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

Meeting the Diverse Needs of the Member States

TRANSPORT OUTLOOK 2013

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 Trade, Transport and Communication, Tourism, Agriculture, Poverty Alleviation, and 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 COMCEC region 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 its member countries.

This COMCEC Transport Outlook - **Meeting the Diverse Needs of the Member States** is the First Issue of the COMCEC Transport Outlook Series planned to be published by the COMCEC Coordination Office twice a year. 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 substantial emphasis on the transportation sector within the OIC (Organization of Islamic Cooperation) framework. Firstly, one of the three principles of COMCEC Strategy i.e. enhancing mobility (the other two are strengthening solidarity and improving governance), directly relates to the transportation. Secondly, transportation is explicitly declared by COMCEC as one of the three priority sectors together with agriculture and tourism. Thirdly, it is one of the six cooperation areas (the others are trade, tourism, agriculture, poverty alleviation, and finance) specified by the COMCEC Strategy.

Such an emphasis on the transport sector is not surprising since it is crucial for both the economic and social development of the nations. From the households' point of view, we spend considerable time and money for traveling to achieve 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. A couple of 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 EU's gross domestic product (GDP) and 4.5% of its total employment (European Commission, 2013). In addition, expenditure on transport goods and services correspond to, on average, 13.2% of household's budget within 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 the insufficient public budgets and inefficient provision of transport services through public ownership and management. From the environmental point of view, transport activities are one of the biggest sources of green-house 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. Given these current challenges facing transportation sector, this brief outlook, through a concentrated and focused approach, attempts to provide an overview on how OIC countries are performing in terms of four major policy areas; (1) transportation and trade, (2) transportation infrastructure, (3) transportation privatization, and (4) transportation and environment.

The analyses within this outlook include comparisons between OIC countries and other regions such as European Union (EU), Latin America and the Caribbean, East Asia and Pacific, and Organisation for Economic Co-operation and Development (OECD). For more detailed analysis, we sometimes divided 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, the globalization of the world trade, 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, which 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 deserves detailed analysis and discussion. However, through a concentrated and focused approach, this brief Outlook has identified 4 major challenges ((1) transportation and trade, (2) transportation infrastructure, (3) transportation privatization, and (4) transportation and environment) and attempts to provide an outline about them.

2.1 Transportation and trade

The logistics infrastructure and 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

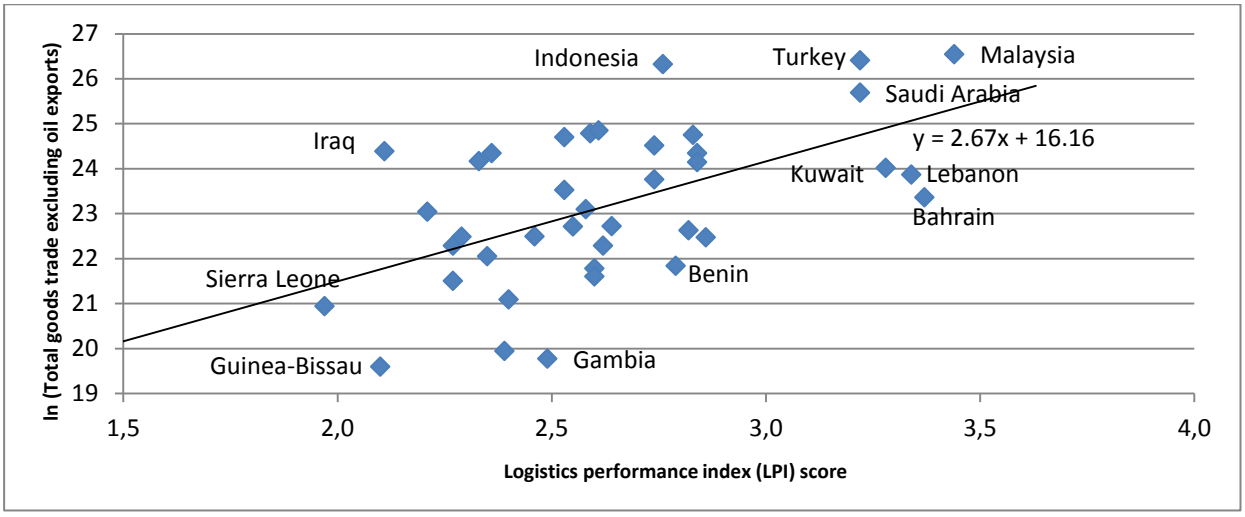
infrastructure/services gain competitive advantage in the global trade. That is why, as a historical fact, trade capitals of the world have been those cities/countries with better accessibility and connectivity. The rapid growth of world trade after World War II as a result of decreasing transportation 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 of the shares of the countries in the global trade. In this section, we will analyze a couple important measures to see the current situation of 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 2007, 2010, and 2012. From the OIC point of view, 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 OIC countries for 2007, 2010, and 2012.

Logistics costs have become more important over time for two main reasons. First, the tendency to shift the production facilities abroad to enjoy lower labor costs necessitates more movement of goods (raw materials and final product). Second, with decreasing tariffs, logistics costs increase in ad valorem terms and turn into an important factor in the prices of the products. That is why the nations with a strategic perspective 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 2010. Data on international goods trade and LPI scores came from The World Bank World Development Indicators and we used the Economywatch's data for the value of oil exports by countries. Figure 1 suggests that there is a positive relation between LPI scores and total goods trades. 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 1 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.

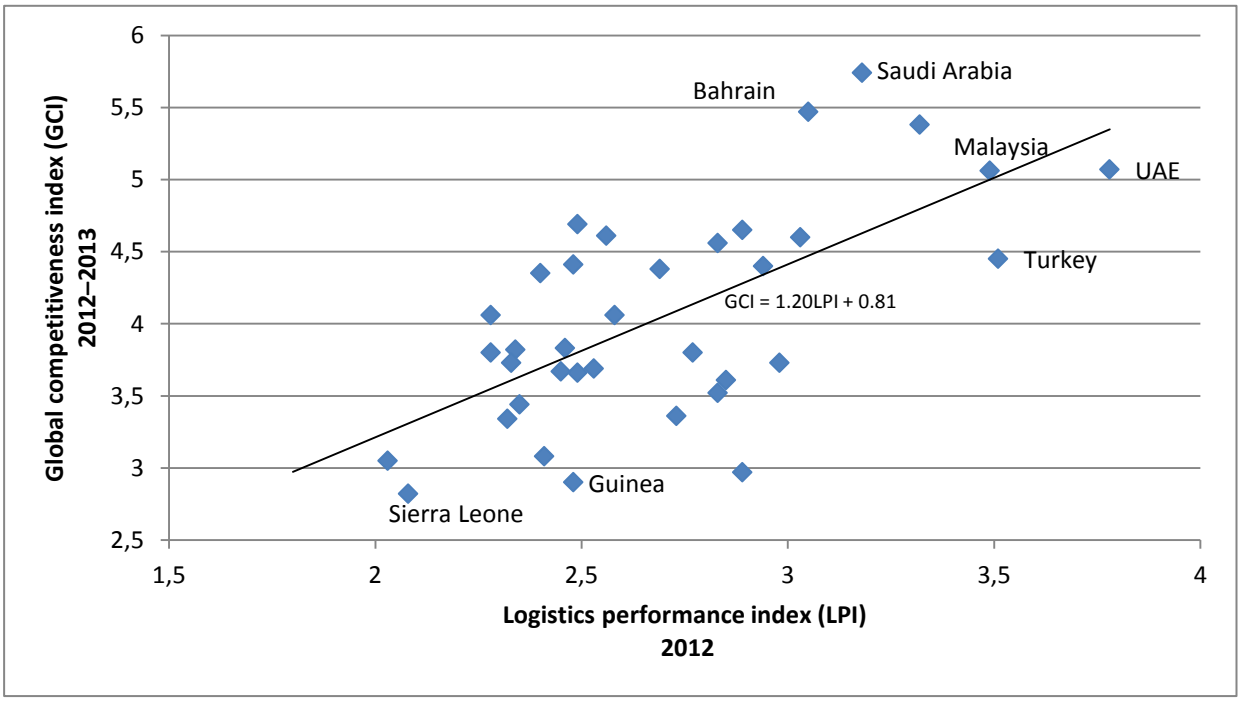
Figure 1: Total goods trades (excluding oil exports) and LPI scores in OIC countries in 2010



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, OIC countries with higher LPI scores tend to engage more in international goods trade. High LPI score countries are more likely to gain competitive advantage over those having lower LPI scores because high LPI score countries can facilitate their international trade easier through their enhanced logistics infrastructure and services. Figure 2 shows this relation for 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 2012-2013 period. Based on these data, a bivariate regression analysis shows that a 1 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.

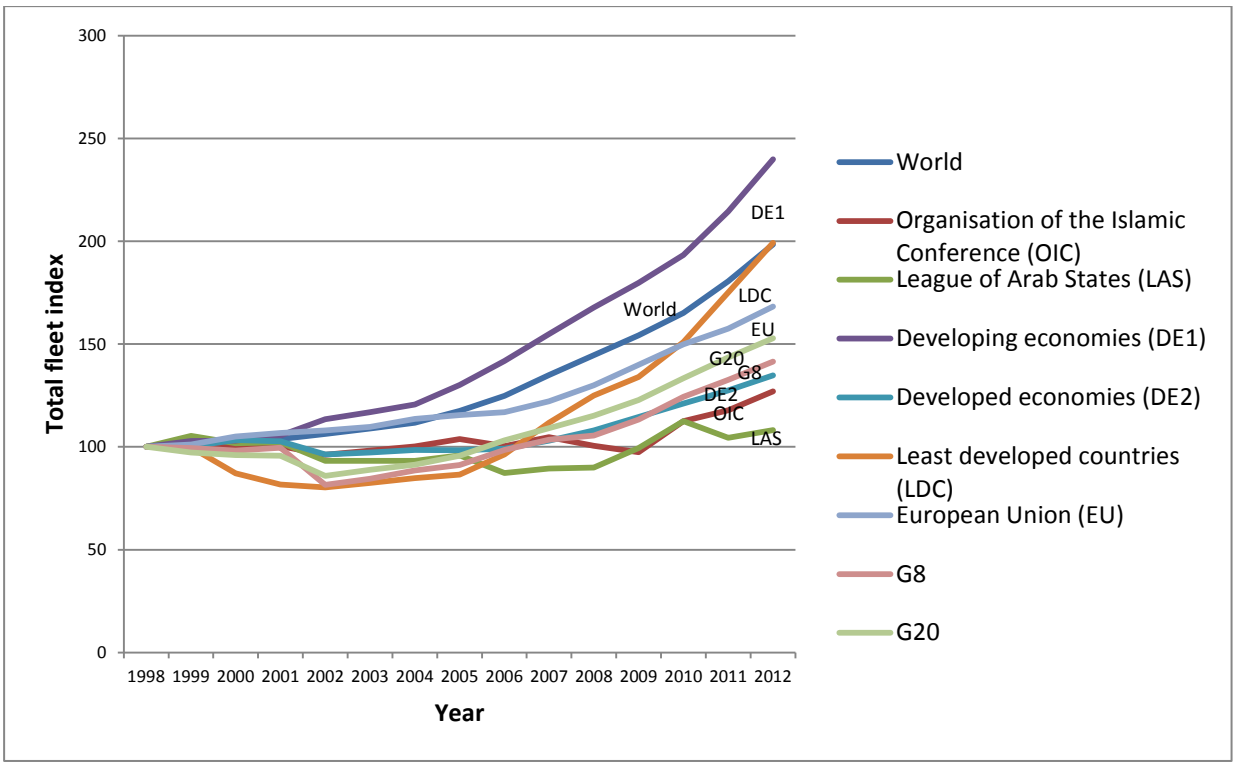
Figure 2: 2012 LPI scores and 2012-2013 GCI scores of the OIC countries



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 1998-2012 period. During this 15-year period, world fleet has increased 99% while only developing countries, among 9 international groupings classified in Figure 3, outperformed this global average. OIC countries failed to achieve the world average in fleet growth and only increased their fleet by 27%. Similarly, League of Arab States (LAS) fell below world average and grew its fleet by 8%. 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) countries, and (6) group of twenty (G20) countries, can also be seen at Figure 3.

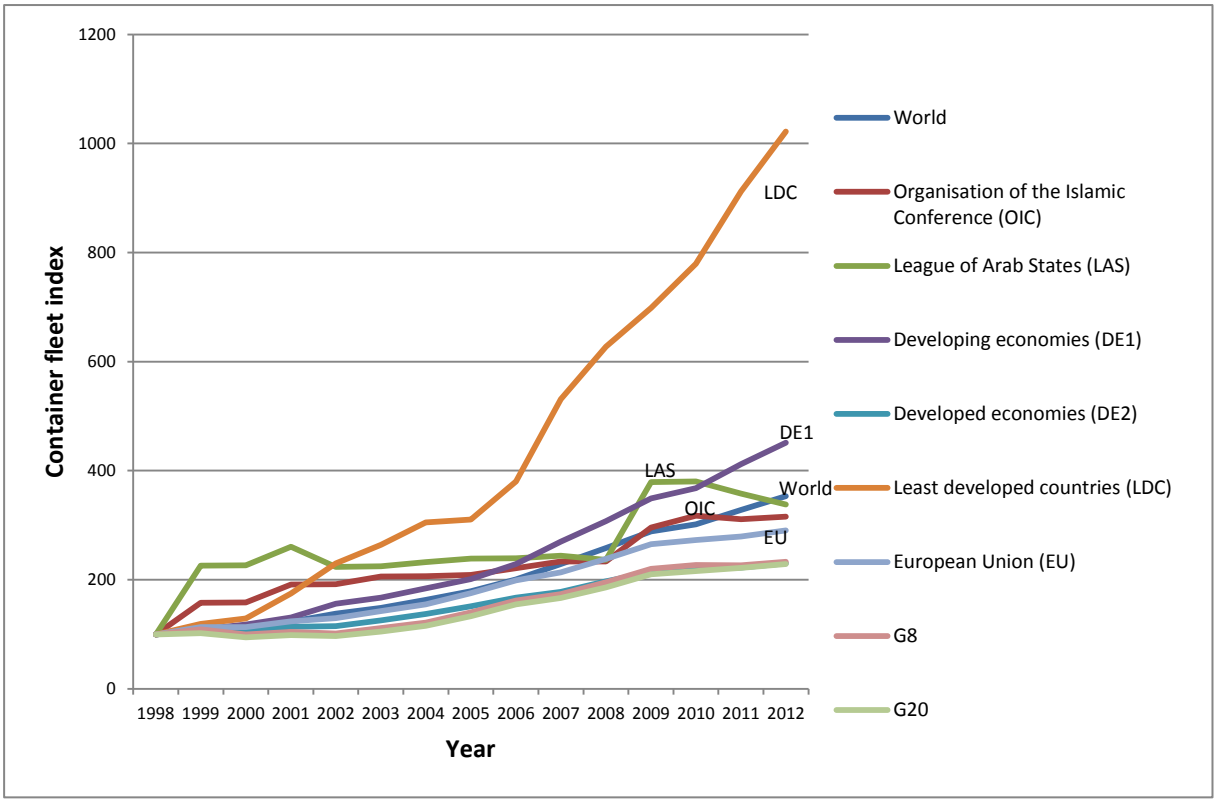
Figure 3: Change in total fleet (in dead weight tons in thousands) by flag of registration for the 1998-2012 period (1998 value=100)



Source: UNCTAD Database

Containerization, one of the most influential phenomenon 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 of container fleet outpaced that of total fleet. While world total fleet has increased 99% between 1998 and 2012, world container fleet has increased 253% during the same period. Like in the case of change in the total fleet, the change in container fleet of OIC and LAB countries underperformed with respect to world average but this time at least they were able increase their container fleet more than DE2, EU, G8, and G20 (Figure 4).

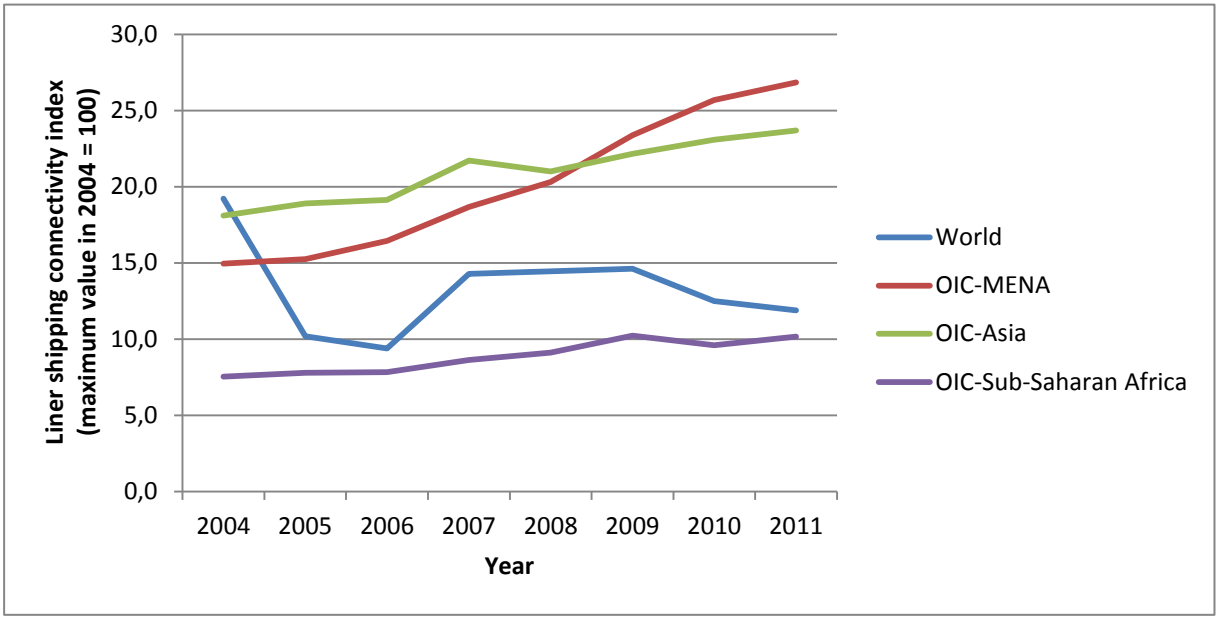
Figure 4: Change in container fleet (in dead weight tons in thousands) by flag of registration for the 1998-2012 period (1998 value=100)



Source: UNCTAD Database

Third measure we will explore is liner shipping connectivity index (LSCI) that is provided by The World Bank. We divided OIC countries into OIC-MENA, OIC-Asia, and OIC-Sub-Saharan Africa to be able to analyze the LSCI trends among OIC geography. Figure 5 provides, in average, the LSCI changes for the OIC-groupings between 2004 and 2011. As the figure suggests, starting from 2005, 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. Throughout the 2004-2011 period, average LSCI scores for OIC-Sub-Saharan Africa region, however, fell below the world averages.

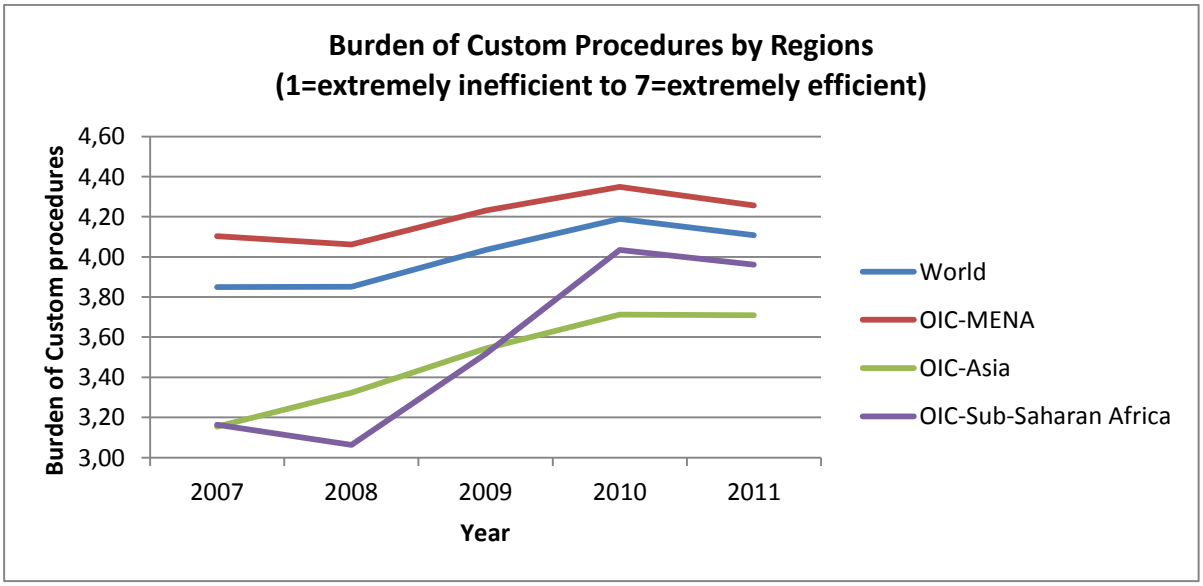
Figure 5: The liner shipping connectivity index by OIC regions in the 2004-2011 period



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 OIC countries as OIC-MENA, OIC-Asia, and OIC-Sub-Saharan Africa to be able to analyze the trends, which are provided at Figure 6, among OIC geography. 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 for OIC-Sub-Saharan Africa had custom efficiency scores below the world average.

Figure 6: The burden of custom procedures by OIC regions in the 2007-2011 period



Source: The World Bank World Development Indicators

2.2 Transportation infrastructure

Transport infrastructure is crucial for both the economic and social development of the nations. It is therefore not surprising to see that developing the transport infrastructure is assessed as a powerful instrument for a wide variety of policy goals such as reducing logistics costs, enabling the mobility of the workforce, reducing poverty (through enhancing rural road infrastructure), reducing congestion, 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 the least developed nations, the major concern is to establish a transportation infrastructure meeting at least the basic needs.

The variation in the needs of transportation infrastructure across 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 of low 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 the quality of transport infrastructure in terms of indexes among 42 OIC countries (16 from OIC Sub Saharan Africa, 16 from OIC MENA, and 10 from OIC Asia) whose indexes are provided. The indexes, which are compiled for The Global Competitiveness Report 2012–2013 (2012) of World Economic Forum, range from 1 to 7 where 1 represents the extremely underdeveloped infrastructure and 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 for every measure. Second, OIC-MENA performs better than world average in every measure except the quality of railroad infrastructure. Third, 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)

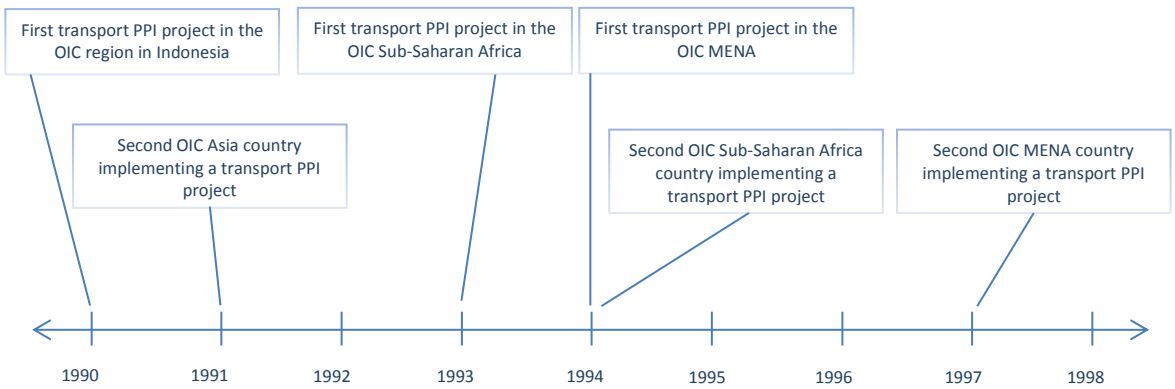
2.3 Transportation privatization

Network industries necessitating big infrastructure investments such as transportation, telecommunication, energy, and water have been traditionally state owned and operated for two major reasons. First, huge initial investments created a barrier to entry for the private investors. Second, 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. No matter whether 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 where the private operator obtained a concession to operate the canal for 99 years. Other transportation concessions during the Ottoman Empire era included 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. First PPI project in OIC Sub-Saharan Africa and OIC MENA were implemented in Mozambique in 1993 and in Turkey in 1994, respectively. 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, and OIC countries, on average, 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 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 closures of a total of 5,238 PPI projects were finalized in the world between 1990 and 2011. Energy sector had the largest share (43.6%) in terms of number of PPI projects and it was followed by transport sector with a 26.2% share (Table 3).

Table 3: Distribution of PPI projects by infrastructure sectors in the 1990-2011 period

Sectors	Number of PPI projects	Percentage shares
Energy	2,283	43.6%
Telecom	822	15.7%
Transport	1,371	26.2%
Water and sewerage	762	14.5%
Total	5,238	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 1990-2011 period, shows that some variations in PPI-type existed depending on the characteristics of the 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, both in absolute and percentage terms, than transport and water and sewerage sectors did. In addition, water and sewerage sector used management and lease contracts more than any other sector did.

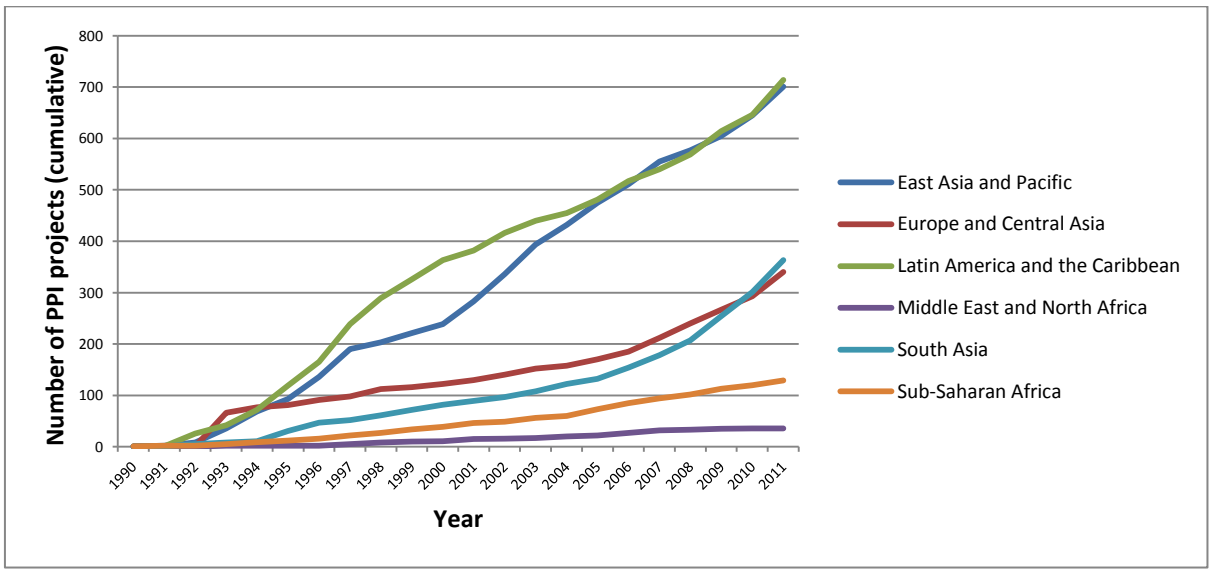
Table 4: Distribution of the transport PPI projects by PPI-types in the 1990-2011 period

Sector	Concession	Divestiture	Greenfield project	Management and lease contract	Total
Energy	202	405	1,633	43	2,283
Telecom	9	195	611	7	822
Transport	787	69	440	75	1,371
Water and sewerage	295	29	318	120	762

Source: The World Bank Private Participation in Infrastructure Database

Our analysis now moves to the use of PPP/PPI models by geographic regions. PPP/PPI models have not penetrated equally to every geographic region, a fact that can be observed at Figure 8 showing the cumulative changes in the number of PPI projects by geographic regions in the 1990-2011 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 while (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 PPI projects.

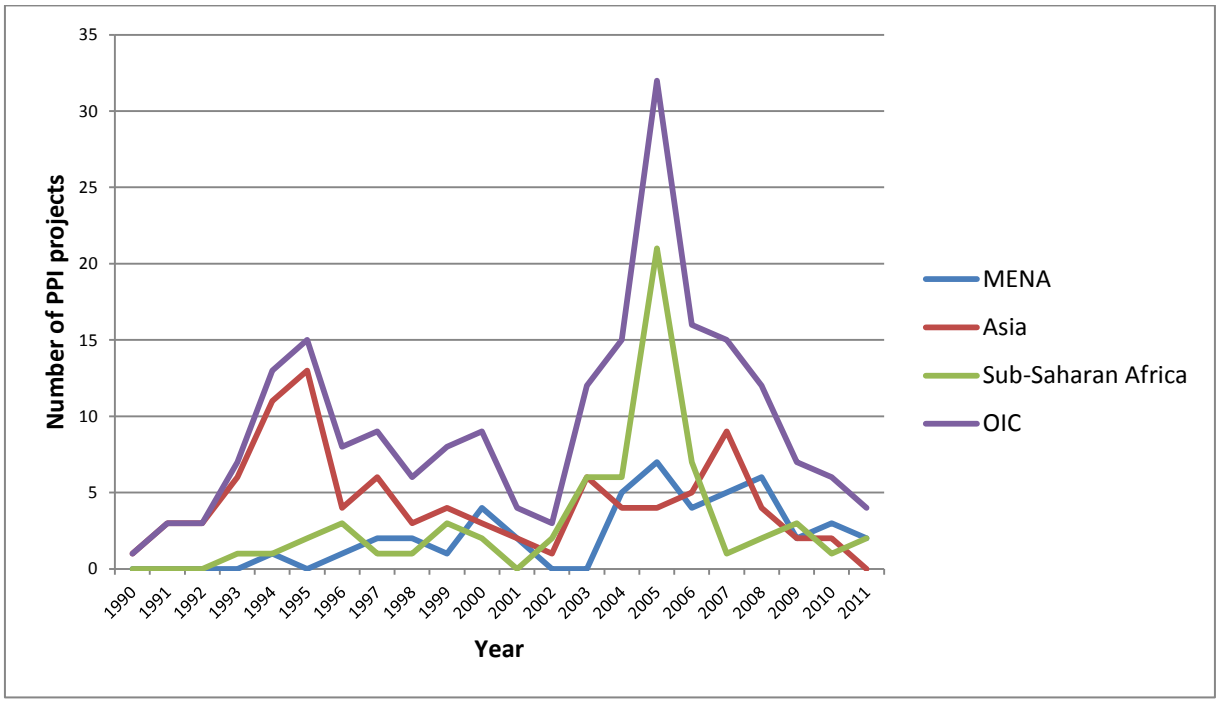
Figure 8: Changes in the cumulative number of PPI projects by regions for the 1990-2011 period



Source: The World Bank Private Participation in Infrastructure Database

After a snapshot on the distribution of PPI projects by global geographic regions, we now focus specifically on the 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 worth noting.

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

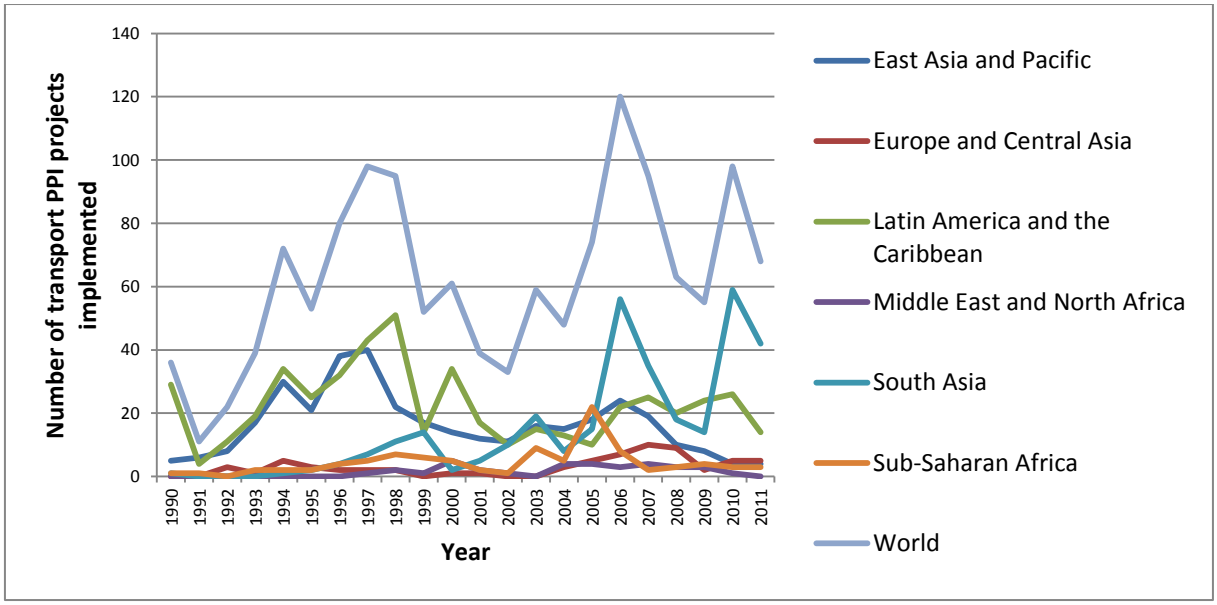


Source: The World Bank Private Participation in Infrastructure Database

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 1990-2011 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 again remained at the bottom of the figure. Another interesting feature of the figure is its fluctuative pattern as a result of regional and global crises which proves that PPI/PPP implementation has been quite sensitive to economic stability.

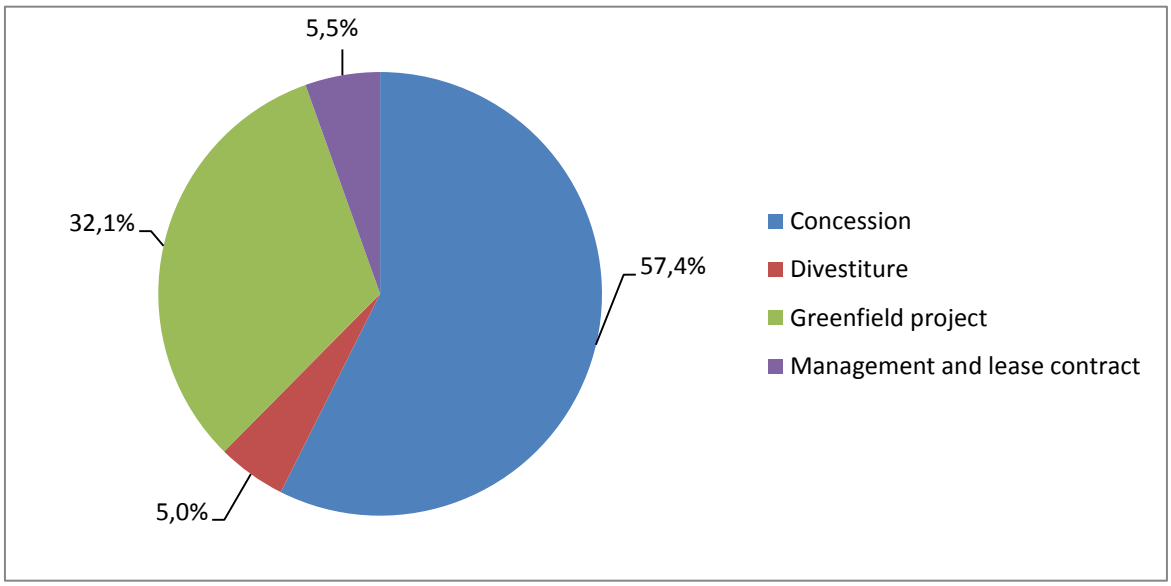
Figure 10: Changes in the number of transport PPI projects by regions in the 1990-2011 period



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 been the most frequently implemented PPI type. Almost 57.4% of all transport PPI projects have been realized through concessions while 32.1% of the transport PPI projects were greenfield. Management and lease contract and divestitures had relatively lower shares with 5.5% and 5%, respectively.

Figure 11: Distribution of transport PPI projects by types in the 1990-2011 period



Source: The World Bank Private Participation in Infrastructure Database

With respect to the distribution of transport PPI projects by modes, road PPI projects outnumbered others with a share of 51.7% while seaports, railroads, and airports had the shares of 19.5%, 17.9%, and 10.9%, 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 1990-2011

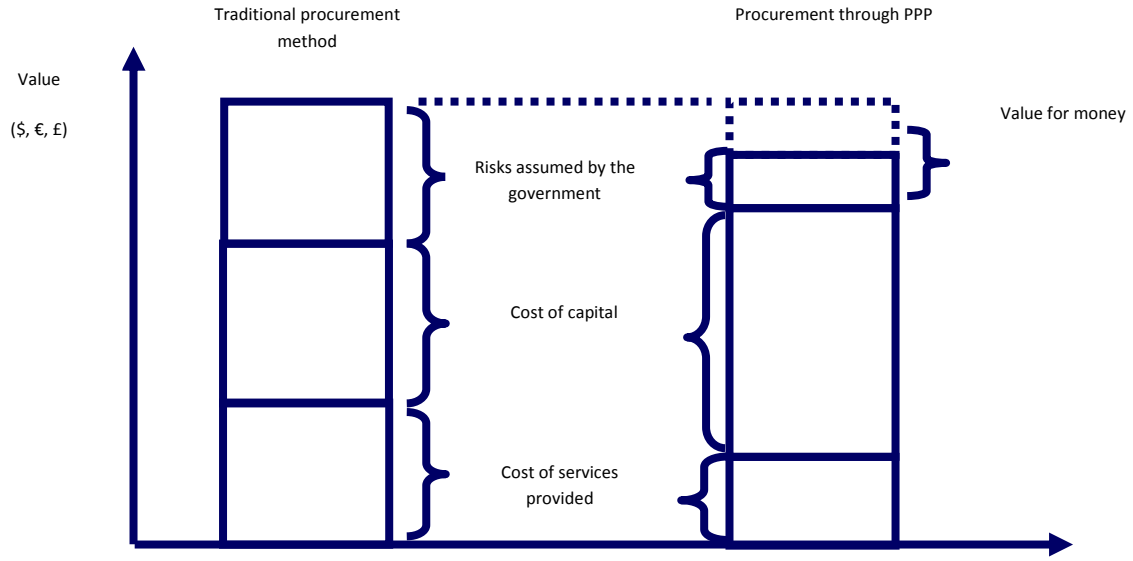
Subsector	Project Count	% Project Count	Total Investment (billion $)	% Total Investment
Airports	145	10.6%	33,957	10.9%
Railroads	116	8.4%	55,712	17.9%
Roads	731	53.2%	160,495	51.7%
Seaports	381	27.7%	60,488	19.5%
Total	1,373	100.0%	310,652	100.0%

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 as: (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



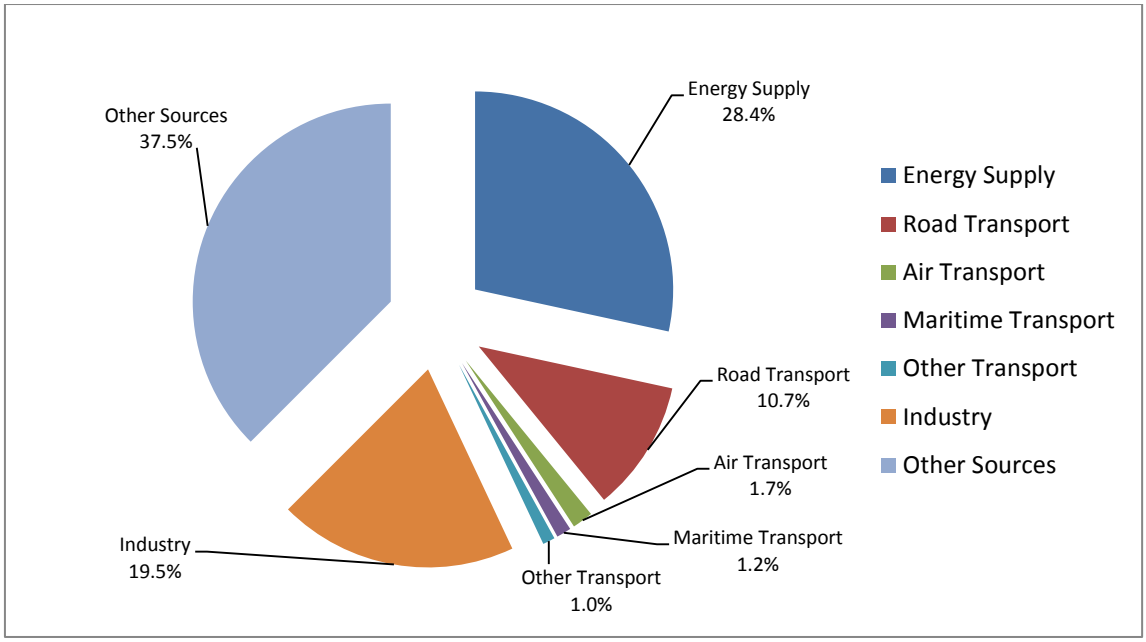
Source: (Moriarty, 2006)

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. The advantages of the PPP-type procurement arise, on the other hand, 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 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 both 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% and 21%, for the 1971-1990 and 1990-2002 periods, respectively (OECD/IEA, 2012). Based on The Emissions Database for Global Atmospheric Research (EDGAR) and IEA data for year 2005, transportation activities were responsible for 14.6% of all greenhouse gas (GHG) emissions, making these activities 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% which are followed by air transport (1.7%) and maritime transport (1.2%) GHG emissions (Figure 13). Regards to CO_2, which is the most emitted GHG, transportation accounted for 22% of global CO_2 emissions; making 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

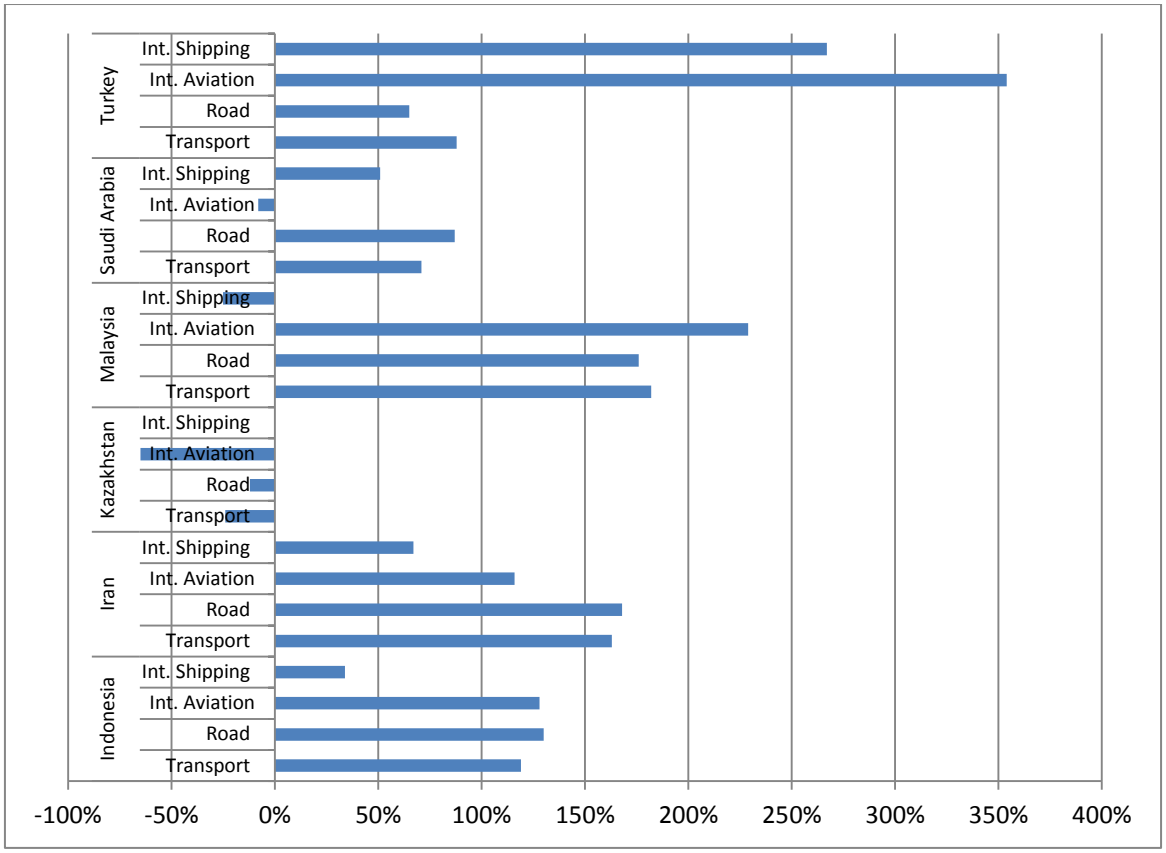


Source: International Transport Forum, 2010; (EDGAR 4.0 (2009) and IEA)

Interaction between transportation and environment in 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. Looking at OIC countries specifically, IEA data (2009) reveal that the first four top per capita energy CO_2 emitters in the world are OIC countries (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. In the same year, some other notable OIC countries with lower per capita income such as Turkey and Pakistan, on the other hand, 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.

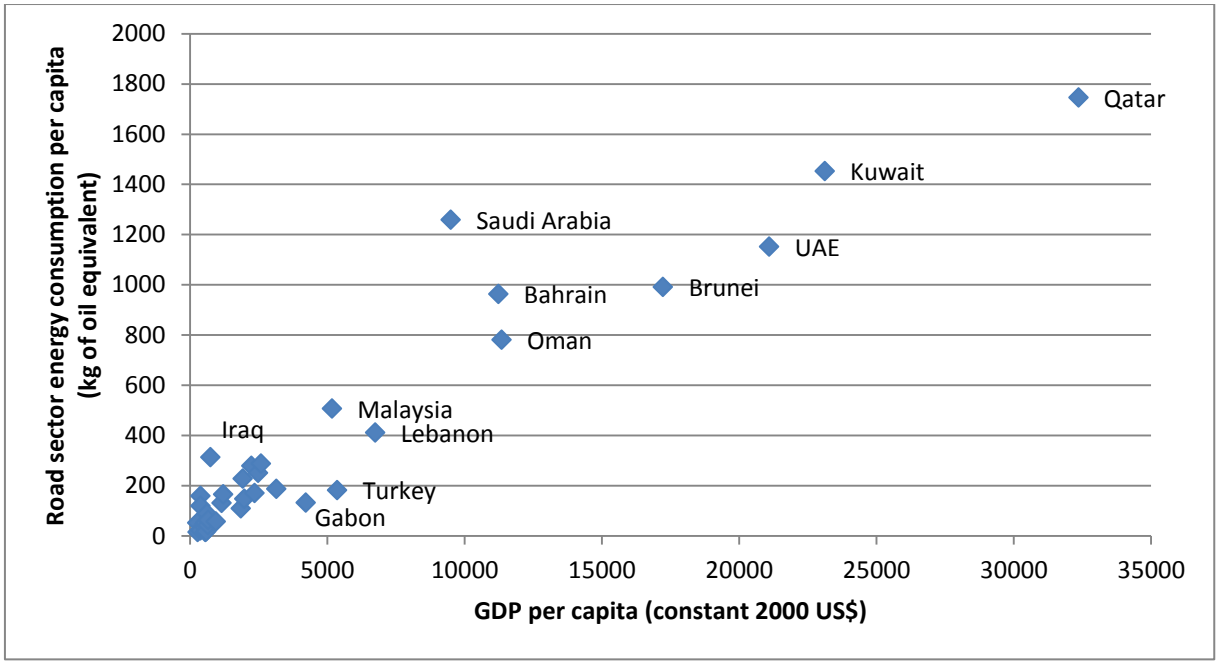
Figure 14: Changes in transport CO_2 emissions of the selected OIC countries for the 1990-2007 period



Source: International Transport Forum, 2010

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

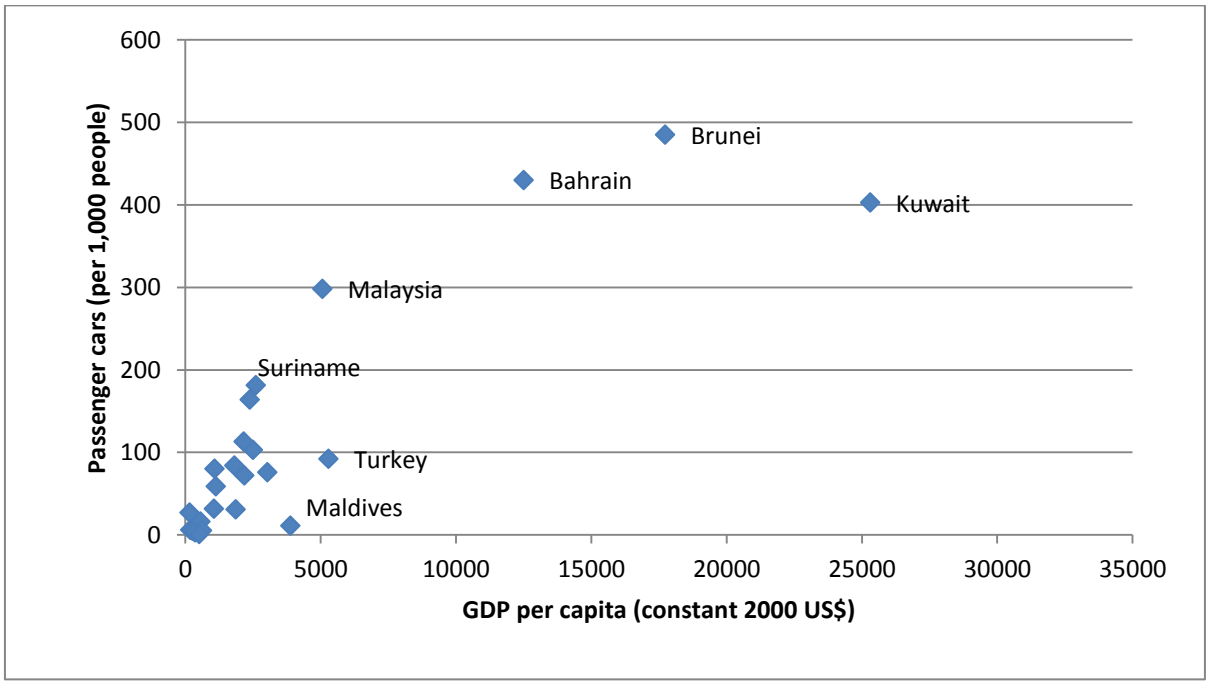
Figure 15: Road sector energy consumption per capita and per capita income in 36 OIC countries in 2010



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 personal 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, 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 at the same time the top per capita road sector energy consumers. On the other hand, OIC countries with lower per capita income group in the lower-left part of the Figure 15 implying that these countries consume less per capita road sector energy.

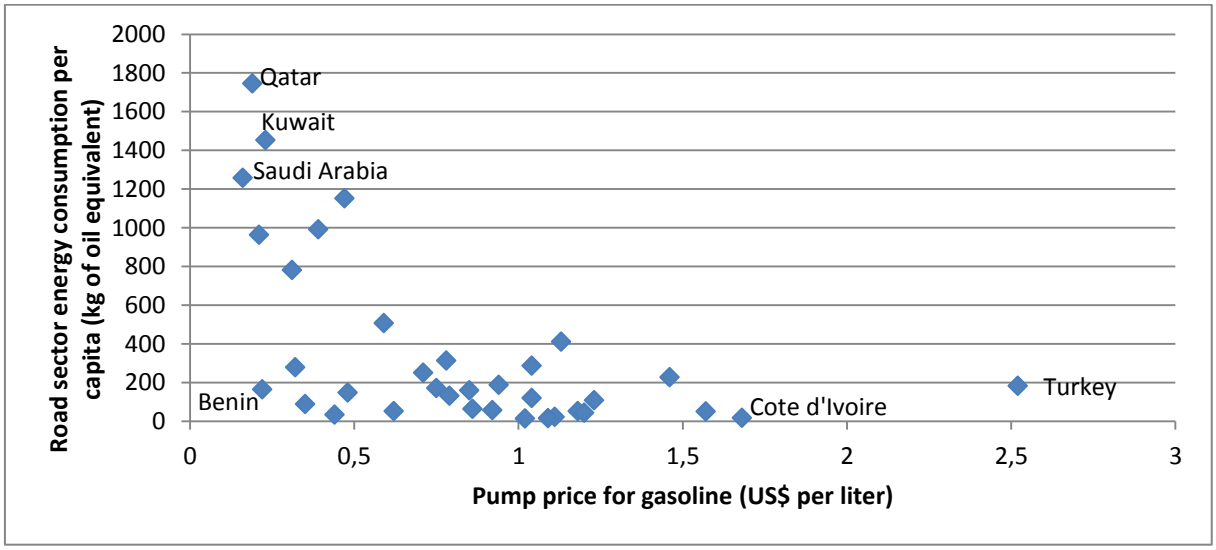
Figure 16: Passenger Cars and Per Capita Income in COMCEC Countries in 2010



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 personal 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 2008.

Figure 17: Road sector energy consumption per capita and pump price for gasoline in COMCEC countries 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 and 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.

- **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 will 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 pay principle suggesting 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. Regarding air transportation, on the other hand, European Union included aviation into EU Emission Trading Schemes starting from January 1, 2012 meaning that the emissions of all the flights starting/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 personal 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, improve public health, and leads to better land use practices. The costs associated with non-motorized travel, on the other hand, include increased travel times and accident rates. Public transit, through buses, light rail, and metro, can also help reduce surface transport GHG emissions. However, especially light rail 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 plate numbers, high occupancy vehicle (HOV) lanes, congestion pricing schemes, and new plate quotas. These policies are difficult to implement politically and may raise equity concerns.

3. Concluding Remarks

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

Regarding transportation and trade, our analysis reveal that 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, OIC countries fell below the world averages 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 averages in terms of LSCI during the 2005-2012 period 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 transportation privatizations and PPPs/PPIs, the concession has been the most widely used PPI-type in the world. Regarding transport modes, road PPI projects outnumbered other modes in terms of both project count 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.

Finally, 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.

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 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 the 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. Egypt, Arab Rep.	1. Guyana
2. Somalia	2. Jordan	2. Pakistan
3. Nigeria	3. Iran, Islamic Rep.	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. Yemen, Rep.	14. Brunei Darussalam
15. Niger	15. Qatar	
16. Senegal	16. Oman	
17. Sierra Leone	17. Kuwait	
18. Gambia, The	18. Palestine	
19. Sudan	19. United Arab Emirates	
20. Suriname		
21. Togo		
22. Uganda		
23. Comoros		

Table A.2: LPI scores of the OIC countries

Country	LPI score-2012	LPI score-2010	LPI score-2007
United Arab Emirates	3.78	3.63	3.73
Turkey	3.51	3.22	3.15
Malaysia	3.49	3.44	3.48
Qatar	3.32	2.95	2.98
Saudi Arabia	3.18	3.22	3.02
Tunisia	3.17	2.84	2.76
Bahrain	3.05	3.37	3.15
Morocco	3.03	-	2.38
Egypt. Arab Rep.	2.98	2.61	2.37
Indonesia	2.94	2.76	3.01
Yemen. Rep.	2.89	2.58	2.29
Oman	2.89	2.84	2.92
Benin	2.85	2.79	2.45
Kuwait	2.83	3.28	2.99
Pakistan	2.83	2.53	2.62
Albania	2.77	2.46	2.08
Cote d'Ivoire	2.73	2.53	2.36
Niger	2.69	2.54	1.97
Kazakhstan	2.69	2.83	2.12
Guinea-Bissau	2.6	2.1	2.28
Togo	2.58	2.6	2.25

Lebanon	2.58	3.34	2.37
Jordan	2.56	2.74	2.89
Maldives	2.55	2.4	-
Cameroon	2.53	2.55	2.49
Senegal	2.49	2.86	2.37
Iran. Islamic Rep.	2.49	2.57	2.51
Guinea	2.48	2.6	2.71
Azerbaijan	2.48	2.64	2.29
Gambia. The	2.46	2.49	2.52
Uzbekistan	2.46	2.79	2.16
Nigeria	2.45	2.59	2.4
Algeria	2.41	2.36	2.06
Mauritania	2.4	-	2.63
Kyrgyz Republic	2.35	2.62	2.35
Gabon	2.34	2.41	2.1
Guyana	2.33	2.27	2.05
Burkina Faso	2.32	2.23	2.24
Afghanistan	2.3	2.24	1.21
Libya	2.28	2.33	-
Tajikistan	2.28	2.35	1.93
Iraq	2.16	2.11	-
Comoros	2.14	2.45	2.48

Sudan	2.1	2.21	2.71
Sierra Leone	2.08	1.97	1.95
Chad	2.03	2.49	1.98
Djibouti	1.8	2.39	1.94
Somalia	-	1.34	2.16
Mali	-	2.27	2.29
Mozambique	-	2.29	2.29
Uganda	-	2.82	2.49
Bangladesh	-	2.74	2.47
Turkmenistan	-	2.49	-

Source: The World Bank World Development Indicators

5. References

Economywatch, www.economywatch.com/economic-statistics/economic-indicators/Value_Oil_Exports/ (last accessed 15 March 2013).

European Commission Web Site, http://ec.europa.eu/transport/strategies/facts-and-figures/transport-matters/index_en.htm (last accessed 15 March 2013).

Eurostat, 2012. Europe in figures-Eurostat yearbook 2012.

Handley, P., 1997. A Critical View of the Build-Operate-Transfer Privatisation Porcess in Asia. Asian Journal of Public Administration 19 (2), 203-243.

Hummels, D., 2007. Transportation Costs and International Trade in the Second Era of Globalization. Journal of Economic Perspectives 21 (3), 131–154.

Moriarty. E., 2006. Public Private Partnerships in Health. Workshop on Public-Private Partnerships. Ankara, Turkey.

Yılmaz, O., 1996. Yap-İşlet-Devret Modeli ve Türkiye Uygulaması. Expertise Thesis at State Planning Agency of Turkey.

International Energy Agency, 2009. World Energy Outlook 2009.

International Transport Forum, 2010. Reducing Transport Greenhouse Gas Emissions-Trends&Data 2010.

International Energy Agency-OECD, 2012. CO_2 Emissions from Fuel Combustion-Highlights.

Ozdogan, I.D., Birgonul, M.T., 2000. A decision support framework for project sponsors in the planning stage of build-operate-transfer (BOT) projects. Construction Management and Economics 18 (3), 343-353.

The World Bank Private Participation in Infrastructure Database, http://ppi.worldbank.org/explore/Report.aspx?mode=1 (last access march 15, 2013).

The World Bank World Development Indicators Database, http://databank.worldbank.org/data/views/variableSelection/selectvariables.aspx?source=world-development-indicators (last access march 15, 2013).

Tiong, R.L.K., 1990. BOT projects: Risks and securities. Construction Management and Economics 8 (3), 315-328.

UNCTAD Database, http://unctadstat.unctad.org/ReportFolders/reportFolders.aspx?sCS_referer=&sCS_ChosenLang=en (last access march 15, 2013).

World Economic Forum, 2012. The Global Competitiveness Report 2012–2013.

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