International Transport Forum

The World Bank's Logistics Performance Index (LPI) and drivers of logistics performance

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INTRODUCTION

A sound and comprehensive set of national-level performance indicators is critical for effective policy, preparation and implementation. In this context, the World Bank's Logistics Performance Index (LPI) provides the most comprehensive international comparison tool to measure the trade and transport facilitation friendliness of countries. Understanding and decomposing the components of trade and logistics performance can help countries improve freight transport efficiency and identify where international cooperation could help overcome barriers.

Increasingly respected by policymakers, use of the LPI has significantly enhanced the dialogue between policymakers and the private sector as they determine priorities in trade and transportation facilitation. However, making trade logistics work for competitiveness at the country or sub-regional level requires more than just raising awareness. An in-depth multidimensional assessment of the trade and transport performance related to the action plans and policies such as changes in national regulations and taxes or infrastructure investments in specific links, nodes and corridors requires a variety of different analytical approaches. The LPI, used in conjunction with other in-house resources, can instigate discussion on elements that drive logistics performance and those areas where barriers hinder performance.

This paper presents qualitative assessment of the trade and transport policy environment through a case study on Turkey. It gives an analysis of the country's logistics performance in relation to policy components that affect trade and logistics regulations, procedures, and operations. The paper is structured as follows: Next section gives and overview of the Logistics Performance Index (LPI), its methodology and role in promoting trade. It is followed by the case study which presents the impact of various policy actions on national logistics performance in Turkey. Findings of the study have been summarised and some suggestions are given to improve logistics performance in the following section. Last section finishes with broad conclusions and ideas for future research.

1. OVERVIEW OF THE LOGISTICS PERFORMANCE INDEX

Description the Logistics Performance Index (LPI)

A multi-dimensional assessment of logistics performance, the LPI of the World Bank, is an international benchmarking tool focusing specifically on measuring the trade and transport facilitation friendliness of a particular country, and in so doing, helping them to identify key barriers to, and opportunities for, improvement. The LPI summarises the performance of countries through six dimensions that capture the most important aspects of the logistics environment:

1. Customs; efficiency of the customs clearance process.
2. Infrastructure; quality of trade and transport-related infrastructure.
3. International Shipments; ease of arranging competitively priced shipments.
4. Logistics Quality; competence and quality of logistics services.
5. Tracking and Tracing; ability to track and trace consignments.
6. Timeliness; frequency with which shipments reach the consignee within the scheduled or expected time (Arvis,*et al.*2014).

The LPI provides not only a comprehensive assessment of logistics performance worldwide, but also an analysis of performance trends which makes it possible to understand trends over time. Performance is evaluated using a 5-point scale and the overall LPI is aggregated as a weighted average of the six areas of logistics performance. The LPI also includes a set of domestic performance indicators which is not included in the overall country score. It is also complemented with quantitative information on particular aspects of international supply chains in respondents' countries of work, including import/export, lead time, supply chain costs, customs clearance, and the percentage of shipments subjected to physical inspection (Arvis,*et al.*2012).

The overall index is calculated by analysing the six main sub-dimensions listed above. None of these independently guarantee a good level of logistics performance, and their inclusion is conditioned to empirical studies and extensive interviews carried out with specialists in international freight transport. Each component is defined in detail in following sections.

The role of the LPI in promoting trade

Political decisions and implemented policies have both direct and indirect effects on the attractiveness of a region or a country in terms of business location decisions and/or foreign direct investment (FDI). Here, the FDI stock in a country is a good indicator of its attractiveness.

Transport system efficiency and industry profitability are closely related. Inventory reduction through high turnover, ability to respond to volatile demand, short lead times and achieving lowest possible transportation costs are essential aspects of a company's competitiveness. For this reason, transportation systems are considered as a production factor and as one of the key determinants of facility location decisions.

Transport infrastructure has a significant impact on the productivity and the cost structure of businesses (Haughwout 2001). For example, better port and hinterland connections may reduce the expenditure required for construction of distribution networks or transport of raw materials. Empirical studies show that FDI is attracted to areas with efficient transportation systems (Saidi 2011). For this reason, an effective and efficient logistics system is the cornerstone of a prosperous economy in attracting foreign investment.

Allowing for comparisons across 160 countries, the LPI is used by companies to identify challenges and opportunities related to the receiving country's transport infrastructure, logistics competence, and availability of efficient supply chains. In this context, the LPI is a useful indicator of the host country's trade logistics performance and also a benchmark when choosing locations for various types of operation. This is one of the main reasons why countries tend to focus on their ranking rather than on improvements in actual indicator values of the LPI.

Several countries have announced specific targets of LPI score or LPI rank in their strategic development plans. To increase their attractiveness, countries are embarking on major projects in a number of areas to improve their LPI position. However, the proximity of a country's score to others at any given performance level might be more telling than the exact ranking.

Countries at similar performance levels may have substantially different ranks, especially in the middle and lower country income ranges. Particularly, ranking and relative changes in ranks from one LPI edition to another need to be treated with caution. The latest LPI report also provides a country listing with the weighted average of LPI scores and ranks across all four editions in 2007-2014. This listing smooths out the inevitable variation from one year to another in survey-based data, and it thus provides a more balanced overall picture.

To account for potential sampling error and the LPI's limited domain of validity, LPI scores are calculated with approximate 80 per cent confidence intervals over the standard error of LPI scores across all respondents (Arvis,*et al.*2014). These confidence intervals must be examined carefully to determine whether a change in score or a difference between two scores is statistically significant. Countries with small number of respondents, such as Sweden, Norway, Bahrain, New Zealand, and Ethiopia have larger intervals between upper and lower bounds for scores and ranks, since their estimates are less certain. The average confidence interval translates into an average of 20 rank places, using upper and lower rank bounds.

Understanding the trends in the logistics performance requires looking behind the LPI scores and rankings to see the interactions between the logistics performance and policy actions, competitive forces, economic and political environment. Over the case study we present here, we propose implementation of a holistic point of view, which constitutes an analysis of coherent and interlocking sets of processes for identifying the hidden bottlenecks that have a critical impact on sector competitiveness, and taking necessary actions to support the industry in bottleneck areas require a comprehensive analysis of policy impacts on all dimensions.

2. DRIVERS AND BARRIERS FOR TURKISH LOGISTICS PERFORMANCE: A CASE STUDY

This case study has been carried out in two phases[1]. The first phase provides an understanding of the quality of logistics services, physical and procedural bottlenecks, and how both contribute to competitiveness in international trade. The first phase involves the decomposition of the key elements of trade and logistics performance and identification of current status and general bottlenecks in infrastructure, regulations, transport and logistics services, and border crossing and customs clearance procedures that affect trade competitiveness in the country being assessed. Here, The World Bank's Logistics Performance Index (LPI) has provided an important starting point for the assessment.

This phase was conducted as desk research to gather background information from both published reports and statistical data sources. It covers the collection and analysis of the information on the country's trade and logistics performance by reviewing background data on the structure of foreign trade, the level of activity at the major international gateways and land borders and performance of the logistics sector. The output of the desk research presents the findings and including the discussions of the highlights and prominent outcomes.

The second phase focuses on a qualitative assessment of the implementation status of trade and transport policy environment through a survey followed by a series of meetings with experts, policymakers, associations, and selected companies involved in trade and logistics services for the design of the framework and analysis of findings.

This second phase provides an in-depth assessment of the impact of policy components on national freight transport and logistics performance on the basis of the LPI and other in-house and partner resources and of how implemented policy acts change trade and transport performance on national and industrial level.

Using Turkey as an example, the case study assesses potential impacts of policy components to the quality of logistics services, trade competitiveness, and trade and logistics related performance indicators. It aims at providing a holistic understanding of Turkey's trade and transport structure and drivers of its logistics performance. Finally, the case study provides a general framework for this type of assessment which could be followed as a standardised and replicable methodology for other countries.

1 The process resembles the one outlined by Arnold *et al.* 2010

A brief overview of Turkey

Turkey is an upper-middle-income country with a population of 75.2 million in 2012and a diversified economy. It is the world's 17th-largest economy (6th largest in Europe) and 22nd-largest exporter by value. Its economy grew with an average annual real GDP growth rate of 5% between 2002 and 2013. According to the OECD, over the last two years, it has had the highest real growth in GDP of any OECD country and, it is projected to maintain its position with an annual growth rate of 5.1% until 2018 and 4.3% between 2018 and 2030.

Figure 1. **Geographical position of Turkey**

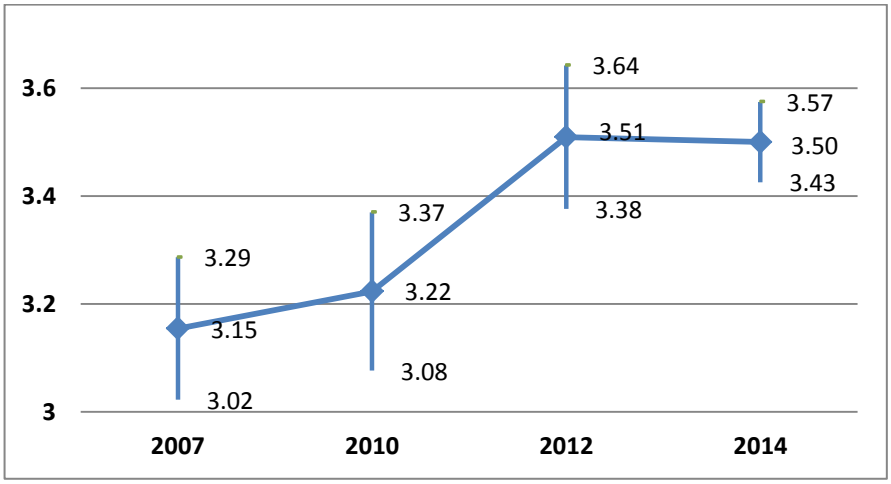
Turkey is a significant hub in international trade due to its position on a traditional and historic trade route between Asia and Europe (Figure 1). Recent economic and political developments throughout neighbouring regions (the Balkans, the Black Sea, the Mediterranean Basin, the Caucasus, Central Asia and the Middle East) have contributed to Turkey's importance as an international hub. Turkish exports are expected to grow more than 5% from 2013 to 2017, while import growth is projected to exceed 9.5% during the same period (IMF). The country plans on tripling its exports by 2023 and becoming one of world's 10 largest economies with an ultimate goal of reaching USD 500 billion in exports.

Turkey in main Trade and Transport Facilitation indicators

The latest available World Bank Logistics Performance Indicator (LPI 2014) places Turkey in a relatively good position, ranked number 30 among 160 countries, with an overall score of 3.5 on a scale from 1 to 5. Figure 2 presents Turkey's overall LPI scores with confidence intervals from 2007 to 2014. The overall score is based on the scores of the six LPI dimensions shown in Figures 3 and 4.

2 According to the OECD; http://stats.oecd.org/

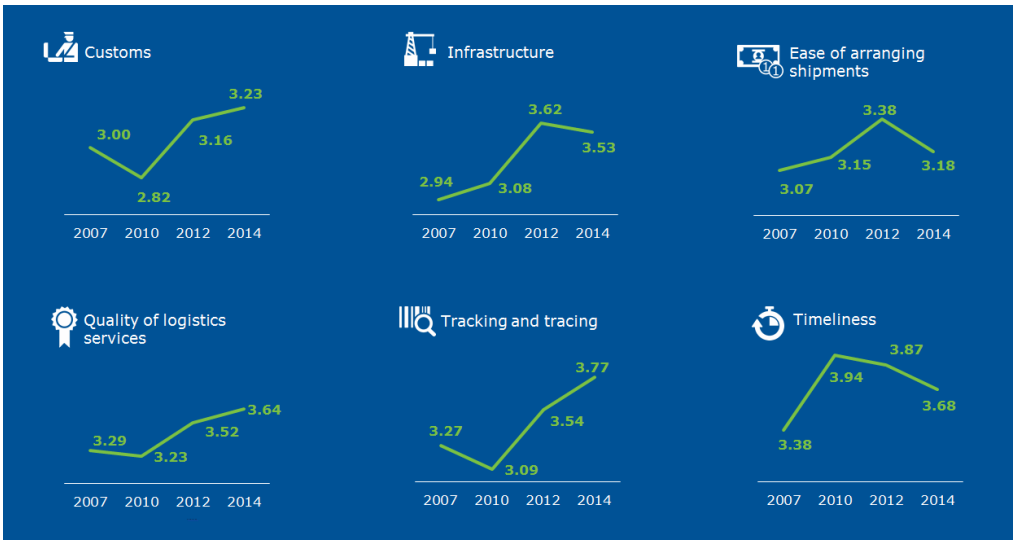
Figure 2. **Turkey's LPI Score for the period 2007-2014**



Note: with Confidence Intervals (min. = 1, max. = 5)

The increase in Turkey's overall LPI score between 2010 and 2012 was largely driven by improvements in indicators such as customs, infrastructure, and tracking and tracing capability. Trends of the sub-dimensions scores of Turkey over the four LPI editions are presented in Figure 3. The absolute scores for timeliness and ease of arranging shipments have declined over the last two years and customs, tracking and tracing performances have shown the greatest improvement. Trends in the scores have been reflected in rankings as well. Turkey's ranking in customs, infrastructure, and quality performance increased significantly. Yet, significant declines have been observed in timeliness and international shipments rankings.

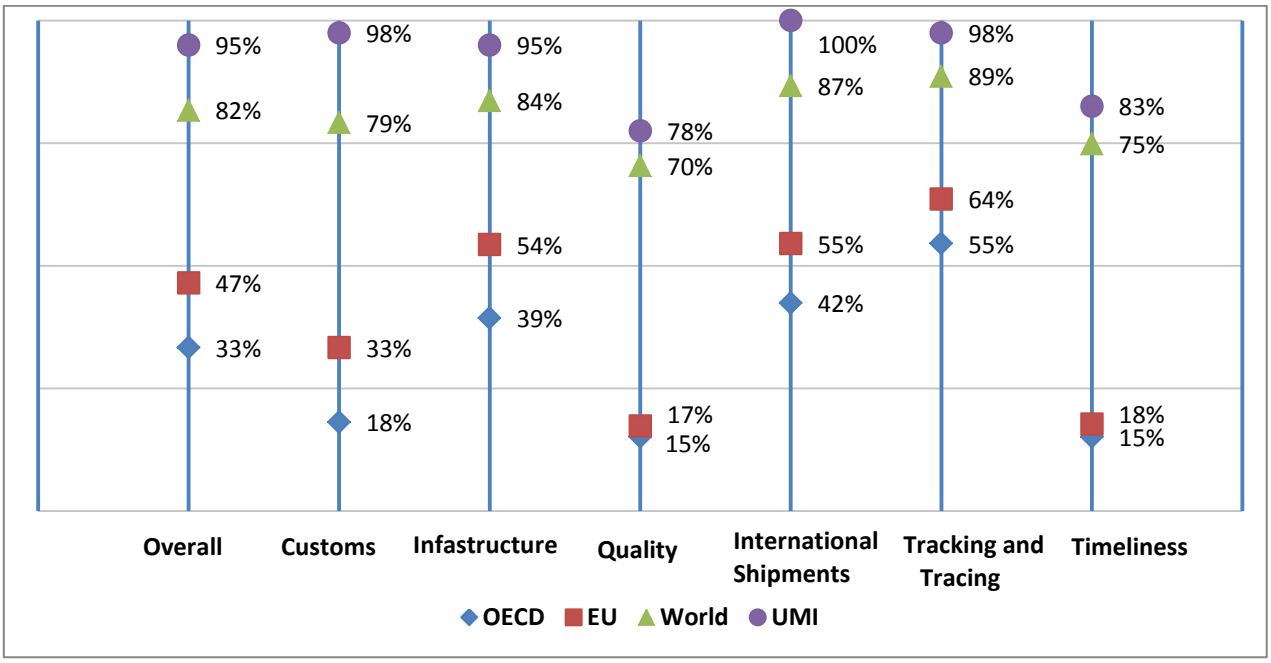
Figure 3. **Turkey's LPI score development from 2007-2014**



Note: min. = 1, max. = 5

The strengths and weaknesses in Turkey's relative performance vis-à-vis other countries may be revealed by a more detailed analysis of the six components which make up the LPI. Figure 4 displays the percentile ranking of Turkey within the World, OECD, EU, and upper-middle-income economies for the overall LPI score and its six components. Turkey's performance in tracking and tracing of shipments and the quality of logistics services is relatively high also compared to OECD and EU countries. In dimensions such as timeliness and competitively priced shipments, the ranking is high among upper-middle-income countries and worldwide, but low compared to OECD and EU countries.

Figure 4. **Percentile ranking of Turkey in LPI 2014**



Source: Arvis,*et al.*2014
Notes: vis-à-vis selected peer groups: Upper-middle-iIncome countries UMI (N = 41), World (N = 160), OECD (N = 34) and EU (N = 28).

Determination of peer groups of comparison

Nations compete in creating the policy, structural and institutional framework that enable its enterprises to develop competitive advantages and thereby participate successfully in international and domestic markets. Porter (1990) notes that "*the competitive advantage of nations is determined by the strength of their factor endowments; their demand conditions; the competitiveness of firm strategies, structures, and rivalries in major industries; and the strength and diversity of related and supporting industries"*.

Even though the notion of the competitiveness of nations is controversial and complex, there is little doubt that international trade is vital to a nation's wealth. The development options for countries depend on the kind of export roles they take in the global economy and their ability to become a high-value industrial environment. Briefly, a country is competitive if its industries can produce at an average level that is at least equal to or above that of its foreign competitors. Well-functioning logistics is one of the most important elements of national competitiveness (Mustra 2011).

Hence, a comprehensive analysis of a country's logistics performance requires investigation of a nation's comparative performance with respect to relevant reference countries which can provide a benchmark in setting objectives or whose industries are considered as the main competitors of the

country's leading industries. The peer group for Turkey used in this instance comprises Germany, USA, Italy, Malaysia, China, Romania, Bulgaria, and Azerbaijan. This group includes Turkey's main competitors in transportation and logistics, world trade leaders, and the top performers of LPI in view of the relevant income group, trade and transport structures, and geographical proximity.

Estimating the potential impact of the LPI improvements on Turkey's Trade

Korinek and Sourdin (2011) suggest that improvements in general logistics quality have a stronger trade enhancing effect on exports than on imports. On average, for every 10% increase in the overall LPI score of a typical exporter, bilateral imports increase by more than 69%, all other determinants of trade being equal. Based on these results, if Turkey's overall logistics performance were at par with Malaysia, the top performer in upper-middle income economies, its imports would increase by 14 % and its exports by 18 % on average, all other things being equal. The effect would be +31 % for imports and +40 % for exports if Turkey's logistics performance would reach the level of average high-income OECD countries.

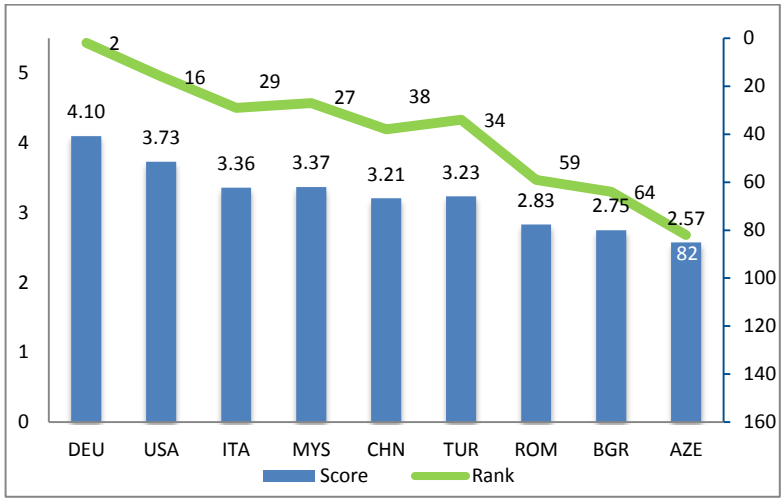
Similar magnitudes of effect may be estimated for other components of the LPI such as tracking and tracing, infrastructure and logistics competence. A 10 % increase in the quality of the infrastructure, as measured by the LPI, would increase seaborne trade by over 50 %.

This means, if Turkey manages to improve the LPI score on infrastructure to the level of high-income OECD countries' average, associated impact on the exports are estimated to be more than 29 %. A 12 % improvement in the indicator for the quality of customs procedures, which is sufficient to reach the average of high income OECD countries, is associated with an increase in bilateral exports of 48% for seaborne trade. Moreover, reaching at top performer's (Germany) LPI score level in tracking/tracing or logistics competence will increase exports by 52 % and 55 %, respectively. On the other hand, to be able to reach its target of USD 500 billion of exports in 2023, Turkey needs to raise its overall LPI score up to 4.15 in the next 10 years.

The efficiency of customs and border clearance

The efficiency of customs and border clearance measures these procedures in terms of speed, simplicity and predictability when dealing with customs and other border agencies. This is one of Turkey's two lagging LPI components in 2014, yet the country's fast progressed in this dimension after 2010. On a comparative basis, Malaysia is the only country among upper-middle-income economies that performs better than Turkey in the LPI score for customs and other border agencies (Figure 5).

Figure 5. **Efficiency of Customs and Border Clearance**



Source: Arvis,*et al.*2014
Notes: Peer Group Scores (left-hand axis; 1 = min; 5 = max.) and country ranks (right-hand axis).

2014 domestic LPI results indicate that the main determinant of the performance difference between two countries is the efficiency of processes in clearance and delivery of the shipments. Even though Malaysia significantly lags in transparency of customs clearance procedures, all of the respondents evaluated country's efficiency of customs clearance processes (i.e. speed, simplicity and predictability of formalities) as high or very high both for imports and exports.

Table 1. **Customs Process Efficiency**

	Per cent of respondents answering often or nearly always				
	Turkey	UMI	Europe & Ctr. Asia	Malaysia	Germany
Transparency of other border agencies	52%	65%	77%	67%	70%
Transparency of customs clearance	53%	69%	80%	33%	80%
Expedited customs clearance for traders with high compliance	70%	60%	81%	67%	80%
Clearance and delivery of imports	74%	75%	93%	100%	80%
Clearance and delivery of exports	90%	81%	91%	100%	85%

Source: Arvis,*et al.*2014

Reform and automation of customs procedures

After adopting a new Customs Law in 2009, Turkey accelerated regulatory harmonisation with the EU and the implementation of modern techniques. With regard to international cooperation, Turkey has signed a considerable number of bilateral agreements on Police and Customs cooperation and mutual assistance, including protocols on exchanges of pre-shipment information.

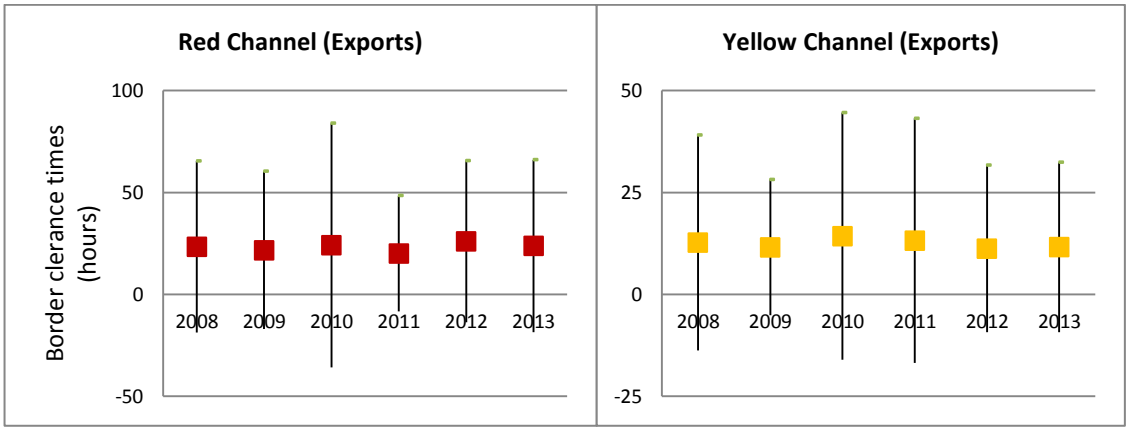
By December 2012, Turkey has joined the *Convention on Common Transit,* which reduced the problems in the transit zones and allowed Turkish carriers to transport goods in Europe and in the European Free Trade Association (EFTA) countries through the same electronic processes. Turkey has also made significant reforms in its customs laboratories to appropriately classify the goods for smuggling prevention.

However, the conflicts among various classification schemes utilised by different authorities still appear as an obstacle for the ease of international trade, creating unreliability and insecurity among customs practices.

Reduced variability of clearance times

Even though average clearance times have not changed significantly, Turkey's customs clearance has improved as a result of a decrease in the variability of clearance times. Simplification and automation of customs procedures, increased productivity gains due to improved IT capability, and investment in improved management and human resources capability have all contributed to this improvement. As evidence, Turkey experienced a decline in Customs Clearance performance score in 2010. Figure 6 illustrates average customs clearance times (hours) within one standard deviation range for red and yellow channels.

Figure 6. **Border crossing Times (hours)**



Source: Turkish Ministry of Customs and Trade

The changes in the coefficient of variation are also presented in Table 2. These numbers provides a good evidence for supporting importance of variability in clearance times on customs score. Successful implementation of build-operate-transfer (BOT) schemes in construction and operation of border gates has also contributed to improvement of customs clearance procedures.

Table 2. **Border crossing times (hours)**

			2008	2009	2010	2011	2012	2013
Exports	Red Channel	Mean	23.4	21.6	24.1	20.0	25.9	23.7
		CV	1.8	1.8	2.5	1.4	1.5	1.8
	Yellow Channel	Mean	12.7	11.5	14.3	13.2	11.2	11.6
		CV	2.1	1.4	2.1	2.3	1.8	1.8
Imports	Red Channel	Mean	50.3	33.6	41.7	49.5	45.0	66.0
		CV	1.6	1.4	1.6	1.4	1.3	1.3
	Yellow Channel	Mean	33.1	30.7	36.8	31.7	28.5	34.6
		CV	2.0	1.8	1.1	1.8	1.5	1.6

Source: Turkish Ministry of Customs and Trade

Increased utilisation of computerised border clearance systems

The computerisation of customs offices and automation of customs procedures is one of the key factors in improvement of the score. By the end of 2011, legislative arrangements concerning paperless declaration have been made - e-signature/m- signature for customs declarations have been made compulsory, 100% of customs transactions have been computerised, and paperless customs declaration procedures have been introduced in all customs offices.

All automated Customs offices are connected with each other and the Customs headquarters via local area and wide area networks. During the last five years, existing customs automation system is further developed also to work in sync with other systems utilised by related authorities and to allow external access for traders and eligible foreign trade intermediaries.

As of January 2012, all Customs offices in Turkey started to use New Computerised Transit System (NCTS), which is a European wide system of electronic declaration and processing that enables traders to submit community transit declarations electronically. The system provides a reduction of costs which are incurred in relation with the paper-based system of declaring goods. NCTS also allows less time spent waiting at customs, by declarations sent electronically beforehand. The system has a significant contribution to increased efficiency of transit operations, prevention and detection of fraud, and acceleration of transit transactions.

With a new set of actions and legislations put in force recently, a further increase in efficiency of customs clearance procedures is expected to come. On March 2012, the Turkish government has launched the single-window system, providing a centralized platform to streamline and simplify the operation of customs and other government agencies involved in border control. Under the single-window system, all required documentation and information needed for the import or export operation is submitted by the trader to a single application point.

The system aims at coordinating border control procedures, such as port transactions, customs transactions, technical controls and licensing through an integrated management system. The implementation has been divided into two phases due to complexity of the system. In the e-document phase, trader can apply to related public institutions via electronic or paper based methods. Then related institutions send data of the traders to Customs electronically. A registration number is assigned to each application and status can be checked electronically by using this number. The e-application phase is currently in the pilot phase. Full implementation will take place after an adoption process including software development, review of current legislations, and training sessions for both public officials and traders.

Future plans include the incorporation of additional services and new features in relation to international data exchange. A voluntary Authorised Economic Operator (AEO) programme was launched on January 2013 to enhance security through granting recognition to reliable operators and encouraging best practice at all levels in the international supply chain. Turkey has commenced negotiations with EU, Korea and USA to sign Mutual Recognition Agreements (MRAs) to increase the benefits of the system.

Although the technical and operational conditions for the introduction of 'one-stop' controls at border crossings are in many cases satisfactory, there are currently no links between the databases of the different border services. Information exchange occurs on an ad-hoc basis and is not institutionalised. There is a process underway for database integration which will include databases from the Customs, Ministry of Interior, Ministry of Foreign Affairs, Land Forces and Coast Guard.

Integrating activities of border management agencies

Another obstacle to efficient management of customs clearance processes if the lack of coordination between the government departments and agencies involved in controlling cross-border transactions. For a number of reasons, border crossings are subject to substantial and often unpredictable variability. Even though the average border crossing capacity is sufficient, significant volumes during peak seasons result in long delays. This is partly due to insufficient infrastructure and telecommunications capacity. Also the multiplicity and diversity of sometimes uncoordinated data and document requests by different agencies increases transaction costs and the risk of making mistakes.

According to Doing Business 2014 (World Bank, 2014), on average eight documents are required for export and import operations in Turkey. Yet, according to a study conducted by the Ministry of Trade and Customs in 2011, 330 different documents are used in customs transactions where 94% are collected from other institutions than the customs administration.

Similarly, only 1.5 days of the average time recorded for imports are spent in customs agencies. Remaining days are spent for collection of the documents from other public and private institutions, laboratory inspections, and other similar supporting processes. The complicated and rigorous customs controls and elevated fines that serve to thwart the corruption of a few actors place high time and money costs on all others.

Improvement of border facilities

Around 40 per cent of Turkey's foreign trade is conducted through the country's land borders. Modernising inefficient border crossing points (BCP) has become one of the most important issues in the country's reconstruction policies. However, these have not been realised for some time due to a lack of financing.

A private institution, the Customs and Tourism Enterprises (GTI), established by The Union of Chambers and Commodity Exchanges of Turkey (TOBB) in 2005, is undertaking the modernisation of BCPs, including the actual border gates. This is done using the 'build-operate-transfer' model in a partnership between TOBB and government and public institutions.

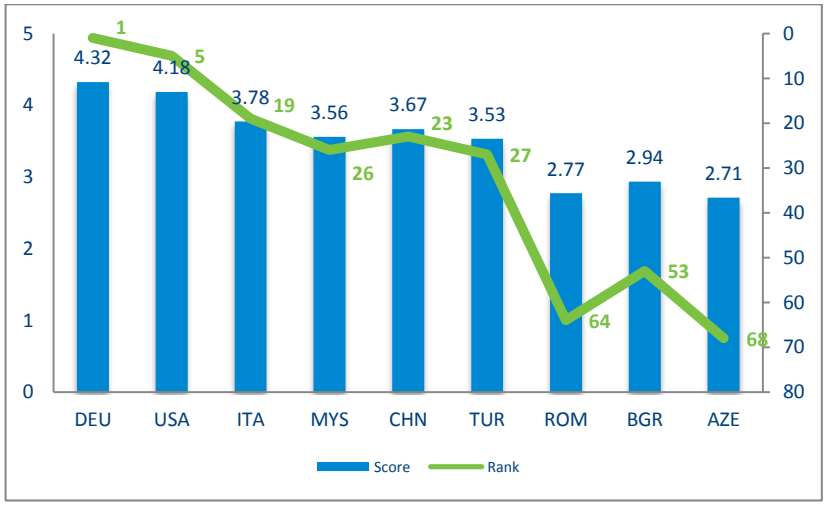
Modernisation of five BCPs is already completed, and the reconstruction and renovation of five new points is still on-going. "Build" stage covers modernisation of BCPs, reconstruction of the physical and telecommunications infrastructure, building supporting facilities, and providing the advanced technological equipment. In the "Operation" stage, GTI operates only the commercial areas; food and beverage stores, banks, souvenir shops, gas stations and duty-free stores, and also assists cleaning and maintenance services. Any administrative processes and procedures such as customs clearance and travel documents inspection are undertaken by government institutions and bodies. At the end of the concession period, the modernised facilities will be transferred back to the public sector in the "Transfer" stage.

As a result, waiting times at the borders have been substantially reduced, queues have been shortened, and vehicle and passenger passing time has been sped up by a factor of four. The technical improvements that accompanied the modernisation of BCP infrastructure have also made an effective contribution to security and control over smuggling and human trafficking.

The quality of trade and transport infrastructure

Infrastructure development is essential for assuring basic connectivity and access to gateways. Surrounded by four seas on three sides, Turkey is geographically advantaged with easy access to Eastern Europe, Central Asia, the Middle East and North Africa. However, inland connections are relatively underdeveloped due its hilly landscape and poor infrastructure in remote areas. In the World Economic Forum's global competitiveness index for 2013-2014, Turkey is ranked 27th out of 144 countries for its transport infrastructure, particularly benefiting from reasonably developed road and air infrastructure. Maritime and rail transport infrastructures rank below average, with a ranking of 63rd in ports and 52nd in quality of railroad infrastructure.

Figure 7. **Quality of Transport Infrastructure –**



Source: Arvis *et al.*2014
Notes: Peer Group Scores (left-hand axis; 1 = min; 5 = max.) and country ranks (right-hand axis).

2014 Domestic LPI results for the quality of trade and transport related infrastructure (e.g. ports, roads, airports, information technology) are presented in Table 3. Turkey's performance is noticeably above the group average in three areas: warehousing, road and port infrastructure.

Table 3. **The quality of trade and transport related infrastructure**

Per cent of respondents answering above average

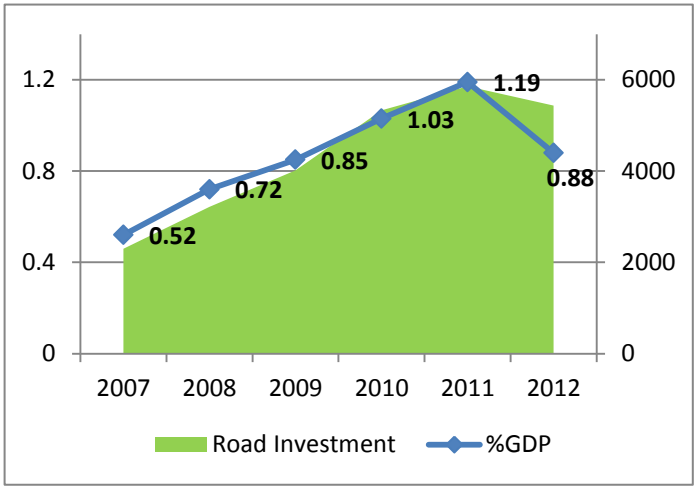
	Turkey	Average UMI	Europe & Central Asia	Malaysia	Germany
Ports	88%	38%	25%	67%	100%
Airports	84%	44%	33%	100%	100%
Roads	88%	29%	30%	100%	100%
Rail	39%	22%	26%	100%	100%
Warehousing	97%	55%	26%	100%	100%
Telecom and IT	94%	59%	40%	100%	100%

Source: Arvis *et al.*2014

Construction of new transport links

Turkey's LPI score in quality of trade and transport infrastructure has significantly improved since 2007. Massive road investment plays a crucial role in increasing Turkey's infrastructure performance. As Figure 8 illustrates, the percentage of road investment in GDP has almost doubled in the last 5 years, reaching up to EUR 5.9 billion in 2011. International freight forwarders are the direct assessors of logistics performance in the LPI methodology and since they constitute almost 60% of the road freight industry, any improvement in road infrastructure is likely to be reflected directly in the LPI.

Figure 8. **Road Investments in Turkey 2007-2012**



Source: Turkish General Directorate of Highways
Notes: in million Euros (right-hand scale) and percentage of GDP (left-hand scale)

Increased private sector participation to provide and maintain transport related infrastructure

The improvement in the infrastructure score also depends on the successful projects and strategic actions taken to increase the competitiveness in transport infrastructure and to promote private sector participation in infrastructure development projects. The Build-Operate-Transfer (BOT) model has extensively been utilised for raising the standards of the road network and developing modern road infrastructure between important industrial centres in Turkey. Logistics connectivity has been improved by construction of several new motorways and bridges through BOT model.

Currently, a number of existing ports are being expanded and new container terminals are being built. Turkey's container capacity is expected to be tripled by 2023, if all the current expansion and construction projects are carried out. This is also reflected in improved ratings in UNCTAD's Liner Shipping Connectivity Index[3], where Turkey was ranked 21st out of 155 countries in the world.

3 See e.g. http://data.worldbank.org/indicator/IS.SHP.GCNW.XQ

Table 4. **Public-Private Partnership Projects (PPP) in Transportation in year 2014**

Sectors	On-going		Completed	
	Value (US$ million)	Number	Value (US$ million)	Number
Airports	538	2	12,580	8
Roads	8,000	3	195	18
Ports	73	1	2,278	3
Border Gates	22	1	197	7

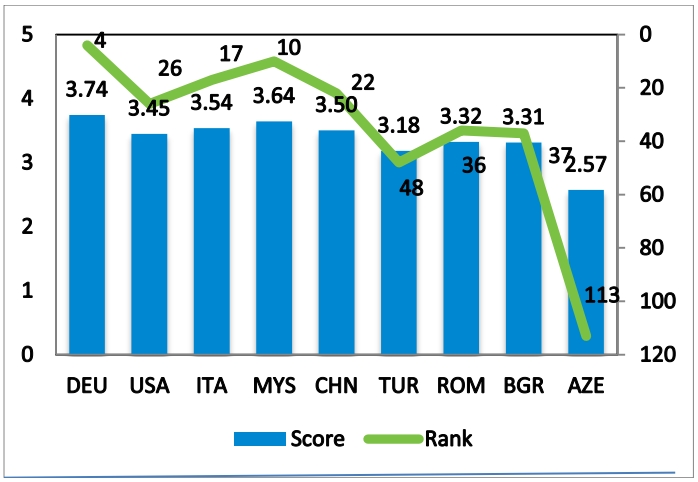
Sources: Turkish Ministry of Development and http://ppi.worldbank.org/

Despite the intense infrastructure investments and capacity enhancement efforts in maritime transport, freight handling capacity of the Turkish ports is still restricted by hinterland transport facilities and connections between international ports and manufacturing sites. As port hinterlands are limited, increased throughput causes delays to the movement of goods and increased variability in handling times. Turkish maritime industry still suffers from lack of a standardised system which provides a seamless communication between ports and other port related institutions. Due to the lack of a system for online data exchange, most of the operations are still paper-based (Keceli, 2011).

Ease of arranging competitively priced shipments

The ease of arranging shipments is Turkey's weakest LPI component., which has also been the one with the lowest level of improvement after 2007. On this component Turkey ranks 48th out of 160 countries, and 10th out of 41 upper-middle-income economies. (See Figure 9)

Figure 9. **Ease of arranging competitively priced shipments**



Source: Arvis *et al.*2014
Notes: Peer group scores (left-hand axis; 1 = min; 5 = max.) and country ranks (right-hand axis).

The macroeconomic factors generally make services more expensive and may make it hard to arrange low priced shipments (Arvis *et al.* 2014)] in high income countries. Table 5 presents the typical charge for a 40 foot dry container or a semi-trailer when exporting and importing a full load in selected countries. The numbers illustrate that Turkey has shipping charges as high as the high-income-economies despite being a middle-income-country which places it at a disadvantage compared to its regional competitors, particularly over land supply chains.

In comparison with EU, facility utilisation rates and operational charges related to logistics services are relatively low in Turkey. For example, Turkish port service charges are much lower than charges incurred in other major ports around the globe. However, the cost advantage is surpassed by longer times spent at ports due to delays and longer and complicated import procedures.

Table 5. **Typical Shipping charge for a 40-foot dry container (US$)**

	Port		Land	
	Export	Import	Export	Import
Germany	675	892	1 129	1 326
United States	921	769	1 293	944
Italy	647	647	1 316	1 456
China	494	683	683	514
Turkey	759	767	1 165	1 196
Romania	866	707	500	500
Bulgaria	600	600	508	454

Source: Arvis *et al.*2014

Turkey's heavily road dominated transport system accounts for high costs of transport and maintenance, congestion, which has a negative impact on the environment and affects also road safety. High energy costs represent one of the greatest obstacles for road transport and trade.

Promoting low cost transportation modes

Turkey's current track record in supporting modal equality is sub-par. To strengthen combined and intermodal transport and decrease the country's dependence on road transport, authorities recently approved the law on the liberalisation of the Turkish railway transportation which has opened doors to private investment. The law also allows international investors to enter into the Turkish railway sector. Government incentives for the railway sector are expected to speed up the privatisation process. For example, the government expanded the definition of "large scale investments" to include the manufacturing of locomotives and rolling stock. This qualification means that manufacturers can now benefit from a number of incentives such as low corporate taxes, social security support, and land allocation. Expected impacts include improved quality of rail transport services and increased availability of competitively priced shipments.

Outside of the logistics system itself, high energy costs represent the single greatest obstacle for road transport and trade network. Particularly for long distance destinations, diesel fuel accounts for over 60% of total freight costs. Given high domestic energy costs, companies are seeking low cost practices such as using fuel-efficient trucks or intermodal transport.

Especially large international companies use intermodal transport for creating a competitive advantage rather than relying purely on road transport. However, the sector is highly fragmented and the many smaller logistics firms lack the profit margins and upfront capital required to purchase fuel-efficient vehicles. Similarly, the main obstacle to more generic use of intermodal transport is the lack of intermodal equipment. More than 90% of semi-trailers cannot be lifted by cranes and cannot be loaded onto standard intermodal trains. Even though intermodal transportation is utilised in international transport and logistics activities, at present, no financial and administrative incentives are utilised to empower intermodal transport, such as tax reduction and subsidy schemes.

Moreover, there is no national legal framework or provision that will regulate the national and international intermodal transport or facilitate the transition to lower cost transportation modes. There is a requirement for a comprehensive intermodal transportation strategy and framework (Peer Review: TURKEY – © OECD/ITF, 2009). Turkish Ministry of Transport Maritime and Communication is planning to solve this problem through the EU Twinning Project of Strengthening Intermodal Transportation in Turkey with the goal of preparing an intermodal transportation legislation that is harmonized with the EU legislation.

Encouraging economies of scale

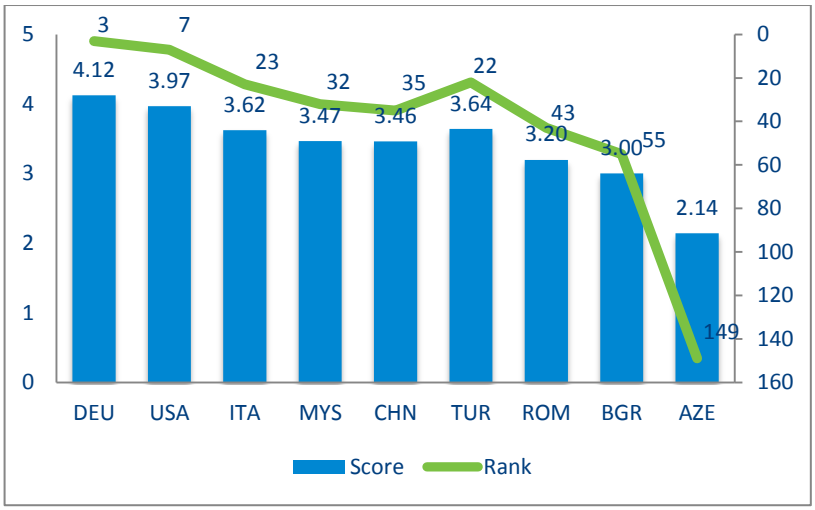
The Turkish transport market is internationalizing through the entry of large European and Asian logistics groups in. This mostly occurs through acquisition of Turkish companies. Turkish logistics providers are also becoming larger, growing both nationally and internationally. Market entry has been made easier to attract FDI and the sector has also welcomed several leading international firms over the years. This has elevated competition and accelerated the inward transfer of technology and expertise.

Though Turkey has introduced important regulatory reforms in road, air and maritime transport sectors and launched significant infrastructure investments to promote rail, maritime and air transport, these actions often focus only for the specific single transport mode concerned.

Competence and quality of logistics services

The competence and quality of logistics services measures the overall level of logistics services available in a country. It also represents the quality of the logistics services and operational excellence of the transportation operations. Turkey's performance on this dimension is relatively high in its peer group with an increasing trend of 12% growth from 2010 to 2014.

Figure 10. **Quality of Logistics services**



Source: Arvis *et al.* 2014
Peer group scores (left-hand axis; 1 = min; 5 = max.) and country ranks (right-hand axis).

Supporting logistics industry and private sector

There is an especially large and diverse pool of internationally oriented global providers in Turkey offering transportation, bonded warehousing, fiscal representation and value-added logistics services at competitive rates. Turkey scores very high on the competence and quality of logistics services such as road and maritime transport operations and freight forwarding services, but the quality of rail transport operations and supporting services such as customs and inspection agencies lag behind the regional and economic averages (Table 6). Turkish government regulates various aspects of the freight transportation sector. Government imposes several regulations on safety, environment and economic aspects across all modes of transport in line with the compliance with EU.

Table 6. **Competence and Quality of Services**

	Per cent of respondents answering high/very high				
	Turkey	UMI	Europe & C. Asia	Malaysia	Germany
Road	81%	48%	61%	33%	90%
Rail	20%	21%	44%	0%	68%
Air transport	70%	60%	66%	67%	94%
Maritime transport	83%	66%	80%	100%	84%
Warehousing and distribution	77%	66%	77%	67%	90%
Freight forwarders	81%	73%	81%	100%	85%
Customs agencies	55%	55%	69%	67%	85%
Quality inspection agencies	47%	44%	61%	33%	85%
Health/SPS agencies	33%	43%	59%	0%	76%
Customs brokers	55%	61%	78%	67%	80%
Trade and transport associations	68%	52%	58%	0%	78%
Consignees or shippers	61%	49%	68%	33%	84%

Source: Arvis *et al.* 2014

Turkey's logistics performance is primarily bolstered by development of the private sector. The sector is getting more internationalized through entry of large European and Asian transport and logistics groups in the Turkish transport market, mostly over acquisition of Turkish companies. Turkish logistics providers are also becoming larger, growing both nationally and internationally. Market entry has been made easier to attract FDI and the sector has also welcomed several leading international firms over the years. This has elevated competition, but also led to the inward transfer of technology and expertise.

Chambers of Commerce and industry associations also take an active role in the development of the sector and the improvement of service quality. Several successful projects are accomplished by these associations, such as BALO project and build-operate-transfer model for modernisation of border crossing points. International Transporters Association (UND) offers consultancy, certification, and training services for its members on a wide range of topics such as legislations, insurance, finance, institutionalization, and safety and security.

Supporting human resources and skill development in logistics and transportation

Despite the high growth performance of the industry, the availability of skilled work force in the logistics sector is scarce, leading to lacking management skills especially at tactical and strategic levels. The logistics sector in Turkey suffers from organizational skills, lack of leadership, disjointed skills, and positions and lack of sufficient R&D activities.

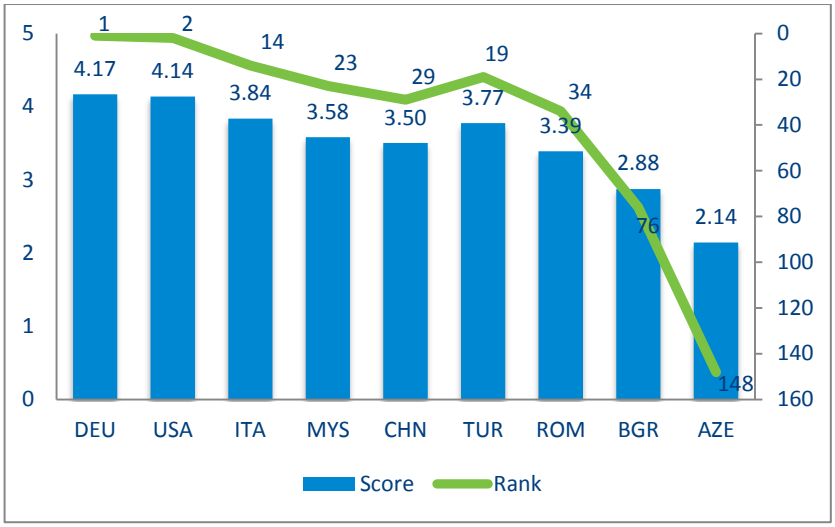
The transport and logistics industry appears highly unattractive due to its poor image, extreme working conditions, low pay scale, and lack of clearly defined career paths. Incentives to support professional training and higher education in logistics and transport are scarce. The most severe and immediate need for skill development is in the technical and middle management levels.

Ability to track and trace consignments

It is important to identify the exact location and the route of each consignment up to its delivery to the end customer. Traceability is the result of the activity of the logistics sector as a whole, since all parties in the goods' supply chain are involved in this component. Since lower income countries do benefit significantly from improved tracking and tracing, it can be regarded as one of the priority areas for future investments in trade logistics.

Ability of tracking and tracing shipments is Turkey's strongest point; country's performance in this dimension has shown a consistent and remarkable increment after 2010. Increasing its rank from 56th in 2010, currently Turkey is ranked 19th in traceability, performing better than many high income economies.

Figure 11. **Ability to track and trace consignments**

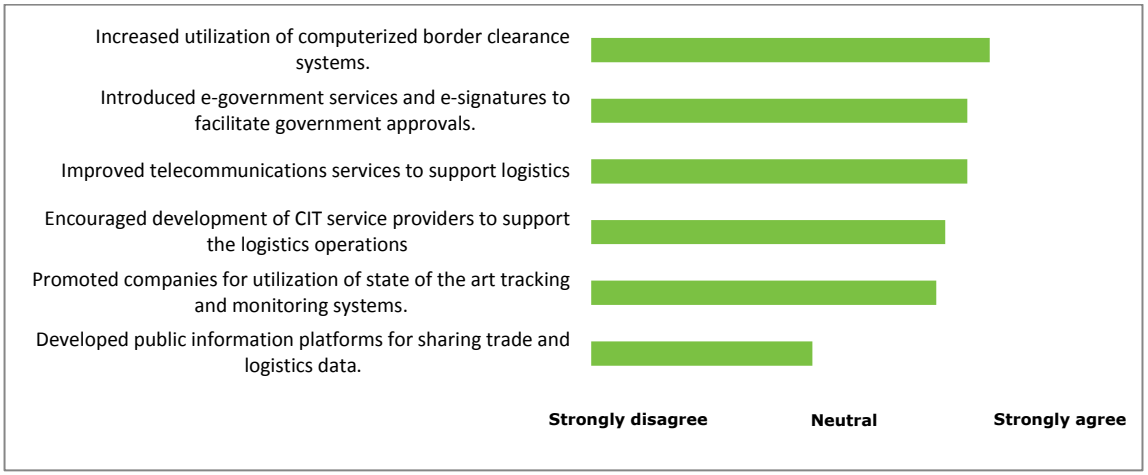


Source: Arvis *et al.* 2014
Notes: Peer group scores (left-hand axis; 1 = min; 5 = max.) and country ranks (right-hand axis).

Promoting utilisation of ICT in Logistics Services

The increase has greatly profited from widespread use of information and communication technologies (ICT) in public and private institutions. ICT provides a convenient way of improving the tracking and traceability performance by enabling gathering, organizing and distributing information on products, services and trade regulations. Several companies use the internet as an exchange mechanism for planning the supply chain with their partners. Major freight transport service providers provide information on their services, schedules and rates that can be easily accessed.

Figure 12. **State of policy actions for tracking consignments**

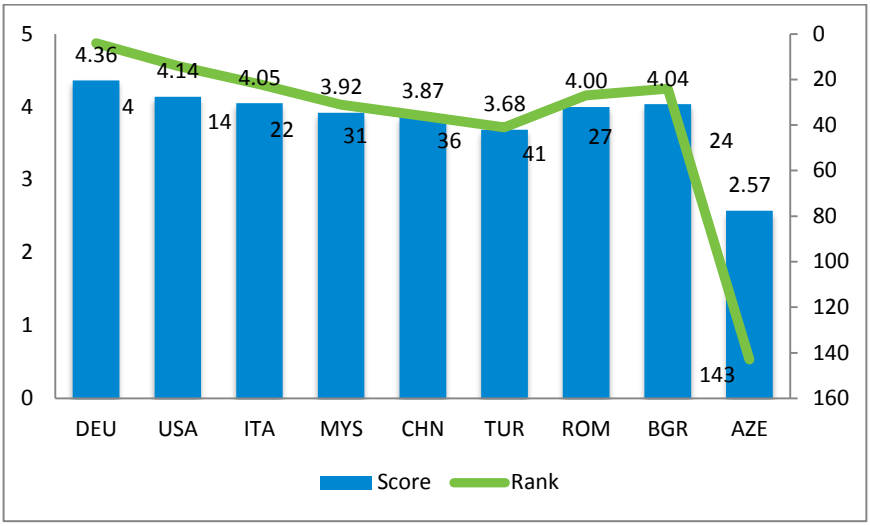


One of the major barriers confronting companies in the uptake of advanced ICT technologies is the high investment risk. This imposes great uncertainties on the willingness of the private sector to invest in ICT, particularly if there is uncertainty surrounding governments' communications policy and spectrum allocation. Hence, policymakers need to keep up with the rapid development of ICT and develop a stable communications framework that is conducive to logistics planning by the private sector (OECD Report 2002).

Timeliness of shipments in reaching destination

Timeliness of shipments in reaching destination measures how reliably shipments meet the promised delivery times. Turkey's performance on timeliness of shipments is relatively low compared to most peers. The score has decreased significantly since 2010. Shipment times depend on the nature of the product, planning and management, logistics services, distance to customers and suppliers, but also on external factors such as supply chain disruptions related to political risks or weather conditions. Table 7 gives the average time measures for selected countries in terms of export and import lead times recorded in Domestic LPI report, and trade times, recorded by WB Doing Business project. The latter measure also includes the waiting time between procedures, for example, during unloading of the cargo.

Figure 13. **Timeliness of shipments in reaching destination**



Source: Arvis *et al.* 2014
Notes: Peer group scores (left-hand axis; 1 = min; 5 = max.) and country ranks (right-hand axis).

Timeliness of the shipments mainly is an indicator of supply chain reliability. A long lead time is not necessarily a problem if delivery is predictable and demand is stable. However, if there is uncertainty about future demand, long lead time is costly. Table 8 details possible causes of delay that are not directly related to how domestic services and agencies perform in benchmark countries. Turkey performs relatively well in terms of compulsory warehousing and criminal activities. Of the five LPI delay categories, maritime transhipment has the highest percentage of respondents who often or always experience delays.

Table 7. **Indicative average export and import lead-times in days**

	Export Lead Time*		Import Lead Time*		Time to Export**	Time to import**
	Port	Land	Port	Land		
Germany	1	2	2	3	9	7
USA	2	2	3	3	6	5
Italy	1	2	1	1	19	18
Malaysia	1	1	-	-	11	8
China	2	3	2	2	21	24
Turkey	2	2	2	3	13	14
Romania	2	2	-	1	13	13
Bulgaria	1	1	1	1	20	17

*** Time taken to complete trade transactions (days) Arvis *et.al*.2014]**
****Time necessary for a procedure starts from the moment it is initiated and runs until it is completed (days)**

Source: WB Doing Business 2015

Table 8. **Sources of major delays**

	Per cent of respondents answering often or nearly always				
	Turkey	UMI	Europe & C. Asia	Malaysia	Germany
Compulsory warehousing/trans loading	6%	46%	38%	0%	15%
Pre-shipment inspection	13%	60%	49%	0%	20%
Maritime transhipment	33%	54%	59%	33%	21%
Criminal activities	3%	40%	40%	33%	11%
Solicitation of informal payments	10%	53%	64%	33%	5%

Source: Arvis *et al.* 2014

Reducing transport network system vulnerability

The need to reroute shipments due to political instability and war in neighbouring countries has been one of the major reasons for delays in delivery times. For international shipments, Turkish trucks use sub-optimal routes, some of which are limited by capacity restrictions. This results in increased delivery times and shipment costs. Turkish trucks are directed to use the two Ro-La4 lines from Slovenia and Italy in order to transit Austrian territory. In 2012, 90% of the trucked carried on Slovenia-Italy Ro-La lines were carrying a Turkish plate. Due to capacity constraints in those lines, transporters often experience long waiting times during peak hours.

Any uncertainty in the border crossings creates unpredictable circumstances and delays, increases transactional costs, and can even lead to the loss of business and opportunities. On a daily basis, such unpredictable circumstances are the result of multiple and contradictory documentation requirements or lengthy inspection procedures by agencies that include customs, immigration, health and sanitary authorities, police and other security agencies. However, certain external events, when combined with existing network vulnerabilities, have the potential to cause widespread, systemic disruptions with high impacts, such as natural disasters, wars, political disputes, or government imposed legal restrictions.

For example, in 2014 a transit permit crisis that loosed the border between Turkey and Bulgaria for almost two weeks has created a truck queue of over 10 kilometres, waiting for border crossing. Transporters immediately turned to alternative routes to transport goods to Europe, yet the absence of one of the major and cheapest transit options has created huge losses.

Similarly, the number of Turkish trucks crossing the Syrian border has decreased by 87% after the free trade agreement between the two countries has been suspended and Syria imposed prohibitive duties on fuel and freight. As a response, new trade routes to the Middle East have been created where cargo ships sail between the Turkish port of Mersin and ports in Egypt.

4 Ro-La refers to "Rollenden Landstrassen" (in German), where trucks are piggy-backed on freight trains for a certain part of the route, typically through an alpine region in Austria.

3. FINDINGS

This case study used Turkey as the focal country. It also gives an idea how an intensive and relatively quick analysis of a country's logistics performance could be made in view of trade and transport operations. One starting point for the analysis was the World Bank's bi-annual Logistics Performance Index (LPI), which is an indicator of a country's trade logistics performance. Being a survey with comparative findings across 160+ countries, it provides overall metrics of a country's supply chain efficiency. It also provides a broad indication of related problem areas. However, the LPI is not a diagnostic tool. Therefore, other tools are needed to perform that function, such as the structured stakeholder interviews and surveys, along with other available statistical and survey evidence, that were used in the case study on Turkey.

While some findings are specific to Turkey given e.g. its size, economic level of development, endowment structure and geographic location, some more generally applicable observations can also be drawn. These include the following:

Variability is one of the main factors of efficiency of the customs and border clearance

Clearance time variability mainly affects the efficiency of the customs and border clearance. A high rate of variability is typically more damaging than having long, but predictable lead times.

Policies related to the simplification and automation of customs procedures, efficient risk management, optimal use of information and communications technology, effective partnership with the private sector, and increased cooperation and transparency can significantly improve efficiency and reduce variability.

Capacity management plays vital role infrastructure efficiency.

Most of the transport facilities operate with low utilisation rates, yet suffer from capacity constraints in peak periods due to high variability of demand.

Flexible transport systems, better resource allocation, and higher utilisation of existing physical infrastructure provide less costly and more efficient improvement opportunities than capacity extension.

A superior transport infrastructure supports intermodal transport systems, including access roads to terminals and seaport channels.

A form of modal equality should be part of public policy where each mode would compete based upon its inherent characteristics. If government policy gives one mode a cost advantage over another, shipping costs and utility of freight modes can be distorted. This reduces the overall efficiency of the transportation system. Inefficient policy decisions can result high shipping costs and decreased competitiveness for the overall logistics industry.

A superior transport infrastructure supports intermodal transport systems, including access roads to terminals and seaport channels. Cost savings and quality improvements in the handling systems are therefore vital instruments for enhancing the competitiveness of intermodal transport. Along with efficient port operations, well-functioning hinterland connections are essential in maintaining competitive transport network

A successful and powerful private sector is the leading factor in providing high quality logistics services.

'Quality of logistics services' and 'Ease of international shipments' do not directly respond to public policies, but are determined by the intervention of the private sector, which adapts its actions according to market conditions. Yet, government policies play an important role in promoting economic efficiency in the freight transportation sector, in terms of jurisdiction and funding mechanisms. There exist various government actions to support private sector to develop logistics competencies, such as promoting competition, increasing managerial capacity, setting quality standards, supporting professional organizations, regulating business certification, and ensuring standardisation of operations.

As the external risks are hard to predict or prevent, the focus must be on making the right investments before the event to reduce transport network system vulnerability and improve recovery capability.

Any uncertainty in the border crossings creates unpredictable circumstances and delays, increases transactional costs, and can even lead to the loss of business and opportunities. As the external risks are hard to predict or prevent, the focus must be on making the right investments before the event to reduce transport network system vulnerability and improve recovery capability. Bringing together different public and private sector entities will allow greater sharing of data and information and enable organizations to better understand and quantify logistics risks. This will improve network risk visibility, and in turn will facilitate the development of proactive and effective actions.

CONCLUSION

This study highlights the importance of promoting policies to improve logistics performance and by implementing efficient policies countries significantly may improve their ability to trade competitively in international markets. For countries, it is important to establish a clear relationship between performance indicators and the transport policy objectives, in order to transform indicator values into relevant action and link them to past and future development. Findings show that even though most aspects of the country's logistics performance are in line with previous findings, the LPI score is a function of various factors, with complicated associations within structure and time, and improving logistics performance is a complex task which requires comprehensive reforms and long-term commitments from policymakers and private stakeholders.

Further steps cover development of a standardized framework for assessing the potential impacts of policy components on the quality of logistics services, trade competitiveness, and trade and logistics related performance indicators based on a standardized and replicable methodology. This framework will further be developed to a generic toolkit for other countries for managing policy changes and suggest future projects to realize opportunities to remove the trade impediments, as well as determining the priority areas of policy actions, given limited resources of investment.

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