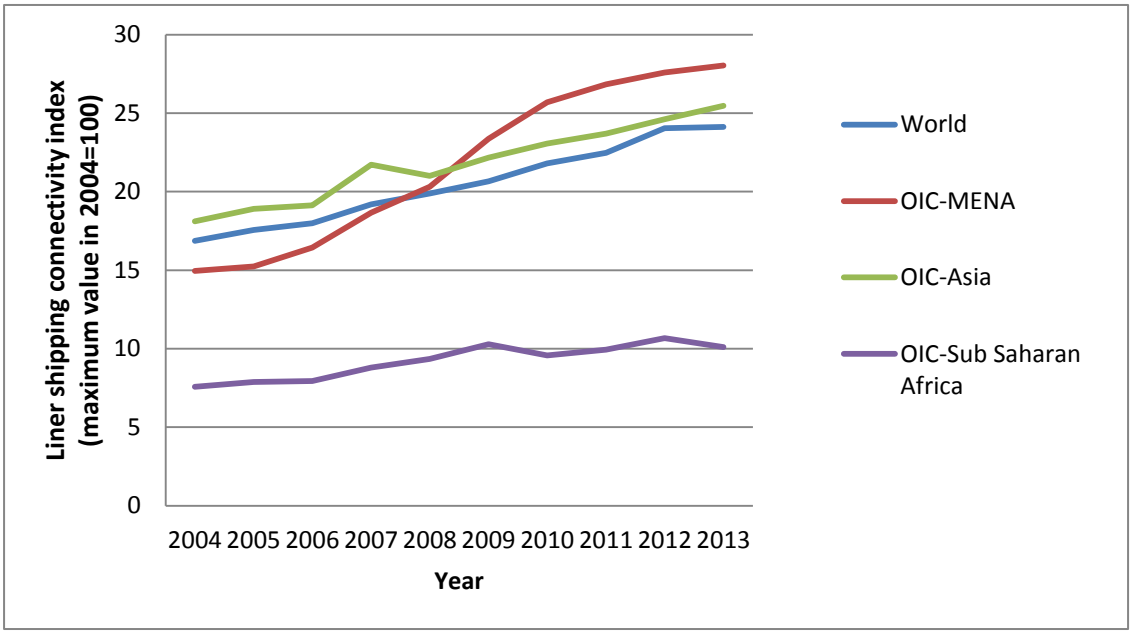
Containerization, one of the most influential phenomena in the world trade in the 20th century which drastically shaped the global trade has been stimulating the container fleet capacity. Parallel with this trend, the pace of growth in container fleet outpaced that of total fleet. While world total fleet has increased 111% between 1998 and 2013, world container fleet has increased 268%.Unlike the change in the total fleet, the change in container fleet of OIC outperformed with respect to world average (Figure 4).

Figure 4: Change in container fleet (in dead weight tons in thousands) by flag of registration for the period 1998-2013 period (1998 value=100)



Source: UNCTAD Database

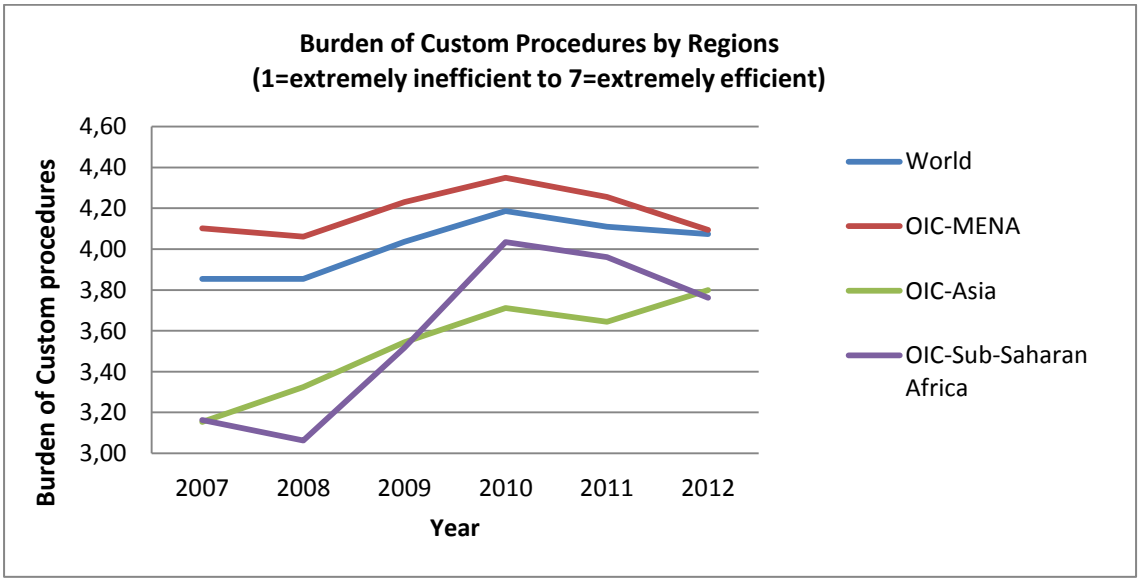
Figure 5: The liner shipping connectivity index by OIC regions in the 2004-2013 period



Source: The World Bank World Development Indicators

Third measure is liner shipping connectivity index (LSCI) that is provided by The World Bank. We divided the OIC countries into OIC-MENA, OIC-Asia, and OIC-Sub-Saharan Africa to be able to analyze the LSCI trends in OIC geography. Figure 5 provides, on average, the LSCI changes for the OIC-groupings between 2004 and 2013. As the figure suggests, starting from 2008both OIC-MENA and OIC-Asia had better LSCI scores on average than the world, and OIC-MENA outperformed better than OIC-Asia starting from 2009. However, throughout the 2004-2013 period, average LSCI scores for OIC-Sub-Saharan Africa region, however, fell below the world averages.

Figure 6: The burden of custom procedures by OIC regions in the 2007-2012 period



Source: The World Bank World Development Indicators

Lastly, we will examine the custom procedures as they directly affect trade facilitation and for this purpose, we will use the burden of custom procedures index, ranging from 1 to 7, provided by The World Bank. According to this index, 7 corresponds to the extremely efficient case while 1 stands for extremely inefficient case. We again grouped the OIC countries as OIC-MENA, OIC-Asia, and OIC-Sub-Saharan Africa to be able to analyze the trends, among OIC geography, which are provided at Figure 6.. Figure 6 reveals that OIC-MENA was the best performing OIC region for the 2007-2011 period in terms of the efficiency of custom procedures while both OIC-Asia and OIC-Sub-Saharan Africa had custom efficiency scores below the world average.

2.2 Transportation Infrastructure

Transport infrastructure is crucial for both economic and social development of the nations. It is therefore not surprising to see that developing transport infrastructure is assessed as a powerful instrument for a wide variety of policy goals such as reducing logistics costs, poverty (through enhancing rural road infrastructure) and congestion, and enabling the mobility of the workforce, etc. As a result of such a variety of policy issues, the problems associated with the transport infrastructure vary across the nations. For developed nations, for example, the major transportation problem is to sustain the aging infrastructure in the most cost-effective way and to maintain their competitive power through efficient transport networks. For least developed nations, the major concern is to establish a transportation infrastructure by meeting at least the basic needs.

The variation in the needs of transportation infrastructure across the OIC countries is in parallel with the situation outlined above. On the one hand, there is a group of oil producing gulf countries with high income per capita and relatively smaller area (except Saudi Arabia). On the other hand, there is a large pool with low income per capita and relatively larger OIC countries, mostly from Sub-Saharan Africa. The Global Competitiveness Report 2012–2013 (2012) of World Economic Forum provides evidence on this gap. 5 of the 7 best performing OIC countries (UAE, Bahrain, Saudi Arabia, Oman, Qatar, Malaysia, and Turkey) in terms of the quality of transport infrastructure are oil producing gulf countries. On the other hand, 6 of the 9 the worst performing OIC countries (Yemen, Sierra Leone, Burkina Faso, Chad, Guinea, Lebanon, Mauritania, Mozambique, and Bangladesh) in the same measure are from Sub-Saharan Africa.

Table 2 presents the variation in quality of transport infrastructure in terms of indexes among 42 OIC countries whose indexes are provided (16 countries from OIC Sub Saharan Africa, 16 from OIC MENA, and 10 from OIC Asia). The indexes, which are compiled for The Global Competitiveness Report 2012–2013 (2012) of World Economic Forum, range from 1 to 7 and while 1 represents the extremely underdeveloped infrastructure, 7 stands for the extensive and efficient infrastructure by international standards.

Second column of Table 2 shows the indexes for the quality of overall infrastructure (such as transport, telephony, and energy) while the third, fourth, fifth and sixth columns provide

comparable indexes for road, railroad, port, and air transport infrastructure, respectively. One implication of Table 2 is that all of the OIC and OIC-Sub Saharan Africa averages fall below world averages in every measure. Secondly, OIC-MENA performs better than world average in every measure except the quality of railroad infrastructure. Finally, OIC-Asia underperforms world averages in every measure except the quality of railroad infrastructure.

Table 2: The indexes for the quality of transport infrastructure

Region	Quality of overall infrastructure	Quality of roads	Quality of railroad infrastructure	Quality of port infrastructure	Quality of air transport infrastructure
World Average	4.30	4.00	3.10	4.30	4.60
OIC Average	3.93	3.72	2.45	3.97	4.31
OIC-Sub Saharan Africa	3.26	3.00	1.89	3.79	3.73
OIC-MENA	4.56	4.48	2.59	4.44	4.89
OIC-Asia	4.00	3.68	3.11	3.52	4.31
OIC Maximum	6.4 (UAE)	6.5 (UAE)	4..9 (Malaysia)	6.4 (UAE)	6.6 (UAE)
OIC Minimum	2.1 (Guinea)	2 (Guinea)	1 (Lebanon)	1.5 (Kyrgyz Republic)	2.7 (Sierra Leone)
OIC Median	3.7 (Indonesia and Tajikistan)	3.3 (Algeria 3.4 and Tajikistan 3.2)	2.1 (Brunei Darussalam)	3.9 (Egypt 4 and Uganda 3.8)	4.2 (Indonesia and Tajikistan)

Source: Compiled by the author using The Global Competitiveness Report 2012–2013 (2012

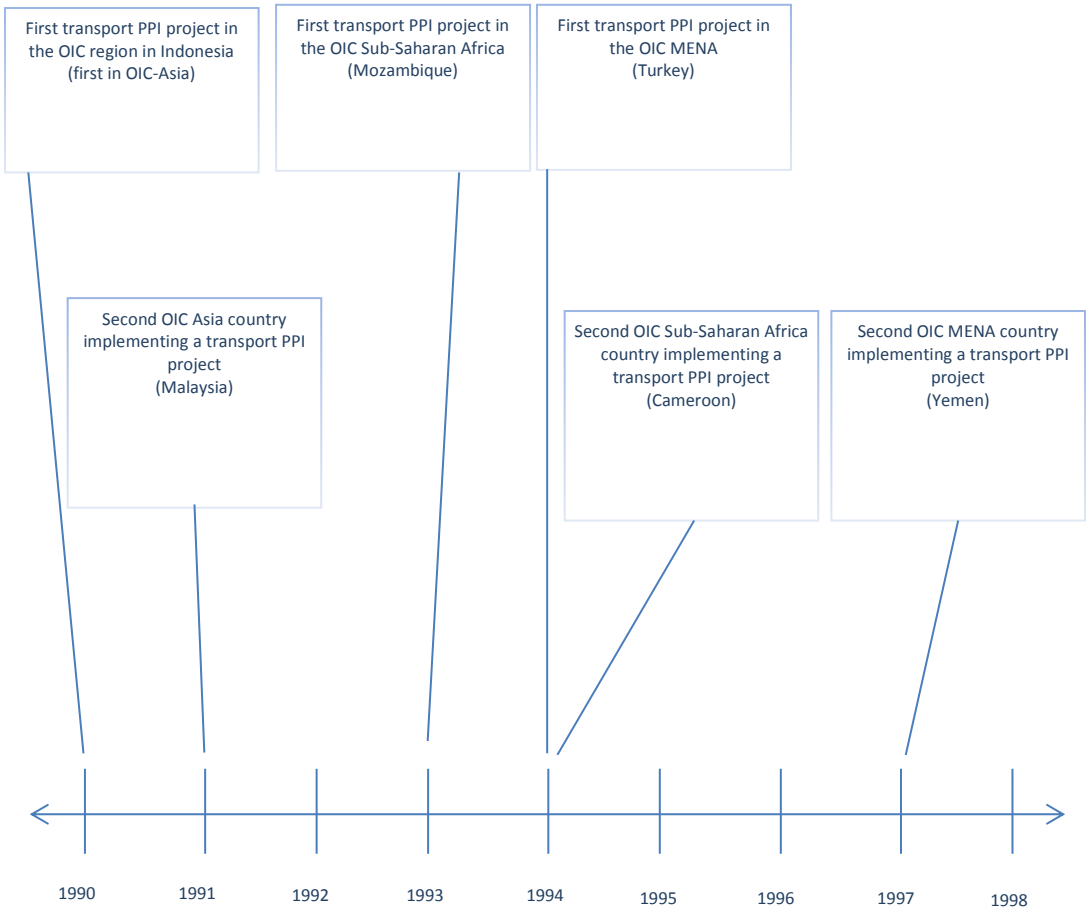
2.3 Privatization of Transportation

Network industries necessitating big infrastructure investments such as transportation, telecommunication, energy, and water have been traditionally state owned and operated for two major reasons. Firstly, huge initial investments created a barrier to entry for the private investors. Secondly, because of the economic and social importance of such industries, governments preferred to keep them in state ownership. However, the poor performances of state ownership and operations like low operating efficiency, labor redundancy, politically motivated tariff setting and underinvestment threatening the sustainability of the system initiated a tendency to appeal to private finance and management.

Initially and substantially adopted by the United Kingdom within the last couple decades, public-private partnerships-PPPs (including private participation in infrastructure-PPI) today play an important role in the provision of public infrastructure and services. It doesn't matter if the country is developed, developing or a least-developed one, governments use various PPP models, ranging from management contracts to Build-Own-Operate model and divestitures, mainly; (1) to attract private finance to their infrastructure projects in the face of large budget deficits, (2) to improve the efficiency and the quality of the services provided, and (3) to liberalize their economy.

In fact, OIC geography has been quite familiar with the private participation in large transport infrastructure projects. Opened in 1869, Suez Canal was a typical Build-Operate-Transfer project which the private operator obtained a concession to operate the canal for 99 years. Other transportation concessions during the Ottoman Empire era included the Port of Istanbul, Port of Izmir, Istanbul Rail Tunnel and Istanbul Streetcar (Yılmaz, 1996). Some sources (Tiong, 1990; Handley, 1997; Ozdogan and Birgonul, 2000) cite that even the term Build-Operate-Transfer was coined by Turgut Ozal, the former prime minister and the president of Turkey. In the 20th century, the first transport PPI project in the OIC geography was implemented in Indonesia in 1990 and it was followed by a second PPI project in Malaysia in 1991. The first PPI project in OIC Sub-Saharan Africa and OIC MENA were implemented in Mozambique in 1993 and in Turkey in 1994. Figure 7 presents the timeline of the initial transport PPI projects in the OIC regions.

Figure 7: Timeline of the initial transport PPI projects in the OIC region



Source: Prepared by the author using World Bank PPI Database

However, past experience of the OIC region on PPP applications calls for major improvements. A successful implementation of a PPP project requires; (1) political and economic stability, (2) sound legal framework, (3) institutional capacity, (4) political commitment and support, (5) transparent and competitive tender procedures free from corruption, (6) an organized and developed domestic private entrepreneurship (including financial institutions and construction companies), and (7) public acceptance and support Besides, on average the OIC countries generally fail to achieve most of these preconditions.

In this section, we will provide a brief analysis on the historical PPP trends and what OIC countries have been doing about transportation PPPs/PPIs.

Distribution of PPI Projects by sector and region

The World Bank PPI database, which covers 139 low and middle-income countries and classifies them into 4 main sectors; (1) energy, (2) telecom, (3) transport, and (4) water and sewerage, provides the most comprehensive data on PPI projects. We begin our analysis with the distribution of PPI projects among major infrastructure sectors. According to the PPI database, financial closure of a total of 5,238 PPI projects was finalized in the world between 1990 and 2012. Energy sector had the largest share (45.8%) in terms of number of PPI projects and it was followed by transport sector (25.4%) (Table 3).

Table 3: Distribution of PPI projects by infrastructure sectors in the 1990-2012 period

Sectors	Number of PPI projects	Percentage shares
Energy	2,653	45.8%
Telecom	843	14.5%
Transport	1,473	25.4%
Water and sewerage	814	14.0%
Total	5,783	100.0%

Source: The World Bank Private Participation in Infrastructure Database

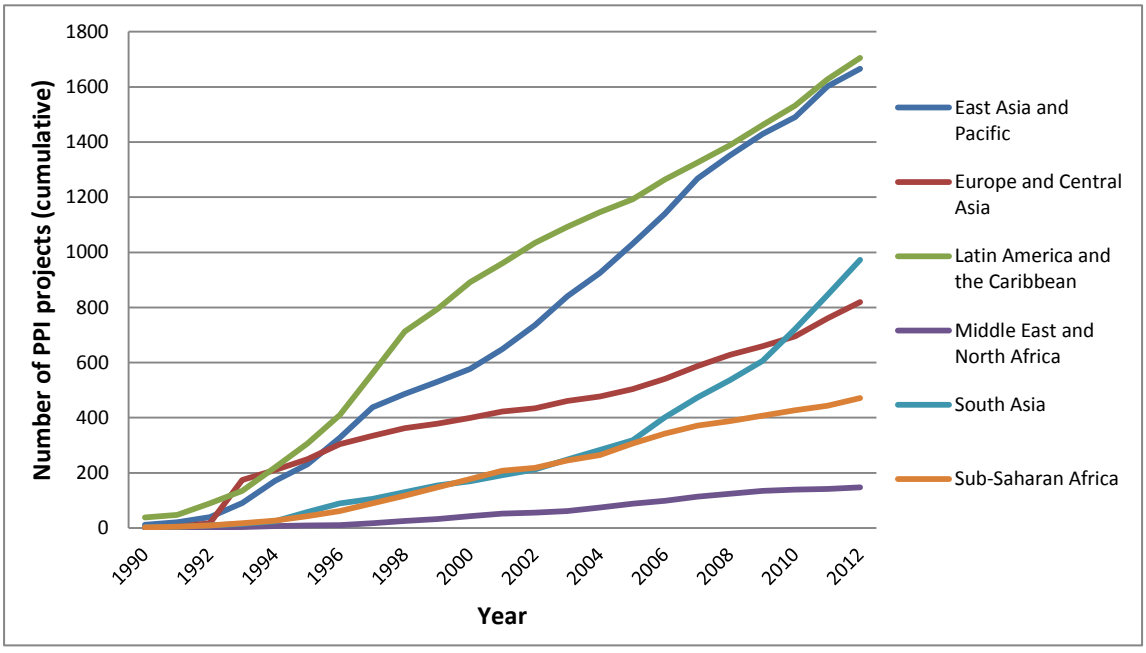
We continue our analysis with the distribution of PPI projects by their PPI-types. Table 4, which presents this distribution during the 1990-2012 period, shows that some variations in PPI-type subsisted depending on the characteristics of individual sectors. Table 4 reveals that greenfield projects have been the most frequently used PPI type in energy, telecom, and water and sewerage sectors while transport sector mostly adopted concessions. On the other hand, both energy and telecom sectors applied divestures more frequently than transport and water and sewerage sectors in both absolute and percentage terms. In addition, water and sewerage sectors used management and lease contracts more than any other sector did.

Table 4: Distribution of the transport PPI projects by PPI-types in the 1990-2012 period

Sector	Concession	Divestiture	Greenfield project	Management and lease contract	Total
Energy	200	426	1,983	44	2,653
Telecom	9	195	632	7	843
Transport	863	69	459	82	1,473
Water and sewerage	334	29	330	121	814

Source: The World Bank Private Participation in Infrastructure Database

Figure 8: Changes in the cumulative number of PPI projects by regions for the period 1990-2012



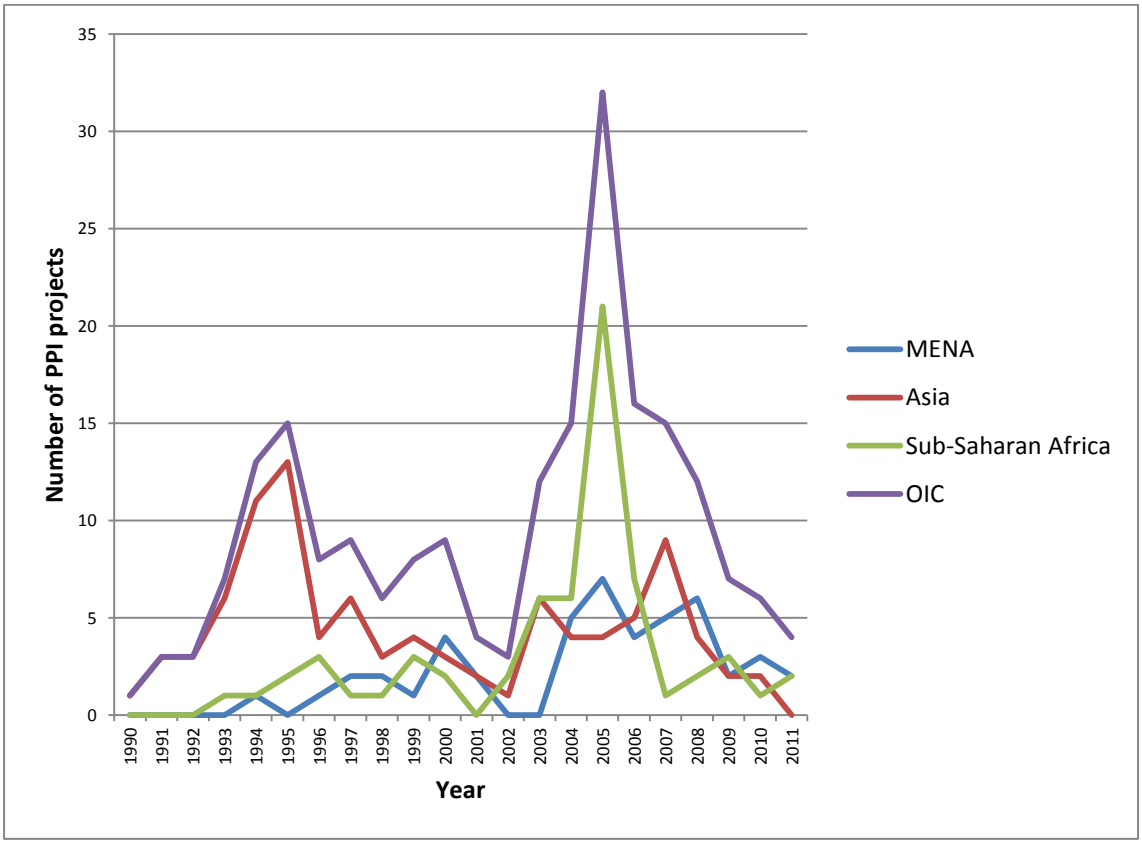
Source: The World Bank Private Participation in Infrastructure Database

Our analysis keeps on the use of PPP/PPI models by geographic regions. PPP/PPI models have not penetrated equally every geographic region and it can be observed at Figure 8 showing the cumulative changes in the number of PPI projects by geographic regions in the 1990-2012 period. As the figure suggests, (1) Latin America and the Caribbean and (2) East Asia and Pacific are the two top regions implementing PPI projects, on the other hand,(1) Middle East

and North Africa and (2) Sub-Saharan Africa are two regions implementing fewest number of PPI projects despite their wideness in comparison to other Sub-Regions in the OIC geography.

After a snapshot on the distribution of PPI projects by global geographic regions, we now focus specifically on OIC geography. As the Figure 9 showing the distribution of PPI projects by OIC regions presents, OIC Asia outnumbered OIC MENA and OIC Sub-Saharan Africa in terms of PPI projects from 1990 to 2000. The peak of the PPI projects in OIC Sub-Saharan Africa in 2005 is also noteworthy.

Figure 9: Changes in the number of PPI projects in OIC regions in the 1990-2011 period



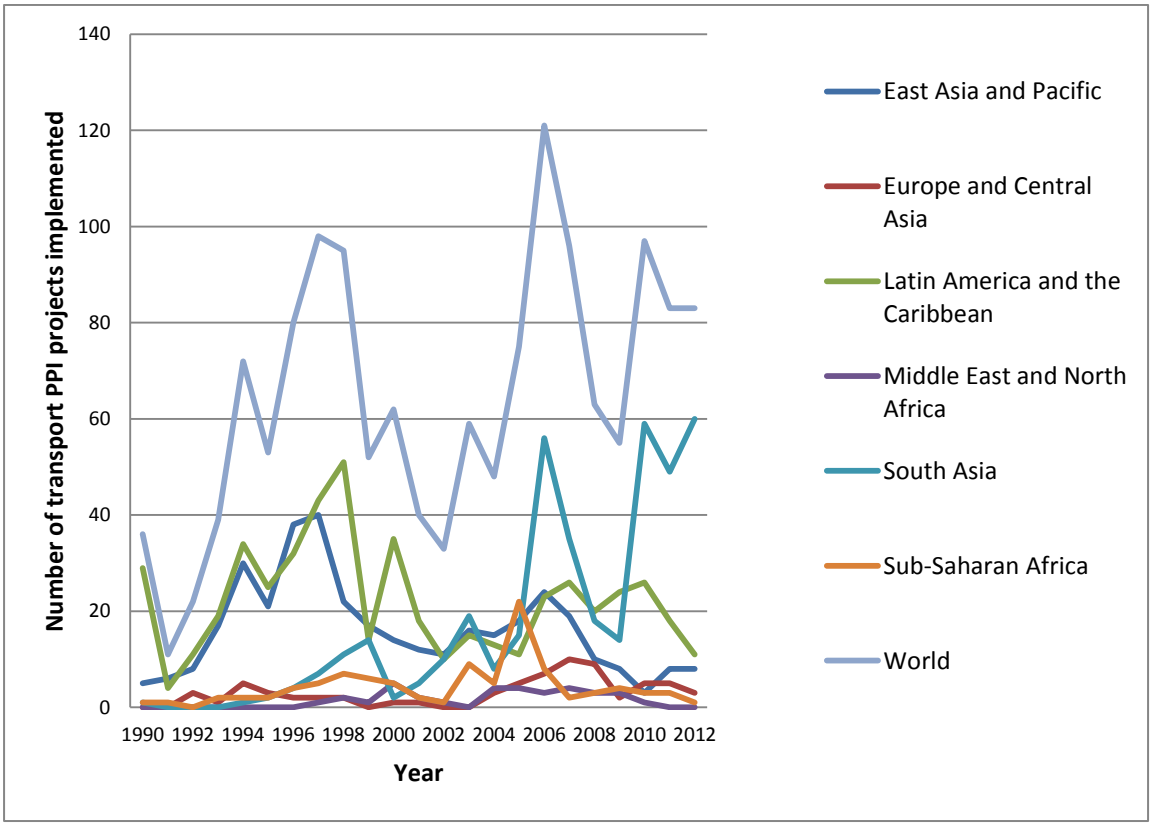
Source: The World Bank Private Participation in Infrastructure Database

Transport PPI projects

In this section we shift our focus particularly to transport PPI projects. Figure 10 presents the changes in the number of transport PPI projects by geographic regions in the 1990-2012 period. Similar to the case depicted in Figure 8, (1) Latin America and the Caribbean and (2)

East Asia and Pacific are the two best performing regions in terms of using PPI models in transport projects, and (1) Middle East and North Africa and (2) Sub-Saharan Africa still remained at the bottom of the figure. Another interesting feature of the figure is its fluctuant pattern as a result of regional and global crises which proves that PPI/PPP implementation has been quite sensitive to economic stability.

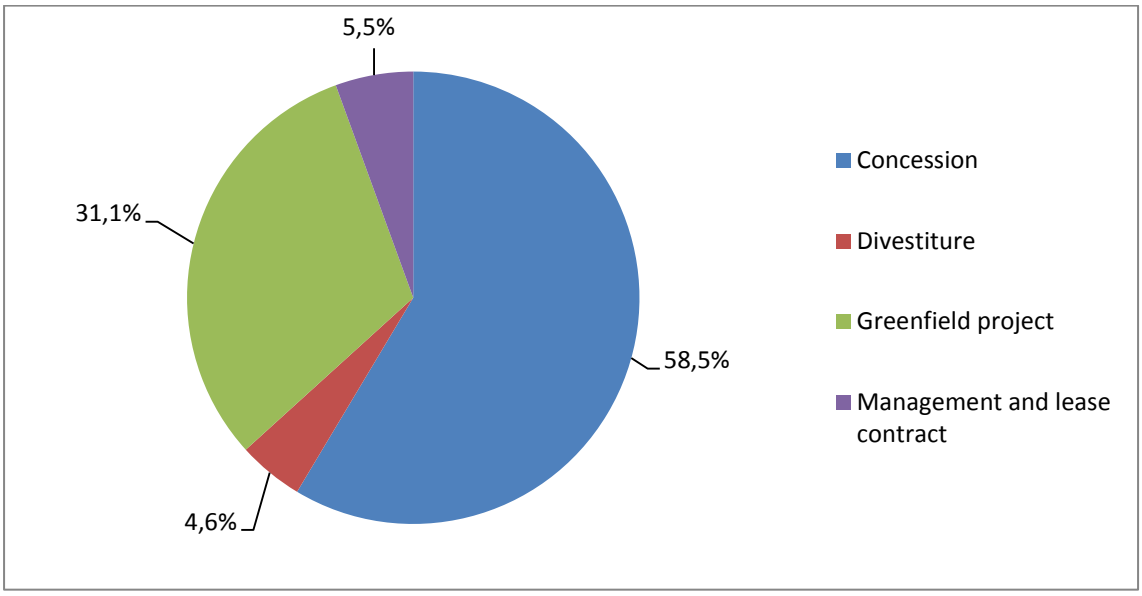
Figure 10: Changes in the number of transport PPI projects by regions in the 1990-2012 period



Source: The World Bank Private Participation in Infrastructure Database

Regarding PPI types, Figure 11 presents the distribution of transport PPI projects by type. Among various PPI types, concession has belonged to the most frequently implemented PPI type. Almost 58.5% of all transport PPI projects have been realized through concessions while 31.1% of the transport PPI projects were greenfield. Management, lease contract and divestitures had relatively lower shares with 5.5% and 4.6%, respectively.

Figure 11: Distribution of transport PPI projects by types in the 1990-2012 period



Source: The World Bank Private Participation in Infrastructure Database

With respect to the distribution of transport PPI projects by modes, road the PPI projects outnumbered others with a share of 54.9% while seaports, railroads, and airports had the shares of 26.3%, 8%, and 10.7%, respectively. Table 5 provides the transport PPI project counts and their respective shares in terms of transport modes.

Table 5: Distribution of transport infrastructure PPI projects by modes in the 1990-2012 period

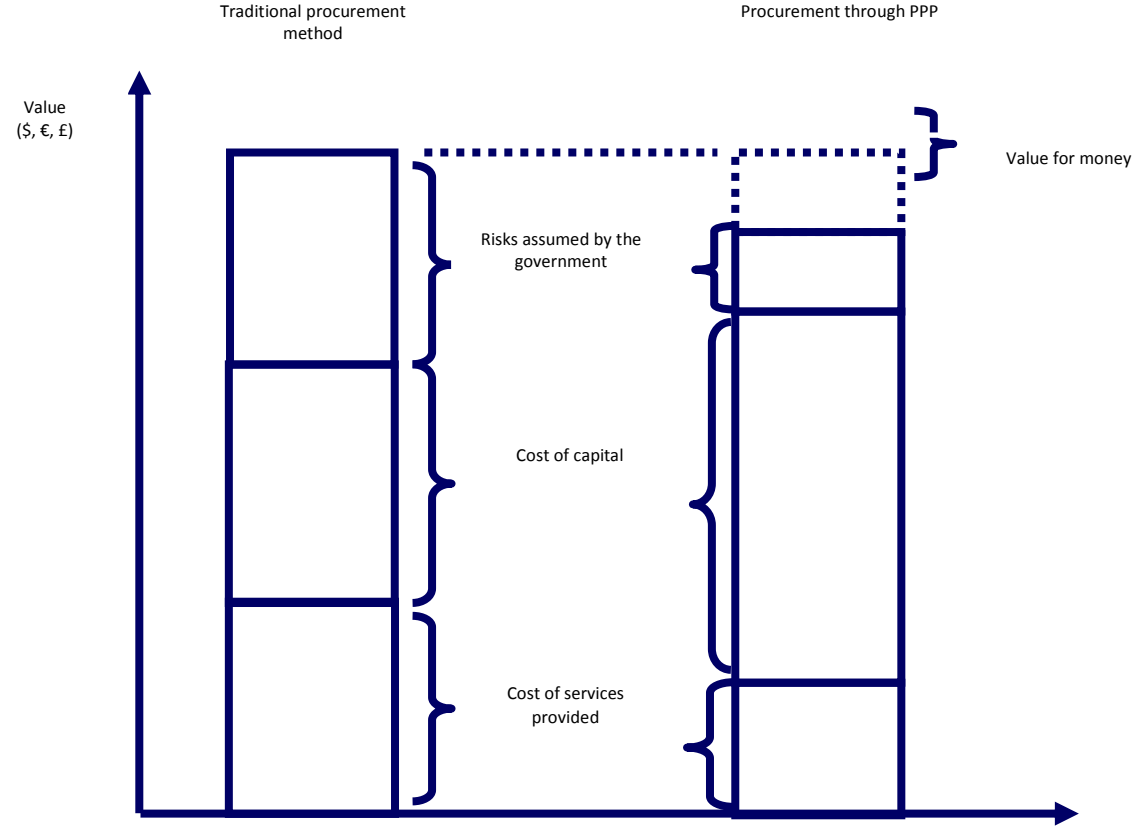
Subsector	Project Count	% Project Count	Total Investment (billion $)	% Total Investment
Airports	158	10.7%	49,347	13.4%
Railroads	118	8.0%	68,537	18.6%
Roads	811	54.9%	186,57	50.8%
Seaports	388	26.3%	62,805	17.1%
Total	1475	100.0%	367,259	100.0%

Source: The World Bank Private Participation in Infrastructure Database

Where the real benefit of a PPP project lies?

To make a comparison between the traditional public procurement and public procurement through PPP models, we can divide the total value of a project into three: (1) the cost of services provided, (2) the cost of capital, and (3) the risks assumed by the government (Figure 12).

Figure 12: The comparison of the traditional public procurement with PPP-type procurement



Source: (Moriarty, 2006)

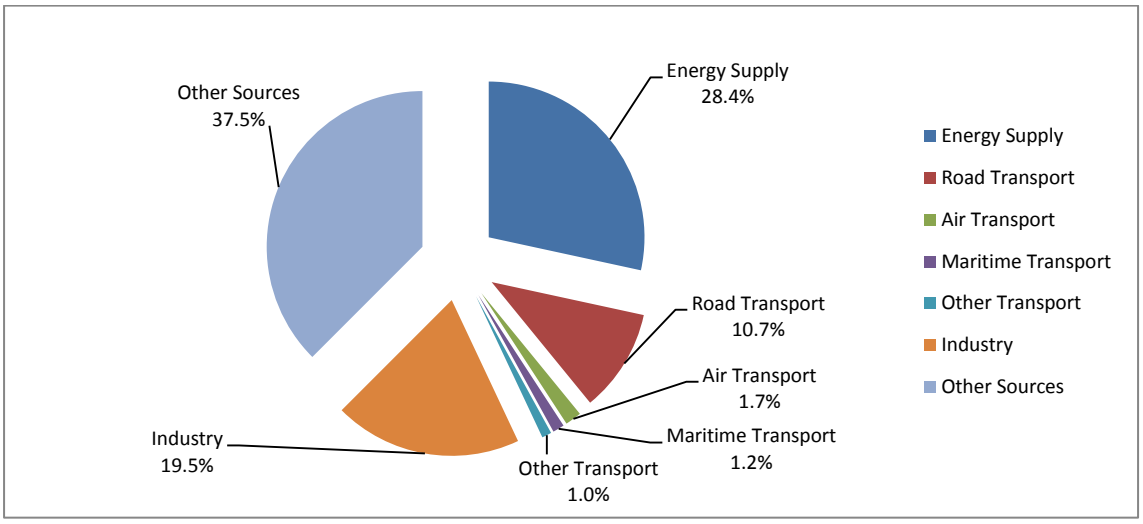
Regarding the cost of capital, state procurement is generally more advantageous than PPP-type procurement because the cost of borrowing of a private entity is generally higher than that of the public sector, given the generally high risks inherently involved in PPP projects. On the other hand, the advantages of the PPP-type procurement arise by regarding the cost of services provided and the risks assumed by the government.. It is generally expected that the private sector can achieve cost savings during the implementation of the investments and can provide

cheaper services than the public sector can. In addition, during the PPP-type procurement, private sector assumes that some of the risks, such as construction, availability, and demand risks, associated with the projects which public sector assumes in the traditional procurement. For a PPP model to be eligible, value of money must be achieved, which means that the sum of the benefits- from the cost savings for the services provided and the risks transferred from public sector to the private one- should exceed the costs associated with higher cost of capital of the private sector.

2.4 Transportation and Environment

Transport emissions have been rising over time in parallel with the increase in the transport demand. A joint report of OECD and International Energy Agency (IEA) underlined that transport emissions have increased by 108% in the period 1971-1990 and by 21% in the period 1990-2002 (OECD/IEA, 2012). Based on The Emissions Database for Global Atmospheric Research (EDGAR) and IEA data for the year 2005, transportation activities were responsible for 14.6% of all greenhouse gas (GHG) emissions, because of making these activities as the third biggest emitter after energy supply (28.4%) and industry (19.5%).Among all transportation modes, road transportation dominates GHG emissions by 10.7% and it is followed by air transport (1.7%) and maritime transport (1.2%) GHG emissions (Figure 13). In regard to CO_2, which is the most emitted GHG, transportation accounted for 22% of global CO_2 emissions; And this situation makes it the second largest source of CO_2 emitter, proceeded by electricity and heat generation (41%) and followed by industry (20%) in 2010 (IEA, 2012).

Figure 13: GHG emissions by sources in 2005

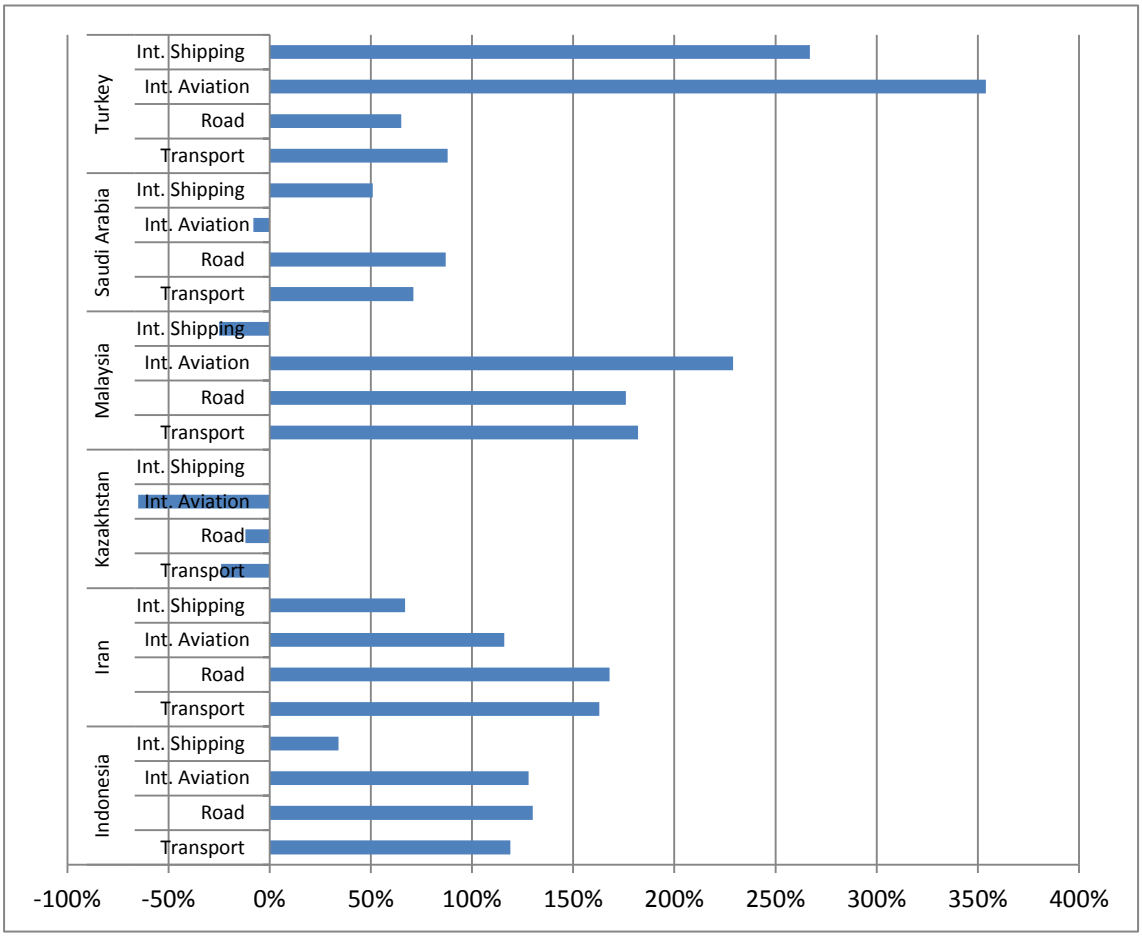


Source: International Transport Forum, 2010; (EDGAR 4.0 (2009) and IEA)

Interaction between transportation and environment in the OIC countries

Though it is likely to observe some variations depending on the domestic fuel prices and the availability of alternative energy sources, higher per capita income countries tend to emit more GHG per capita. IEA data (2009) reveal that the OIC Countries is the first four top between energy CO_2 emitters per capita Qatar, UAE, Bahrain, and Kuwait), thanks to their quite high per capita income and lower fuel prices. Qatar, for example, emitted 58 tons per capita of CO_2 in 2007 while the world average was 4.4 tons. , on the other hand, in the same year, some other notable OIC countries with lower per capita income such as Turkey and Pakistan emitted 3.6 and 0.9 tons per capita of CO_2, respectively (IEA, 2009). Figure 14 shows the changes in transport CO_2 emissions by modes of the selected OIC countries for the 1990-2007 period.

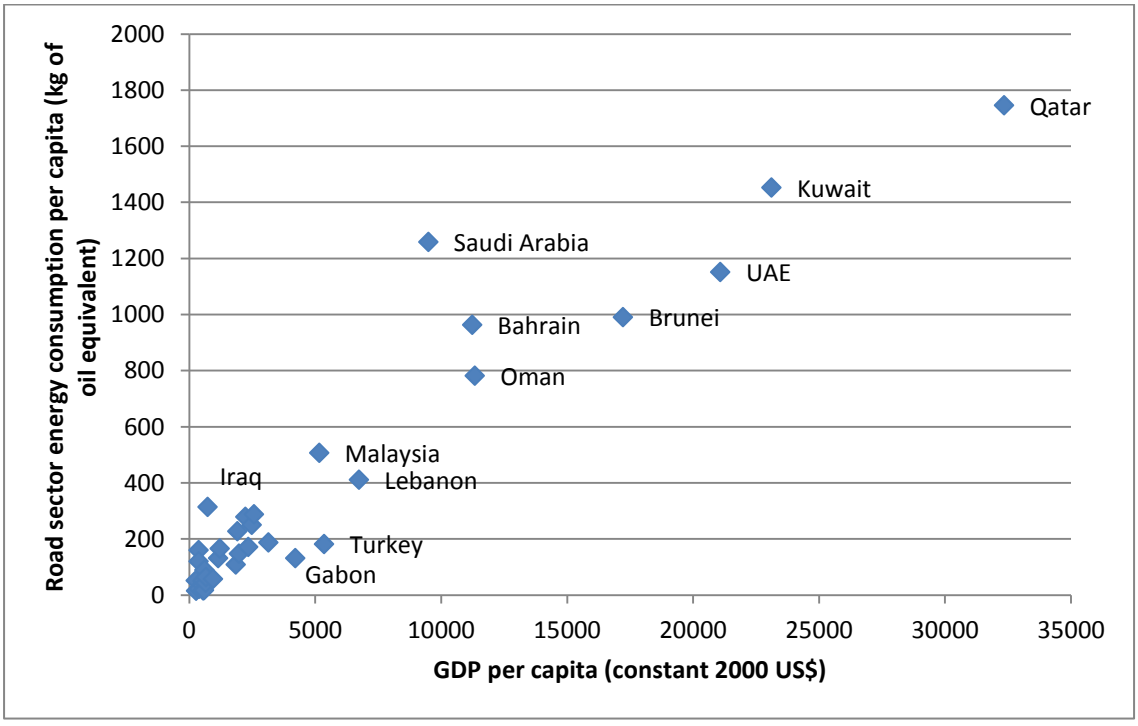
Figure 14: Changes in transport CO2 emissions of the selected OIC countries for the period 1990-2007



Source: International Transport Forum, 2010

Our further analysis on the linkage between transportation and environment focus on road passenger transportation for two reasons. Firstly, road transportation accounts for almost three-quarter of all transportation GHG emissions and road passenger transportation is responsible for the majority of the GHG emissions in the road transportation. Secondly, available data generally cover road passenger transport statistics but lack comparable statistics on road freight transport.

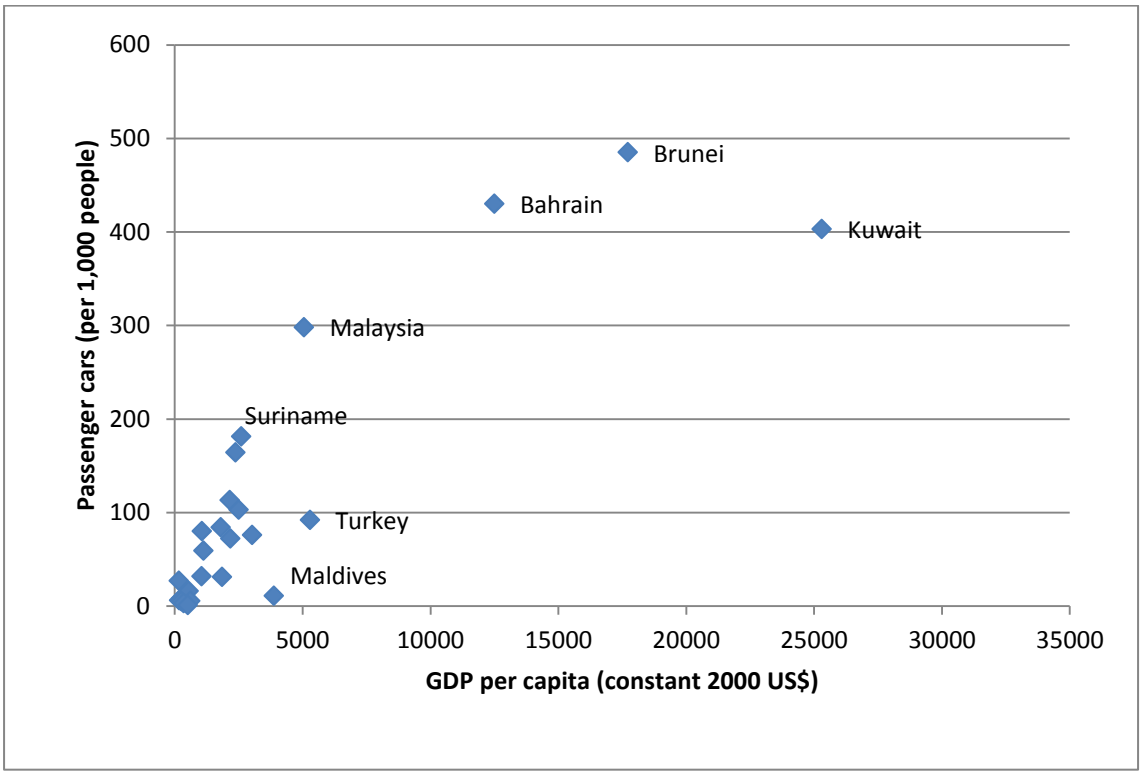
Figure 15: Road sector energy consumption per capita and per capita income in 36 OIC countries in 2010



Source: The World Bank World Development Indicators

As noted earlier above, higher per capita income countries tend to emit more GHG per capita and this generalization is valid for the transport GHG emissions as well. Although several other factors, such as existing road infrastructure, alternative public transport opportunities, existing parking policies, personal security concerns, and the urban sprawl, are also influential; the personal income and the prices of the fuels are the two major determinants (in addition to car prices) for private car ownership and use. We begin with 'per capita income'. Figure 15, which depicts the change in road sector energy consumption per capita with respect to per capita income, shows the comparable relation for 36 OIC countries having necessary data. As this figure suggests, the OIC countries with higher per capita income are more likely to consume more road sector energy per capita. The top 10 OIC countries (Qatar, Kuwait, UAE, Brunei, Oman, Bahrain, Saudi Arabia, Lebanon, Malaysia, and Turkey) with highest per capita income are also the top road sector energy consumers per capita. On the other hand, the OIC countries with lower per capita income group in the lower-left part of the Figure 15 implying that these countries consume less road sector energy per capita.

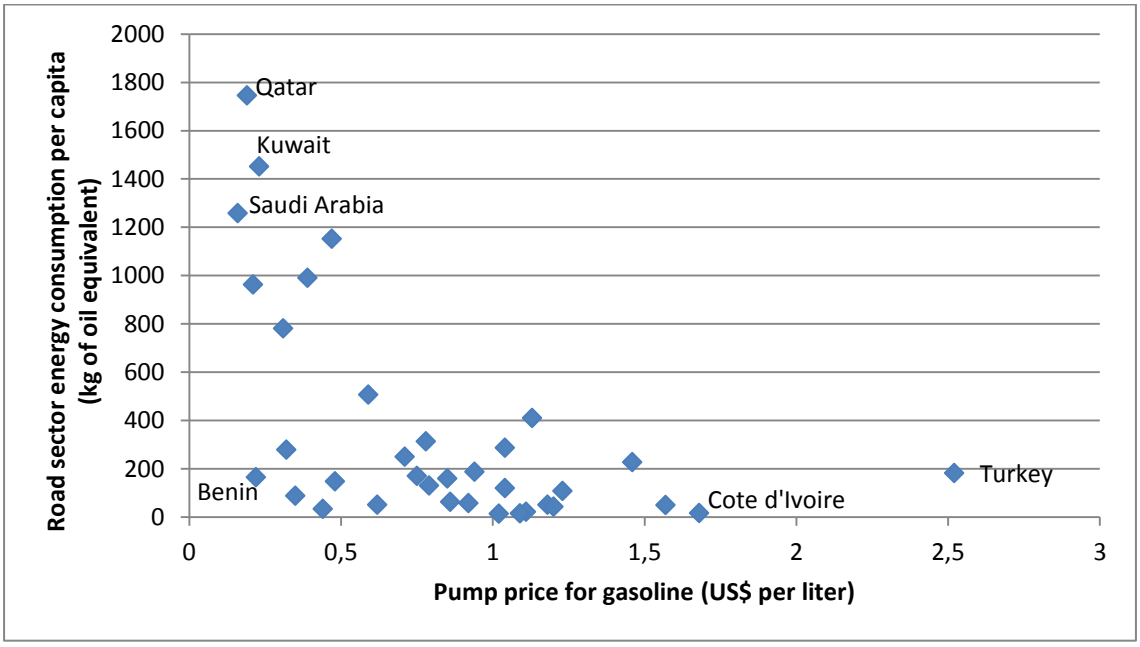
Figure 16: Passenger Cars and Per Capita Income in the OIC Member States in 2010



Source: The World Bank World Development Indicators

The law of income elasticity of demand suggests that consumers demand more of a good or service (unless this good or service is an inferior one) if their income increases. One implication of this tendency is the increase in private car ownership, which eventually increases personal trips and accordingly GHG emissions with increasing per capita income. Figure 16 shows the positive relation between passenger car ownership and per capita income in 26 OIC countries in 2010.

Figure 17: Road sector energy consumption per capita and pump price for gasoline in the OIC Member States in 2010



Source: The World Bank World Development Indicators

The pump price for gasoline is also a major determinant for road sector GHG emissions. Figure 17 shows that a negative relation exists between pump price for gasoline and road sector energy consumption in 37 OIC countries in 2010 (which can be used as a proxy for GHG emissions).

Options to mitigate transportation-related GHG emissions

Public policy actions aiming at reducing the transportation-related GHG emissions of transport activities involve one or more of the following measures and as any other public policy action, each measure has its own advantages or disadvantages:

- **Enhancing fuel efficiency:** Using less fuel to travel the same amount of distance will help reduce GHG emissions. To achieve this, one option is to use smaller vehicles. Second option is to increase engine efficiency and employing lighter but still safer materials. The drawback of this option is that more fuel-efficient vehicles may stimulate higher vehicle-kilometers which may partially off-set the fuel savings.
- **Using alternative fuels:** This option involves using more environmentally friendly alternative fuels such as biofuels, natural gas, and electricity. However, using more of these

alternative energy sources have their own drawbacks. An increase in biofuel (such as ethanol and biodiesel) use will not only threaten food security as it is likely to increase food prices, but also increase water use and contribute to the nitrous oxide (N_2O) emission through fertilizer use. Regarding natural gas and electricity, there is still a large room to develop more efficient, affordable and safer cars using these alternative fuels.

- **Adopting environmental pricing:** Following the polluter pays principle which suggests that a pricing mechanism should be established in a way that the polluters must bear the cost of the pollution they cause, environmental pricing schemes in transportation include some forms of taxing the travelers. The easiest way to implement an environmental pricing scheme is increasing the gasoline taxes. Though mainly aiming at reducing congestion, congestion pricing can also be classified as another form of environmental pricing. On the other hand, regarding air transportation, the European Union included aviation into EU Emission Trading Schemes starting from January 1, 2012 which means that the emissions of all the flights starting or ending at an EU airport will be charged. One implication of this inclusion for the non-EU air carriers is the competitive disadvantage arising from the low quotas allocated to these non-EU air carriers.

- **Shifting from** private car use **to environmentally-friendly transport modes:** The most environmentally friendly transportation mode is non-motorized travel and it does not only help reduce GHG emissions, but also contribute to congestion relief and improve public health and leads to better land use practices. The costs associated with non-motorized travel, on the other hand, include increasing travel times and accident rates. Public transit through buses, light rail system and metro can also help reduce surface transport GHG emissions. However, especially light rail system and metro require high infrastructure investment, and transit operations may require state subsidy since transit revenues generally fail to cover transit expenses.

- **Adopting traffic restrictions**: While reducing traffic congestion is the major motivation for adopting this option, traffic restrictions are also expected to help handle transport GHG emissions. Traffic restrictions involve driving bans based on number plates, high occupancy vehicle (HOV) lanes, congestion pricing schemes, and new plate quotas. These policies are difficult to implement politically and may raise equity concerns.

2.5 Transport Movements

As most of the transportation textbooks underline, transportation is a derived demand. We use transportation services to go work, to visit our relatives and friends, to go shopping, etc. That is why, the change in the transportation activities can be used as a proxy for the changes in the overall economic activities. The rise in the container traffic, for example, is a perfect indicator of the growth in the trade and manufacturing industry. On the other hand, the change in the air passenger traffic can reveal how some high-tech and service based industries, which rely more on air travel, are performing.

The changes in the transport and traffic figures may also signal some other aspects of the transportation system. The continuously growing traffic figures at an airport, for example, may imply that a capacity expansion may be needed in the near future. On the other hand, relatively stable traffic figures of a port may reveal a physical bottleneck which becomes a barrier for further traffic growths.

Under this heading of the Outlook, we will look at the traffic changes among the OIC geography in three transport modes: air transport, rail transport, and maritime transport. Due to the lack of comparable data, we fail to analyze the changes in the road transport traffic.

Air Traffic Movements

There is a large variation in the air traffic figures between the OIC member states. On the one hand, several OIC countries achieve some of the globally highest air traffic. According to the 2011 statistics of Airports Council International (http://www.aci.aero/Data-Centre/Annual-Traffic-Data, last visited 27.1.2014), four airports from the OIC countries (Soekarno-Hatta International Airport of Indonesia, Dubai International Airport of United Arab Emirates, Ataturk International Airport of Turkey and Kuala Lumpur International Airport of Malaysia) were ranked in the top 30 busiest airports in terms of movement of passengers and three airports (Dubai International Airport of United Arab Emirates, Doha International Airport, and Kuala Lumpur International Airport of Malaysia) were ranked in the top 30 busiest airports in terms of movement of air cargo. On the other hand, several OIC member countries lack an operating airport and accordingly fail to experience any air traffic movement.

Table 6: Air passenger carried at the OIC Member States in 2013

MENA		Sub-Saharan Africa		Asia	
Turkey	74,353,297	Nigeria	3,752,532	Indonesia	85,102,827
United Arab Emirates	69,191,127	Togo	840,949	Malaysia	46,317,632
Saudi Arabia	28,252,104	Mozambique	630,287	Pakistan	7,799,861
Iran, Islamic Rep.	18,867,486	Sudan	556,767	Kazakhstan	4,850,964
Qatar	18,737,348	Senegal	495,216	Uzbekistan	2,570,358
Egypt, Arab Rep.	9,908,460	Cote d'Ivoire	433,283	Bangladesh	2,089,211
Morocco	6,712,922	Mauritania	309,087	Azerbaijan	1,651,710
Oman	4,994,729	Cameroon	287,209	Afghanistan	1,212,058
Algeria	4,535,326	Somalia	258,341	Brunei Darussalam	1,203,751
Bahrain	4,492,052	Uganda	181,818	Tajikistan	628,668
Tunisia	4,190,038	Gambia, The	146,787	Kyrgyz Republic	525,797
Jordan	3,470,770	Benin	137,639	Suriname	259,070
Kuwait	3,180,230	Burkina Faso	106,002	Guyana	191,975
Libya	2,508,274	Niger	87,932	Turkmenistan	146,935
Lebanon	1,954,014	Gabon	34,101		
Yemen, Rep.	1,254,437	Chad	33,605		
Albania	865,852	Mali	33,449		
Iraq	512,163				

Source: The World Bank World Development Indicators

Table 6 shows the air passenger traffic of the OIC member states for 2012. Among all OIC geography, Indonesia, Turkey, and United Arab Emirates (UAE) had the highest air passenger traffic in 2013. In terms of geographical classification, Turkey, UAE, and Saudi Arabia in the MENA, Nigeria, Togo, and Mozambique in the Sub-Saharan Africa and Indonesia, Malaysia, and Pakistan in the Asia were the top three member states with highest air passenger movement.

In general, more populous countries tend to have higher air passenger traffic. In addition, the income level, geographical position and the availability of alternative transport modes affect the level of air passenger traffic in that country. For example, higher per capita income countries are more likely to have higher per capita air passenger traffic. Similarly, it is possible to observe that island countries where surface transport linkages are quite limited have higher per capita air passenger traffic figures. To analyze the linkage between population and air passenger movements for the OIC member states, we normalized the air passenger movements of the member states with their populations. Table 7 presenting the ratios of air passengers carried to the populations of each member state suggests several implications.

Firstly, in parallel to the theory, the high income gulf countries such as Qatar, UAE, and Bahrain and island states like Brunei Darussalam, Malaysia, and Indonesia have higher per capita air passenger traffic figures. Secondly, the OIC countries with dominant network airlines are more likely to experience higher per capita air passenger traffic. Through hub-and-spoke system, large network airlines such as Turkish Airlines and Emirates connect the spoke cities with their hubs like Istanbul and Dubai. The concentrated air passenger traffic at the hubs then was carried to the final destinations to achieve economies of scale. Therefore, countries having large network airlines tend to experience higher per capita air passenger traffic as in the case of UAE and Turkey.

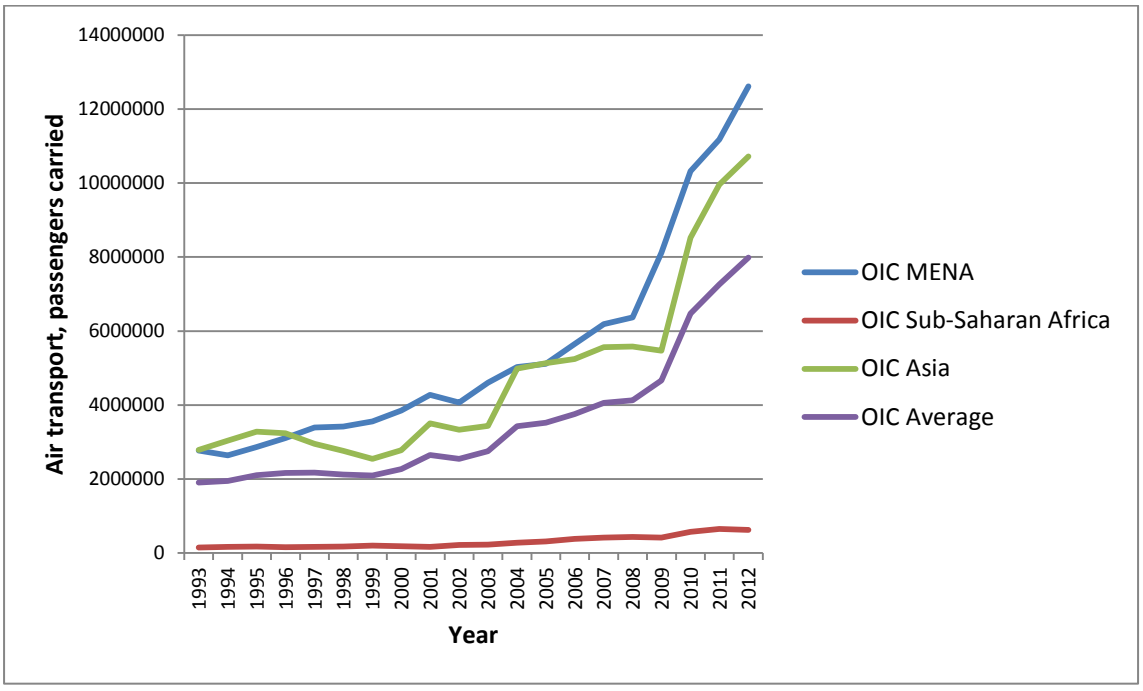
Table 7: Per capita air passengers carried at the OIC Member States in 2012

MENA		Sub-Saharan Africa		Asia	
Qatar	8,38188425	Suriname	0,449965	Brunei Darussalam	2,580148
United Arab Emirates	6,426411342	Togo	0,112267	Malaysia	1,339449
Bahrain	4,448070194	Mauritania	0,085676	Indonesia	0,312547
Oman	1,265546993	Senegal	0,039632	Guyana	0,311528
Kuwait	1,102452057	Nigeria	0,027934	Kazakhstan	0,250442
Saudi Arabia	0,91836585	Mozambique	0,022204	Azerbaijan	0,167796
Turkey	0,856118524	Sudan	0,020899	Tajikistan	0,105759
Jordan	0,528501108	Mali	0,012236	Kyrgyz Republic	0,088612
Lebanon	0,485587206	Cameroon	0,01143	Uzbekistan	0,087098
Albania	0,309929562	Sierra Leone	0,008395	Afghanistan	0,058273
Tunisia	0,304671492	Burkina Faso	0,007636	Pakistan	0,04324
Morocco	0,213520171	Gabon	0,005083	Turkmenistan	0,028514
Iran, Islamic Rep.	0,202245373	Uganda	0,004988	Bangladesh	0,015708
Libya	0,176156038	Cote d'Ivoire	0,00199		
Algeria	0,106091843				
Egypt, Arab Rep.	0,103635936				
Yemen, Rep.	0,054489549				
Iraq	0,024094142				

Source: The World Bank World Development Indicators

We now move to the historical changes of air passenger and cargo traffic in the OIC regions. According to Figure 18 which presents the changes of air passenger carried between 1993 and 2012, OIC Asia outperformed other OIC regions in the 1990-1996 period and OIC MENA took the lead in the 1997-2012 period. Both the OIC regions had higher air passenger traffic than the OIC average while OIC Sub-Saharan Africa felt below that average throughout the 1993-2012 period.

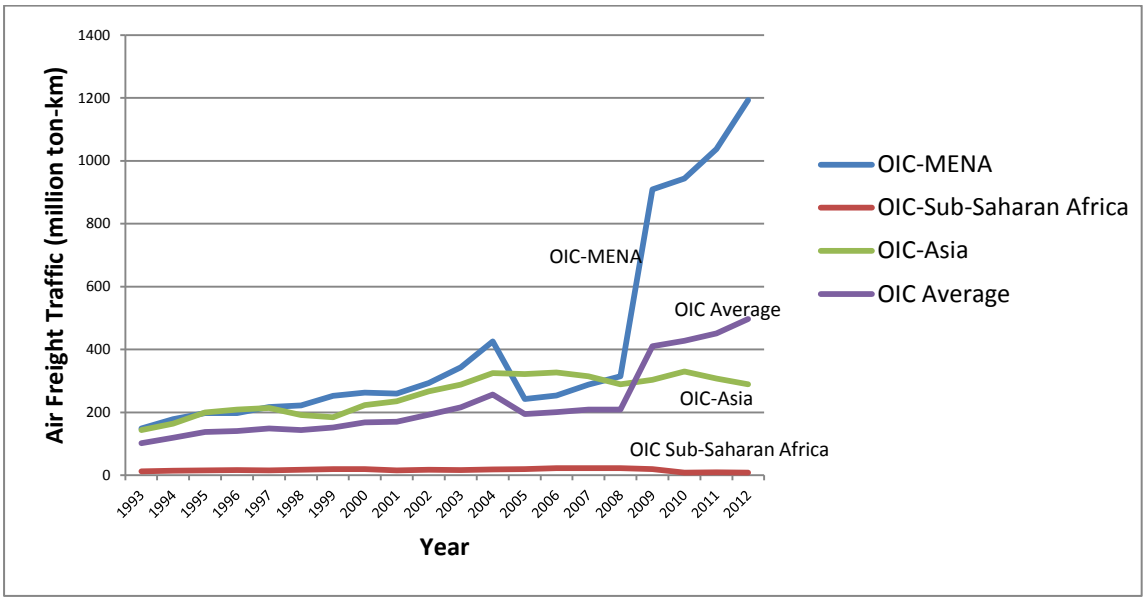
Figure 18: Air passengers carried in the OIC regions in the 1993-2012 period



Source: The World Bank World Development Indicators

Figure 19 shows the changes in the 20 year period between 1993-2012 in the air freight traffic among the OIC regions. One implication of Figure 19 is that air freight traffic in the OIC Sub Saharan Africa has been quite premature and felt well below the OIC averages during the 1993-2012 period. Figure 19 also shows the striking boom of the air freight traffic in OIC MENA. In 1993, the firstyear of Figure 19, the average air freight traffic per member country of both OIC MENA and OIC Asia was quite close where the average air freight traffic per member country at OIC MENA and OIC Asia were 149.1 and 144.1 million ton-km, respectively. However, the respective figures were 1193.5 and 289.5 million ton-km at the end of the 20 year period in 2012. In other words, average air freight traffic in the OIC MENA has increased almost 700% in the 1993-2012 period while the comparable growth at OIC Asia was around 101%. When we decompose the aggregate air freight traffic, we see that the boom of air freight traffic in the OIC MENA region mostly came from United Arab Emirates.

Figure 19: Air freight carried in the OIC regions in the 1993-2012 period

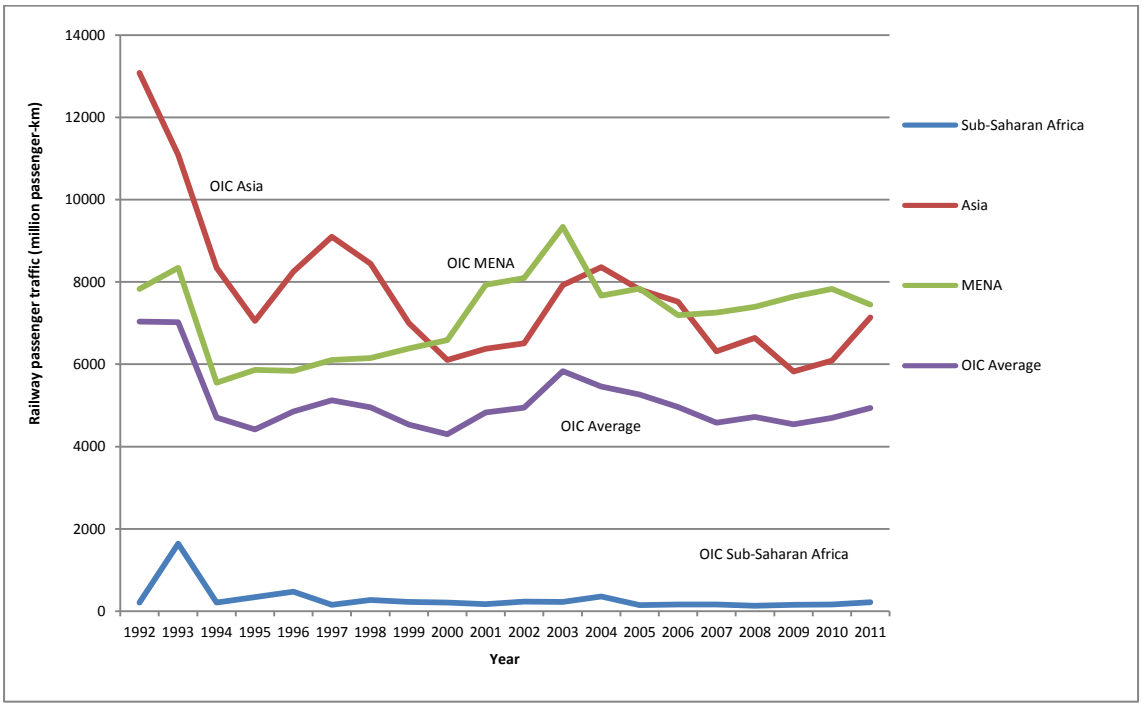


Source: The World Bank World Development Indicators

Rail Traffic Movements

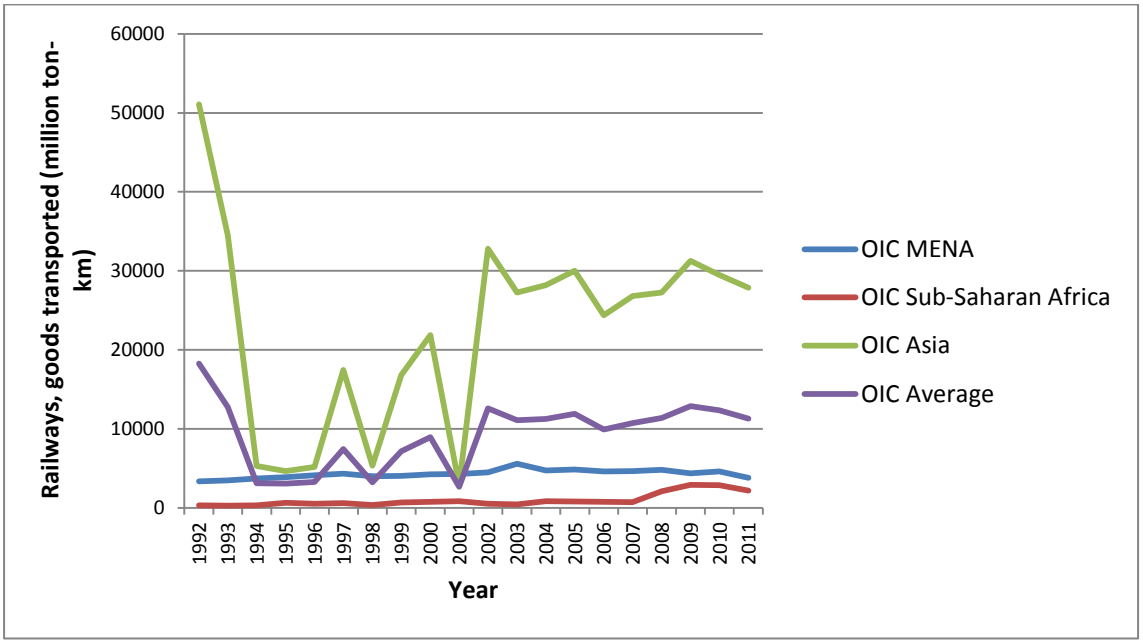
Rail transportation had been the major transport mode especially for most of the inland cities for decades. However, the expanding network of the roads and the improvements in aircraft and road vehicle technology increased the stiff competition from air and road transport. As a result, rail transport has become more freight oriented over time. Today, rail passenger operations are in general financially viable only at some high speed and commuter lines whereas other rail passenger lines are generally subsidized by the governments. Both Figure 20 and 21, which show the changes in the rail passengers and rail freight carried respectively, actually evidence this decline in rail transportation in the OIC regions in the 1992-2011 period. At both of the figures, we fail to see a consistent increasing trend. Indeed, what both figures show instead are relatively fluctuant patterns.

Figure 20: Rail passengers carried in the OIC regions in the 1992-2011 period



Source: The World Bank World Development Indicators

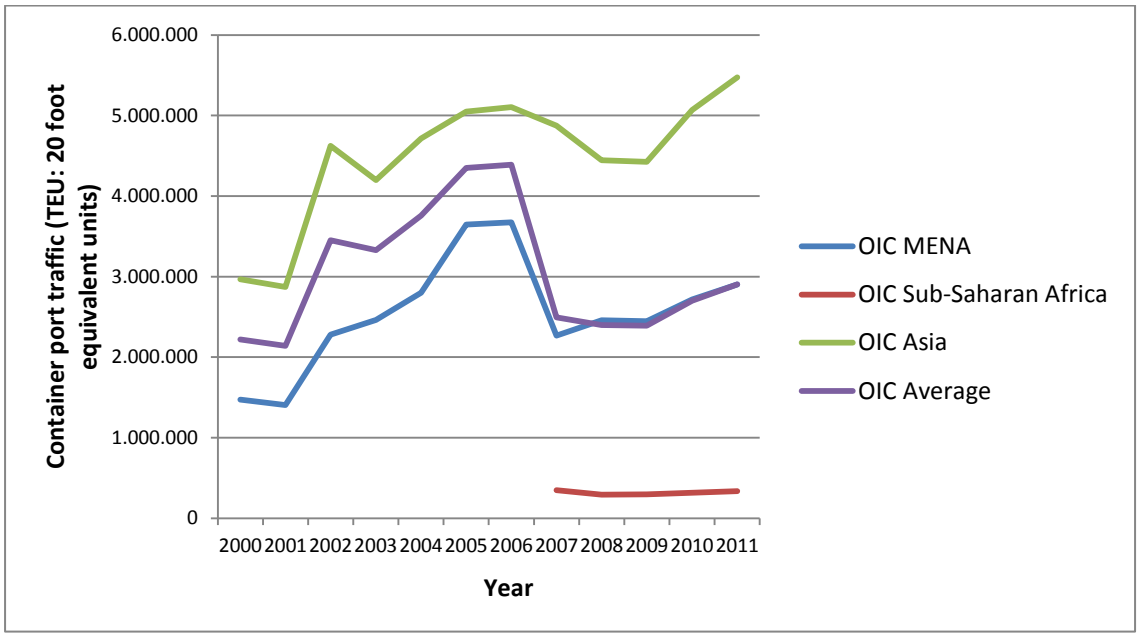
Figure 21: Rail freight carried in the OIC regions in the 1992-2011 period



Source: The World Bank World Development Indicators

Figure 20 reveals that both OIC Asia and OIC MENA performed better than OIC average and OIC Sub-Saharan Africa throughout the period 1992-2011. Egypt, Iran from OIC MENA and Pakistan, Indonesia, and Kazakhstan from OIC Asia have been the leading member states in terms of rail passengers carried. According to Figure 21, average rail freight at OIC Asia, which very largely belonged to the rail freight movements of Kazakhstan, exceeded other OIC regions in the 1992-2011 period. In the OIC MENA, Iran and Turkey combined carried almost two-thirds of the region's rail freight.

Figure 22: Container port traffic in the OIC regions in the 2000-2011 period



Source: The World Bank World Development Indicators

Maritime Traffic Movements

Maritime transport is more characterized by the movement of freights as almost 90% of the global trade, is carried through maritime transport in terms of weight.. With respect to the maritime freight traffic, The World Bank World Development Indicators provide historical statistics on the change in the container port traffic in the OIC regions in the 2000-2011 period. Despite OIC Asia has been the best performing in OIC region in the 2000-2011 period according to Figure 22, such an interpretation may be misleading. Becasue, as a result of the very limited scope of the statistics, OIC Asia is represented by only few countries including Malaysia, Indonesia, and Pakistan which have high container port traffic. On the other hand,

OIC MENA has relatively more observations from many member states; therefore, the standard deviation among the observations is relatively higher than that of OIC Asia. As a result, the average container port traffic of OIC MENA region tend to be lower than that of OIC Asia. Anyway, it is noteworthy that Malaysia, Indonesia, and Pakistan in the OIC Asia, and the UAE, Egypt, and Turkey in the OIC MENA have significant container port traffic in the 2000-2011 period. It should also be underlined that the scope of the container port traffic remained very limited in the OIC Sub-Saharan Africa during the same period.

3. Concluding Remarks

This outlook aims at providing a brief picture of the transportation sector at OIC countries. We specified five dimensions; (1) transportation and trade, (2) transportation infrastructure, (3) transportation privatization, (4) transportation and environment, and (5) transport movements.

Regarding transportation and trade, our analysis reveal that the OIC countries with higher LPI scores tend to engage more in goods trade and are more likely to get higher GCI scores. About fleet growth, the OIC countries fell below the world average for both total fleet and container fleet growths between 1998 and 2012. Among the OIC geography, OIC MENA and OIC Asia performed better than world average in terms of LSCI during the period 2005-2012 while only OIC MENA outperformed world averages in terms of the burden of custom procedures in the 2007-2011 period.

With respect to transport infrastructure, OIC and OIC-Sub Saharan Africa averages fell below the world averages for every transport infrastructure measure according to The Global Competitiveness Report 2012-2013 (2012) of The World Economic Forum while OIC Asia performed better than world averages only in the quality of railroad infrastructure. OIC-MENA, on the other hand, is the best performing OIC region which outperforms all of the world averages except the quality of railroad infrastructure.

As for privatization of transportation and PPPs/PPIs, the concession has been the most widely used PPI-type in the world. Regarding transport modes, the road PPI projects outnumbered other modes in terms of both project counts and total project costs. Among various geographic regions, (1) Middle East and North Africa and (2) Sub-Saharan Africa, the two geography where the most of the OIC countries belong, implemented the fewest number of transport PPI projects.

For the linkage between transportation and environment, statistics show that high income OIC countries tend to both consume more per capita road sector energy and own more per capita passenger cars. In addition, lower pump prices for gasoline stimulate per capita road sector energy consumption in the OIC geography.

Finally, regarding transport movements, our analysis shows that several large countries such as Turkey, Iran, Egypt, Pakistan, Indonesia, and Kazakhstan dominate the traffic movements in the OIC region. The high per capita air passenger movements in the high-income and/or island countries like Qatar, UAE, Bahrain, Brunei Darussalam, Malaysia, and Indonesia is also noteworthy.

As the analyses presented here suggest, a great diversification exists among the OIC countries. On the one hand, oil producing countries such as Qatar, Kuwait, and United Arab Emirates are among the top per capita GDP countries. On the other hand, 21 members (out of 56) of OIC are classified as the least developed and some have a per capita GDP of less than $1 per day. In such a big diversity, adopting a single policy set applicable to all of the OIC members is almost an impossible task. Therefore, when drafting strategies, policy-makers should also take into account the individual needs of the members and abstain from adopting “one size fits all” type of policies and strategies.

The diversity of the OIC countries and availability of various experiences within the OIC also indicate a considerable potential for cooperation in the transport industry. The success of the process heavily depends on the adoption of a sound policy framework, right cooperative approach, institutional capacity and human resources development, and accumulation of expertise. In that context, there is a great scope of cooperation among the OIC countries for sharing their experiences, best practices and technical assistance especially for policy formulation and capacity development and for attracting more investments from other OIC countries in their transport sector.

4. Appendix

Table A.1: Classification of OIC countries by region

OIC-Sub Saharan Africa	OIC-MENA	OIC-Asia
1. Burkina Faso	1. Arab Republic of Egypt	1. Guyana
2. Somalia	2. Jordan	2. Pakistan
3. Nigeria	3. Islamic Republic of Iran	3. Afghanistan
4. Mauritania	4. Bahrain	4. Kyrgyz Republic
5. Benin	5. Morocco	5. Malaysia
6. Cameroon	6. Saudi Arabia	6. Bangladesh
7. Chad	7. Libya	7. Azerbaijan
8. Cote d'Ivoire	8. Algeria	8. Indonesia
9. Djibouti	9. Albania	9. Kazakhstan
10. Gabon	10. Iraq	10. Maldives
11. Guinea	11. Lebanon	11. Tajikistan
12. Guinea-Bissau	12. Tunisia	12. Turkmenistan
13. Mali	13. Turkey	13. Uzbekistan
14. Mozambique	14. Republic of Yemen	14. Brunei Darussalam
15. Niger	15. Qatar	15. Suriname
16. Senegal	16. Oman	
17. Sierra Leone	17. Kuwait	
18. The Gambia	18. Palestine	
19. Sudan	19. United Arab Emirates	
20. Togo		
21. Uganda		
22. Comoros		

Table A.2: LPI scores of the OIC countries

Country	LPI score-2014	LPI score-2012	LPI score-2010	LPI score-2007
Malaysia	3,59	3,49	3,44	3,48
United Arab Emirates	3,54	3,78	3,63	3,73
Qatar	3,52	3,32	2,95	2,98
Turkey	3,50	3,51	3,22	3,15
Saudi Arabia	3,15	3,18	3,22	3,02
Bahrain	3,08	3,05	3,37	3,15
Indonesia	3,08	2,94	2,76	3,01
Kuwait	3,01	2,83	3,28	2,99
Oman	3,00	2,89	2,84	2,92
Egypt, Arab Rep.	2,97	2,98	2,61	2,37
Jordan	2,87	2,56	2,74	2,89
Pakistan	2,83	2,83	2,53	2,62
Nigeria	2,81	2,45	2,59	2,40
Côte d'Ivoire	2,76	2,73	2,53	2,36
Maldives	2,75	2,55	2,40	-
Lebanon	2,73	2,58	3,34	2,37
Kazakhstan	2,70	2,69	2,83	2,12
Algeria	2,65	2,41	2,36	2,06
Burkina Faso	2,64	2,32	2,23	2,24
Senegal	2,62	2,49	2,86	2,37
Bangladesh	2,56	-	2,74	2,47
Benin	2,56	2,85	2,79	2,45
Tunisia	2,55	3,17	2,84	2,76
Chad	2,53	2,03	2,49	1,98
Tajikistan	2,53	2,28	2,35	1,93
Libya	2,50	2,28	2,33	-
Mali	2,50	-	2,27	2,29
Guinea	2,46	2,48	2,60	2,71
Guyana	2,46	2,33	2,27	2,05
Azerbaijan	2,45	2,48	2,64	2,29
Guinea-Bissau	2,43	2,60	2,10	2,28
Comoros	2,40	2,14	2,45	2,48
Uzbekistan	2,39	2,46	2,79	2,16
Niger	2,39	2,69	2,54	1,97
Togo	2,32	2,58	2,60	2,25
Turkmenistan	2,30	-	2,49	-
Iraq	2,30	2,16	2,11	-
Cameroon	2,30	2,53	2,55	2,49

Gambia, The	2,25	2,46	2,49	2,52
Mozambique	2,23	-	2,29	2,29
Mauritania	2,23	2,40	-	2,63
Kyrgyz Republic	2,21	2,35	2,62	2,35
Gabon	2,20	2,34	2,41	2,10
Yemen, Rep.	2,18	2,89	2,58	2,29
Sudan	2,16	2,10	2,21	2,71
Djibouti	2,15	1,80	2,39	1,94
Afghanistan	2,07	2,30	2,24	1,21
Somalia	1,77	-	1,34	2,16
Morocco	-	3,03	-	2,38
Albania	-	2,77	2,46	2,08
Iran, Islamic Rep.	-	2,49	2,57	2,51
Sierra Leone	-	2,08	1,97	1,95
Uganda	-	-	2,82	2,49

Source: The World Bank World Development Indicators

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