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## The Comparison of Basic Transportation Indicators and Freight Villages' Locations Between Germany and Turkey

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# **THE COMPARISON OF BASIC TRANSPORTATION INDICATORS AND FREIGHT VILLAGES' LOCATIONS BETWEEN GERMANY AND TURKEY**

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## **ABSTRACT**

In general manner; Turkey and Germany are quite unlike countries in terms of transportation infrastructure and logistics facilities. Many reasons, most of them ground historical reasons, could be regarded such as; geographical location, industrial history, economy. For whatever reason might be; in today's context the world witness the highest logistics performans index score in Germany and an aggressively developing country in Turkey. As Europe's largest economy and second most populous nation, Germany leads in developing logistics strategies and services as a key member of the continent's economic and political structure. On the other hand, Turkey has got a real strategic location between the continents but traditionally has problems with transportation mode sprit and interconnectivity of systems that prevent Turkey to undertake the "hub" role for its region and achieve economic benefit.

The aim of this paper is to focus on transportation mode sprit and strategic location desicion of freight villages of Germany in order to understand the mind behind the success. In accordance with this purpose, first section of this paper is substantially based on secondary data gathered from a wide variety of sources including Turkish/German Statistical Institutes, Ministries of Transportation, Maritime Affairs and Communication and NGO's of the sector besides European Commision Statistical Office (eurostat) and academic studies. Data gathered is used to point the current transport indicators of Turkey with respect to Germany. Finally; the lessons to be taken for Turkey is presented and future policy in transportation and logistics are guided. The results regarding with the transportation modes indicate that, the finest detail is hidden behind the railway investments and its connections within other transportation modes for Turkey. In a similar manner, Germany's logistics workforce and infrastructure is geographically spreaded all over the country, but in Turkey, unbalanced regional development force country to polarised developed regions in the western side.

**Key Words:** Transportation, Freight village, Germany, Turkey

## **1. INTRODUCTION**

Germany ranks the first in the World Bank's 2014 Logistics Performance Index report of 160 countries and Europe's logistics giant, with annual revenues of nearly EUR230 billion. Second and third are France and UK and even total revenues are less than Germany does. As ranking among the top three in the world for the foreign trade, Germany performs to be the global leader in logistics innovation, technology and services. In ensuring the success, Germany's central position in the EU that makes the country an ideal location for logistics hubs and distribution centers contribute a considerable role. Serving over 82 million Germans, 150 million consumers in its nine neighboring countries, and nearly 500 million EU residents, Germany possesses a direct link to western and eastern European markets.

Germany is a global leader in logistics higher education as well. Over 100 universities and universities of applied science foster advanced logistics knowledge and make Germany the world's leader in developing new and innovative technologies and bringing them to the market. To maintain the logistics performance, German government provides companies with generous support for employment and R&D in addition to industry-specific incentive programs. An extensive and comprehensive logistics infrastructure that integrates state-of-the-art transportation networks with advanced telematics, IT, and telecommunications systems are offered. Moreover; social, economic and political stability as comprehensive indicators provide a solid base for logistics sector in Germany.

Consequently, these some of the mentioned reasons state why Germany is a benchmark for all countries that desire to develop as a world country. The clustering behind the achievement story is clear. This successful case is chosen for comparison with Turkey. Turkey as a developing and driven country to enlarge its sphere of influence would get good sides of this operating example.

## **DATA SOURCES**

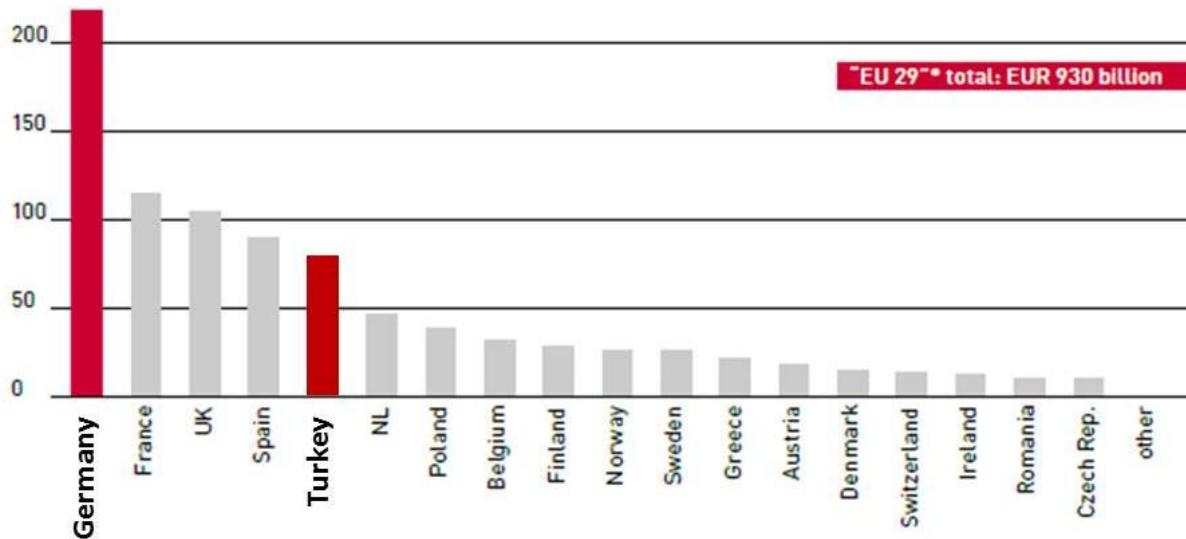
In order to obtain information about the institutional and functional aspects of logistics system and freight villages; an explorative study is an appropriate method because of the limited number of existing freight villages in Germany and Turkey. In terms of methodology, this study is based on desk research. Due to compare two countries, both literature survey and reports prepared by governmental institutions are researched. This study is organized in a qualitative research method to make the comparison. Within this method we intend to compare a well-organised model and a developing country model. Qualitative method is generally used among political science, social work and educational fields. So as to hold a general understanding of the picture from exploring the totality of the situation, qualitative research method is preferred.

This paper is essentially based on secondary data gathered from a wide variety of sources mainly through internet. Data originate from Turkish State Institute of Statistics (TUIK), Ministry of Transportation, Maritime Affairs and Communication (UBAK), General Directorate of State Airports Authority (DLHM), Chamber of Shipping (DTO), Petroleum Pipeline Corporation (BOTAŞ) and Turkish State Railways (TCDD) for the data regarding with Turkey.

Germany data are originated from Federal Ministry of Transport and Digital Infrastructure, Statistical Office of the European Union (EUROSTAT) and European Commission Directorate-General for Energy and Transport Figures. Besides; CIA, WB web pages made the research easier. These publications bring to light the discourses, perceptions and strategies of public and some other actors and provide insight into their institutional goals. Depending upon these investigations; basic statistical data analysis are done such as frequency analysis, average and percentage distribution.

## 2. GENERAL VIEW OF GERMANY: THE REFLECTIONS OF SUCCESS

Germany is ranked no.1 by the World Bank's Logistics Performance Index in 2014. Also the country is Europe's largest logistics market with around 230 billion Euros in annual revenue and the leader in logistics innovation, technology and services (*Figure 1*). Germany has a strong and stable economy, the world's third largest exporting and importing country. On this account, logistics industry is the third largest sector of Germany after the wholesale and retail trade and the automotive industry.



**Figure 1.** Logistics Turnover in Europe (Germany: Europe's Logistics Hub, 2010:7).

With over 80 million inhabitants, Germany accounts for 16% of EU's total population. It has more consumers and therefore more consumer spending power than any other country in the EU, accounting for 20% of the EU's total GDP. EU's eastward shift has given Germany's logistics sector a significant boost. But proximity is not the only advantage Germany enjoys in the logistics field. Germany has some of the Europe's most advanced transportation networks, with both road and rail densities double the EU average. A large well-trained workforce, plus a stable political and economic environment are also important factors. Together they indicate Germany the best possible base for logistics operations.

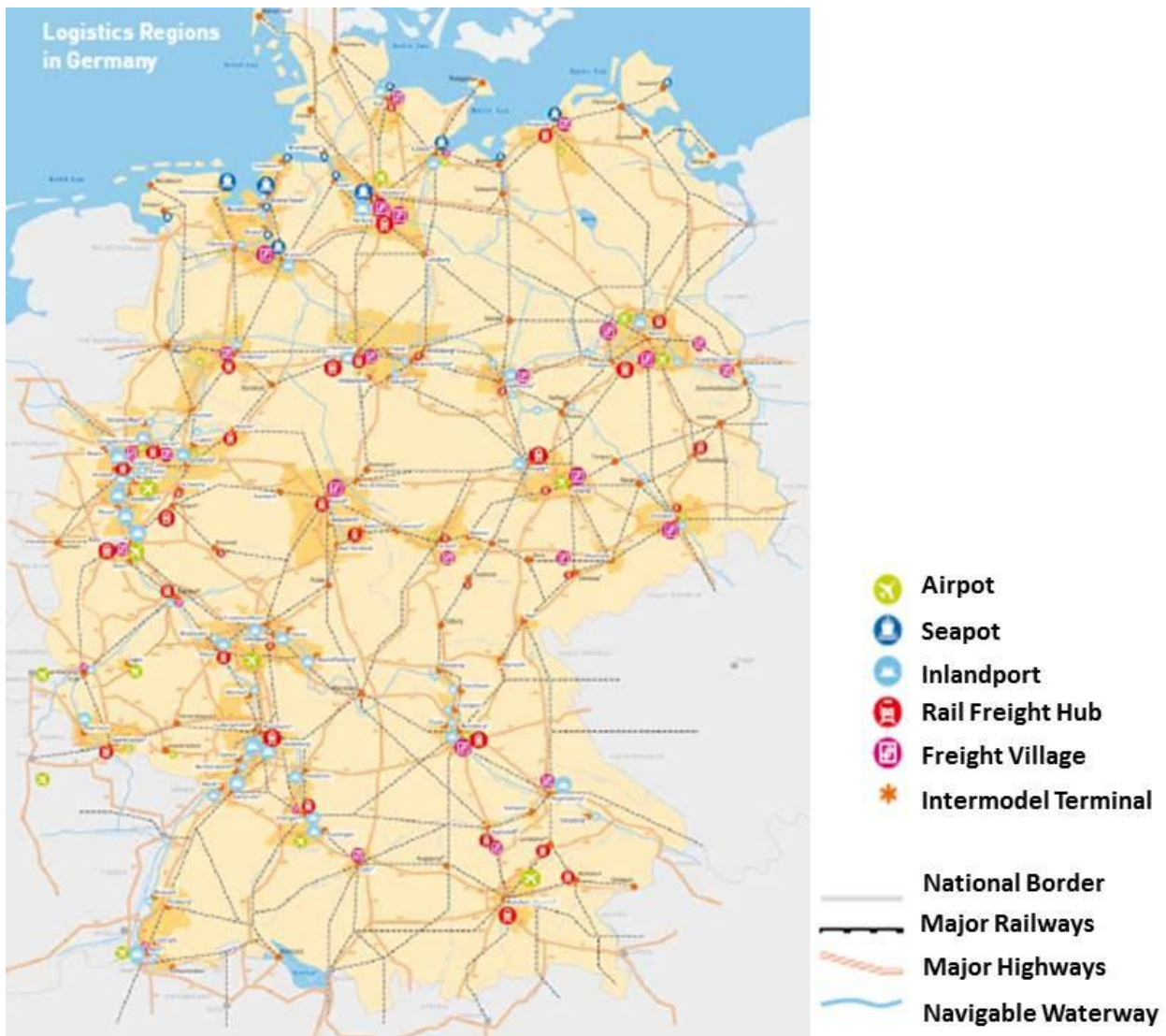
Over recent years industrial production in Germany has – on average – risen much faster than the economy as a whole. Leaving that aside, the size of the German economy alone makes the country attractive for logistics companies. The high per-capita incomes in Germany are also a positive factor for logistics firms as the local sale potential for industrial and trading companies depends on the size of disposable household incomes or private consumption.

The German logistics sector also benefits from the integration into the global economy. No other G8 member has ratios of exports and imports to GDP that are as high as Germany; the world's one of the biggest exporter. One critical advantage that Germany possesses as a logistics hub is its location at the heart of Europe with nine countries as immediate neighbours. This location makes Germany the most important transit country in Europe and offers good opportunities for international freight handling.

Its relatively polycentric economic structure compared to other countries also performs Germany to be interesting for domestic and foreign players in the transport business, as the result is an increase in transport routes. Since mid-1998 companies from the EU-15 have been allowed to conduct freight transport activities

within other EU states (so-called freedom of cabotage)<sup>1</sup>. Since 1999 the cabotage volumes in Germany have risen by around 60%. Germany becomes the most important market for such cabotage traffic after its larger (in terms of land area) neighbour, France. Nearly 25% of all cabotage journeys within the EU are carried out in Germany.

Finally, the transport infrastructure in Germany is one of the country's key assets from a logistical point of view (Figure 2). Germany scores well in an international comparison in terms of both the quality and scope of its transport infrastructure, even though in recent years traffic volume has expanded faster than the corresponding infrastructure. The country has one of the most extensive motorway and rail networks in Europe. Its airports, seaports and inland ports are among the biggest and most up-to-date in Europe, and the Rhine is by far the most important inland waterway in the EU.



**Figure 2.** Logistics Regions in Germany (Germany: Europe's Logistics Hub, 2010:2).

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<sup>1</sup> Transition periods apply between the EU-15 and new EU member states.

Germany's turnover from logistics is almost more than half of the EU and far more than biggest competitors France and UK. Of the ten major logistics sub-market segments in the EU 29, German companies lead in seven. Germany's leading global logistic players include the Deutsche Bahn Group, which ranks no.1 in bulk logistics and also holds first place in Europe's general truckload segment.

The importance of Germany's central geographic location in an expanded European market is not only a significant benefit for logistic service providers, but is also a driving force of the nation's logistics market. As a result, Germany's logistics industry accounts for 8,8% of its GDP, which is significantly higher than the European average of 7,1%.

There are approximately 60.000 companies in Germany's logistics sector, employing almost 2,7 million individuals or roughly 7% of the total workforce. The country's workforce is geographically concentrated along the Rhineland, through the industrial heartland of the Ruhr, to the North Sea and Baltic Ports. This matches the high volume of traffic to and from the Benelux countries and the UK in the west, and Scandinavia and the Baltic States in the north. Finally, EU's eastern expansion has given logistics in the eastern state of Brandenburg a significant economic boost.

As a result, it is impossible to include all the components of Germany's expansive logistics landscape. Germany has a high autobahn density, developed and integrated rail network of freight villages and intermodal facilities, airports, seaports and inland ports.

## **MODAL SPLIT OF FREIGHT TRANSPORT IN GERMANY**

**Road and Railways:** Over the last 60 years or so there has been a major shift in the breakdown of overall freight volume across the individual modes of transport in Germany: the road segment has steadily increased at the expense of rail and inland waterways. In 1950 the share for rail was 56% and for inland waterway it was nearly 24%, whereas the road share came to only around 20%. As per 2013, on behalf of Eurostat Statistics data the road share of the modal split is 70.7%, whereas rail (nearly 19.1%) and inland waterway (about 10.2%) trail a long way behind. The main reasons for the gains made by road transport are the flexibility and speed of trucks compared to other modes of transport. The ongoing shift in the production structure of the economy away from traditional bulk goods to high-quality products, the growing logistics demands of customers as well as the increase in small consignments (heavily associated with the rise of e-commerce) were also pivotal to the success of road transport. In addition, the road infrastructure was expanded quickly and extensively following World War II.

A turnaround in the modal split trend has, however, been looming for a few years. The sharp increase in the price of diesel and the truck toll contributed to goods traffic growing much more slowly than rail in recent years. In recent years, rail freight volumes in Germany grew at an average of 8% per year. This was largely due to private rail companies, which increased their traffic by an average of 40% per year. This success of private rail operators in Germany shows that competition in the rail sector can positive impact the entire transport sector. At the same time, rails play a hugely important role in the seaport hinterland transport segment, which is increasingly developing into a bottleneck at many major German ports.

**Air Freight and Sea Freight:** Given its small share of total domestic freight traffic in Germany, air freight appears quite insignificant at first glance. This is also due to the fact that air freight comes into its own primarily over long distances. Air freight is thus one of the fastest growing modes of transport, both in Germany and worldwide. Mainly high-value and usually time-sensitive items are transported by air.

By contrast, over 90% of international freight traffic in volume is transported by sea. Sea freight thus constitutes the backbone of globalization. The main reasons for the success of container shipping are the

short loading and unloading times for ships and the favorable conditions for forwarding consignments using other modes of transport; container standardization makes this possible.

**Inland Shipping:** According to Eurostat, Germany is the biggest inland shipping market in the EU with a share of 40% of freight traffic. Duisburg is home to Europe's largest port that caters exclusively for domestic shipping. In Germany most inland ports are well connected with other modes of transport. In the seaport hinterland transport segment as well as inland shipping performs a small but significant function as a feeder and forwarder of goods to their final destination. This has played a not inconsiderable part in the steady increase in container utilization in domestic shipping as well. Overall, inland shipping has nevertheless registered the lowest growth of all modes of transport in Germany in recent years. The main reasons for this are the above-mentioned goods structure and logistics effects along with other factors. Domestic shipping is particularly susceptible to external factors such as extremes of weather.

## **FREIGHT VILLAGES IN GERMANY**

Thanks to the perfect location, Germany is the continent's commercial hub at the core of European Union, bordering nine countries. That is why more goods pass through Germany than through any other country in Europe. In the north, Germany's seaports are important conduit for trade with the UK, Scandinavia and the Baltic States. In addition, road and rail links through the Jutland Peninsula provide easy access to Denmark and the rest of Scandinavia. In the west, an extensive network of roads, rail links and inland waterways feeds into France and the Benelux countries of Belgium, the Netherlands and Luxemburg. Again in south, Germany has strong commercial ties with Switzerland and Austria and direct road, rail and water links with the Balkan states. These neighbouring countries and economic relations with them dominate the freight villages locations as well.

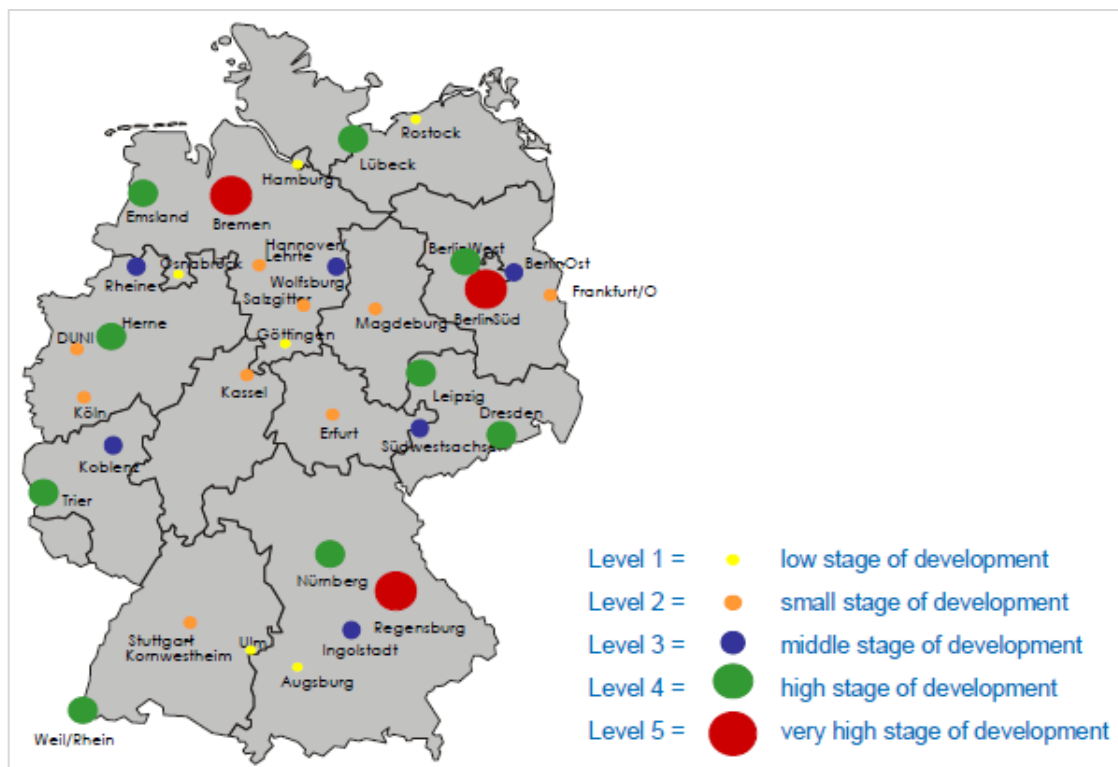
In order to analyze the logistics system in Germany; freight villages are taken into consideration after the basic transportation system is analyzed. Basically, it is known that freight villages must fulfil various functions to comply with the major requirements of the underlying conceptual framework. Freight village operations to serve these functions are based on three basic logistical functions. First of all, the multimodal linkage of different transport modes and high-performance handling and storage systems within freight villages contribute to the efficient transport, handling and storage of products and goods within a logistics network (Tress, 1984; Kracke et al., 1992; 1998). Second, freight villages must fulfil a planning and dispatch function by ensuring the timely and capacity-related allocation of goods and/or tasks to available resources (Krampe, 1993; Fohrmann, 2000). In addition, the third basic function of freight villages pertains to the provision of logistical services on site in a way that ensures that logistical processes are handled without interference. Based on these basic functions, freight villages must also perform specific target functions to ensure that freight village operation enables powerful logistical processes such that products and goods are provided faster and at lower cost while improving freight traffic. Primarily, the consolidation of freight flows and the implementation of intelligent, multimodal transport chains create considerable potential to improve rationalization, leading to time- and cost-saving effects. As a result, freight villages also perform a streamlining function within the entire supply chain and logistical network (Tress, 1984). Moreover, well-positioned freight villages near urban areas also contribute to the establishment of intelligent logistical services to provide products and goods effectively (Hesse, 2004). For this reason, it is necessary to consolidate the flow of goods and to ensure effective local distribution of goods. The requirement of ensuring the effective distribution of goods calls for involvement of high-performing logistics providers in freight villages. These logistics providers are responsible for the supply and disposal of products and goods in a way that lowers delivery frequency due to improved capacity utilization (Kracke et al., 1998).

The polycentric structure of the economy means that it comes as no surprise that many logistics facilities with differing specialties have managed to develop. The two seaports in Hamburg and Bremen (i.e.



Bremerhaven) are Germany's "Gateways to the World" and with their links to other modes of transport they are the most important logistics locations in the north of the country. But smaller ports of the North Sea and Baltic Sea are also becoming more important, since short-haul maritime traffic in the EU, for example, has been rising for a number of years.

The Rhine-Ruhr, Rhine-Main and Rhine-Neckar regions are among the major logistics centers with a high degree of inter modality, due in no small measure to their considerable economic vitality. Nearly 90% of air freight traffic in Germany is processed via the airports in Frankfurt, Cologne/Bonn, Leipzig/Halle and Munich. Berlin conurbation possesses the potential to expand its role as a regional hub for traffic heading towards Eastern Europe. The partially decentralized intermodal freight villages in Germany are becoming more important for the efficient dovetailing of different modes of transport, and they help to achieve the optimum use of load capacities. Locating their facilities near to such freight villages is appealing for logistics firms and industrial segments that involve high levels of freight transportation.



**Figure 3.** The Stages of Freight Villages in Germany (Wagener, 2008:11).

In Germany managed by the state system, a small or a large freight village is located in each state given in *Appendix 1*. Taken from the top level; three main freight villages (Berlin, Bremen and Regensburg) are observed at the top of the hierarchy in nationwide (*Figure 3*). These regions rank also the highest per capita income of people in Germany. So this wealth reveals perfect infrastructure of all logistics facilities. The secondary high stage logistics villages with high accessibility, wide hinterland and a large volume of business have located in all the border provinces of the country. That is because Germany is a foreign trade-oriented country. On the other hand, the three states where Kassel, Magdeburg and Erfurt of small stage level of logistics villages are located, preserved by UNESCO in terms of historic and cultural tourism potentials involving vital fertile agricultural lands of Germany as well. These locations are subsequent service sector hubs. However, absence of a prior freight village in these three mid-states of Germany does not mean that they cannot take advantage of opportunities in the immediate vicinity. Moreover, these villages are supported by a developed intermodal transportation. There are different roles of each of logistics centers in the country. For example in particular, Berlin is positioned as a major hub for cargo from/to Eastern Europe and its



position in the hierarchy is also enhanced by strong connections and access from other freight villages. This map (*figure 3*) has parallels with the industry distribution of Germany by reason of the locations. The more industrialized the better logistics facilities remain. One more important point is that Germany has close economic corporations with the wealthy neighbouring countries especially in north-east and south-east. So, that the freight villages in level 4 and 5 are located by considering these points.

### 3. A BRIEF SUMMARY OF LOGISTICS, FREIGHT VILLAGES AND TRANSPORT PROBLEMS IN TURKEY

Turkey locates at the heart of Europe (South East), Asia (Middle East and Central) and Africa (North East) bordering eight countries. In terms of freight transport, intercontinental position makes Turkey a major transit country and also provides potentials to be a hub as well. At the same time, Turkey is a fast developing country with more than 80 million inhabitants as per 2014 and a great deal of prospective young population and dynamic market conditions; however has some critical challenges behind the regional policies and perspectives followed in logistics sector to convert this geographical advantage and work force into economic profit.

Particularly the main land of Turkey (Anatolia) possesses some difficulties because of mountainous and bumpy terrain but, has a competitive advantage in maritime transport since it is surrounded by seas on three sides (8,333 km.) with the Mediterranean, the Aegean, and the Black Sea, together with the straits of the Dardanelles and the Bosphorus. This is one of the reasons for maritime to be the most preferred mode in the international freight transport of Turkey with a share of 85% in terms of volume.

In between 2004-2013, the total amount of carried cargo increased from 174.846 million ton-km to 253.268 million ton-km with a growth rate of 45%. The general overview of transport sector in countrywide clearly demonstrates road transport as the major mode for national freight transportation where 88% of goods are carried (*Table 1*). Meanwhile Turkey is on the network of eight international roads however, unstable regional political atmosphere for example since 1990s in Iraq and 2011 in Syria, adversely affect international freight transport via road transport although infrastructure of roads and highways are comparatively developing quickly. On the other hand, statistical data in between 2004-2013 indicates that maritime share in freight transport advanced from 4.2% to 6.8% in ten years. And the infrastructure of railways are started to be repaired and developed. However, the efforts could not avoid decline in the rail sectorial share of freight transport from 5.4% in 2004 to 4.4% in 2013.

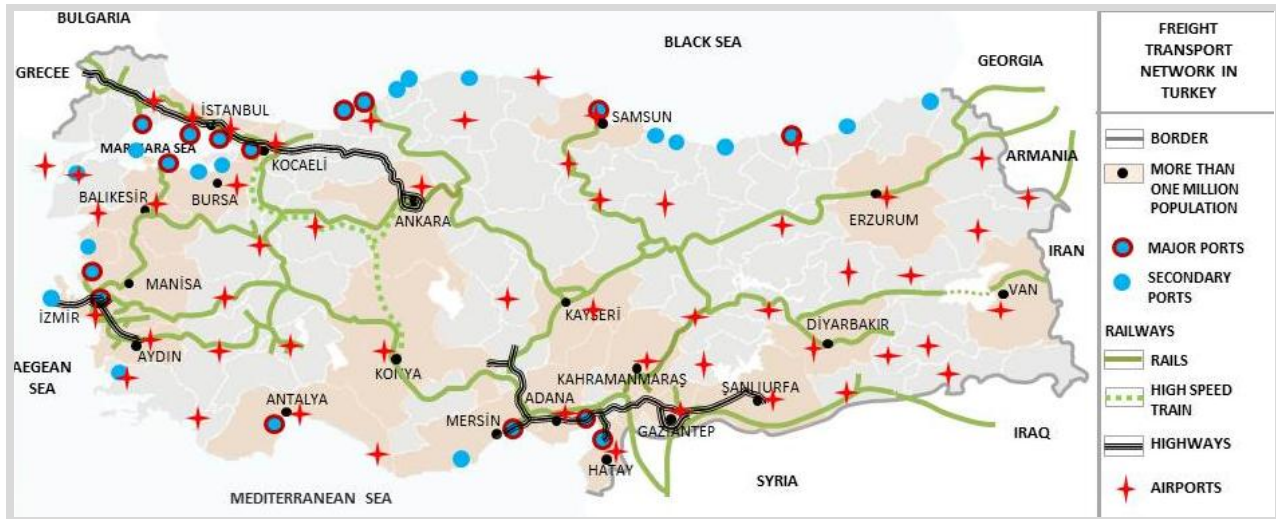
**Table 1.** Modal Split of Freight Transport in Turkey in 2013 (UDH, 2013)

Transport Modes (instead of pipelines)	Volume	
	Ton-km (million)	(%)
Road	224.048	88.5
Maritime	17.312	6.8
Rail	11.177	4.4
Airline	0.731	0.3
<b>Total</b>	253.268	100

Recently, logistics sector in Turkey has made progress and experienced a 20% growth rate during the last five years and is forecast to increase to US\$ 120 bn by 2015. In the year of 2013, market size of logistics industry has been 98 billion US\$ while share in GDP was 12.3%. As a result of domestic/international demand and domestic/international passenger evolution, CAGR of the industry was 5.7% during 2004-2013. Industrial growth performance for 10 years was above GDP growth performance. The sector tends to grow faster than GDP in up cycles, and contracts more rapidly than GDP during recessions. The sector is highly sensitive to changes in international trade since a significant part of domestic movements are actually targeted toward international trade.

## MODAL SPLIT OF FREIGHT TRANSPORT IN TURKEY

**Road and Railways:** In Turkey, road transport has experienced a significant process since 1950s. While 957 ton-km of freight was carried on the roads in 1950, it has increased to 224.048 ton-km in 2013. 1/3 of road network that is 21.393km developed into divided roads and the highways started to be established since 1980s constitute 3.2% (2.127 km) of the total length of road network in Turkey (*Figure 4*). In parallel with the development of road network, the number of trucks operating in the nation escalated 54% from 16.861 in 2000 to 25.930 in 2013. The road freight (ton-km) expanded with a percentage of 47% from 2004 until 2013.



**Figure 4.** Current Transport Network in Turkey

The railway network is available only in certain areas and between some of cities with more than one million populations (*Figure 4*). 4.136 km of Turkish railway network was inherited from the Ottoman Empire. As of 2013 total length of the rail network reached to 12.097 km, of which is consisted of 8.846 km main lines, 2.363 km branch lines and 888 km rapid rail lines. However, the integration of rails with ports is generally weak. For example, even the largest container port at Ambarlı-Istanbul does not have a rail connection. Other international ports like Izmir and Mersin already have railway connections, but unfortunately the ratio to link the hinterland by rail is around 2-3 %. As a result, most of the freight is transported via roadways.

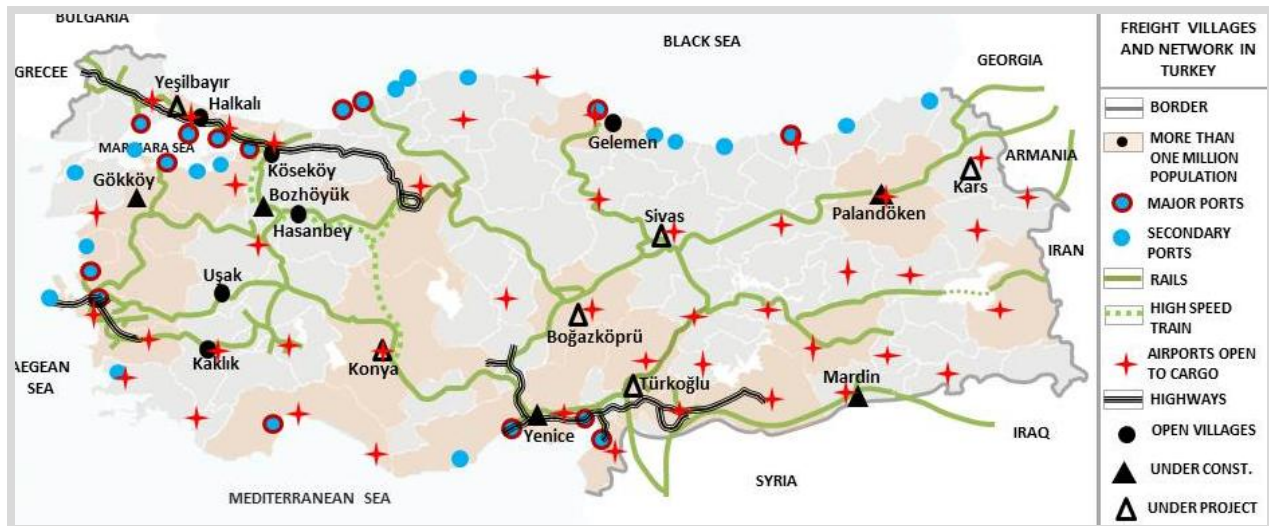
**Air Freight and Maritime Transportation:** Recently, Turkey has had a tremendous development in the civil aviation sector and integrated to the global network. At this period, aviation sector has grown ten times faster than the world average. Although the total cargo carried doubled and reached to 731.962 thousand tons in 2013, in terms intermodal transport, air transport does not have a remarkable share (0.3%) in cargo transport volume. As of 2015, only 35 airports are opened to international freight. Istanbul Atatürk Airport is the largest cargo terminal with a volume of 586.319 ton covers 86% of all airports in Turkey. Istanbul Sabiha Gökçen (29.340 ton) is another major international cargo transport airport.

Cargo arriving from Europe and America are handled in transit to CIS Republics; Iran, Iraq, and the Balkans and vice versa. Turkey's approach to maritime transport is consistent with the broad European principles of free circulation of shipping, fair competition, enhanced maritime safety and pollution prevention. The maritime is one of the most liberally developing sectors in Turkey, with a largely free market oriented economy. Today maritime covers nearly 7% of Turkish freight transport. Both in Turkey's exports and imports, with respective shares of 46% and 59%, in total 85% of the volume of Turkey's foreign trade transportation is being carried by maritime transport. The amount of container handled in Turkish ports has reached 7,89 million TEU in 2013 with an increase of 245% in ten years. Ambarlı (Istanbul), Izmir and Mersin ports are the biggest ports of Turkey in terms of annual handling and traffic capacity. Moreover,

Aliaga, Samsun and Ceyhan regions meet the traffic of oil and its derivatives. Carrying freight via RoRo lines is a developing sector since the last two decades. The number of trucks/cars carried through RoRo lines were 220.345 in 2003 and increased with a percentage of 98 to 436.478 in 2013. As of 2013 there are 13 RoRo ports and 29 RoRo lines actively operating across the Mediterranean and Black Sea countries' ports.

## FREIGHT VILLAGES IN TURKEY

Turkish logistics market has been recently exploring the concept of "freight villages". The government and private initiatives to establish logistics villages in Turkey can be seen as a positive response to identify its constraint in the global market and strengthen its position. By 2015 in Turkey there are 6 operating, 5 under construction and 6 under project process logistics villages given in the *Appendix 2 (Figure 5)*.



**Figure 5.** Logistics Villages and Transport Network in Turkey

However, as seen in Figure 5, most of the logistics villages are located unbalanced in the northwest part of Turkey in the lack of a national logistics plan to comprise centralized management system and integrated viewpoint. In addition to this, when the hegemony of road transport in modal split of Turkish freight transport is remembered, the gap becomes larger. Railway connected warehouses and highly performing railway network is the most important issue that Turkey needs to take into consider. Current logistics villages are mostly connected or in an approximate distance to railway network, however a huge shift to trains is only possible if loads are kept in railway connected warehouses (*Figure 5*). What is more, lines have problems with sufficient parking, loading-unloading, handling services with special equipment and separate areas as well as necessary qualified staff. Most probably, these are all because of the lack of a master plan that plans the basic logistics system in the country.

## 4. THE COMPARISON OF COUNTRIES AND RESULTS

Germany is a pioneer country performing successful logistics applications in the world while Turkey is a developing country. Due to his geographical location, Turkey offers significant potentials but, there are problems in assessing yet. After analyzing the current situation and the overall picture of both countries, this section will reveal similarities and differences according to some indicators and will be finalized by presenting a roadmap for Turkey.

It should be noted that there are some important global challenges which are needed to be considered by the all countries in the world. **One of them is energy.** Energy prices have risen sharply over the last few years and affected all countries not excepting Turkey and Germany of course. Essentially all modes of transport

are affected by these cost increases in all countries. The transport sector has limited scope for making short-term adjustments to higher fuel prices. The long service lives of trucks, rolling stock, aircraft and ships militate against achieving rapid improvements in efficiency. The demand for energy is likely to rise faster than supply for the foreseeable future. Therefore, higher energy prices are likely to make transport costs a more important factor in the choice of business location going forward.

**Another global challenge is the carbon emissions** and its negative results. Over the next few years more measures motivated by environmental and climate policy concerns will impact the logistics and transport sectors. CO<sup>2</sup> emissions in the EU transport sector rose by nearly one third and thus faster than in every other sector. The transport sector is now responsible for over 27% of all CO<sup>2</sup> emissions in the EU. This is why the sector is becoming the focus of even greater environmental policy scrutiny.

Alongside to all these affecting global factors; when two countries are compared, -as it is expected- some of the issues differ and some are similar. One of the similar points is that both countries would like to shift modal split from roadway to railway system. Shifting goods traffic from road to rail is an objective that Turkish and German authorities have advocated for decades. Behind these similarities actually there is a great gap between the countries' rail and road infrastructure network (see *Table 2*). Germany already has great infrastructure and transported freight volume while Turkey is so weak. Besides creating the corresponding infrastructure, it requires that the rail network in particular be opened up to more competition. It is already in public authority in Turkey but has arguments to be privatized. Since rail's specific advantages accrue primarily over long distances competition has to be boosted further throughout Europe. Efforts also need to be made to harmonize the differing rail systems within the EU. At the same time politicians should not lose sight of the fact that the majority of the additional freight will still have to be transported by road in future.

**Table 2.** Comparison of Germany and Turkey in terms of Basic Transportation Infrastructure.  
Prepared with CIA figures (www.cia.gov, last accessed: 03.06.2015)

	GERMANY	TURKEY
<b>BASIC</b>		
<b>Population</b>	80.996.685	81.619.392
<b>GDP - per capita (PPP)</b>	27 <sup>th</sup> in the world 44.700\$	84 <sup>th</sup> in the world 19.600\$
<b>GDP- composition, by sector origin</b>	<b>agriculture:</b> 0.9% <b>industry:</b> 30.8% <b>services:</b> 68.4%	<b>agriculture:</b> 8.2% <b>industry:</b> 26.9% <b>services:</b> 64.9%
<b>Labor force - by occupation</b>	<b>agriculture:</b> 1.6% <b>industry:</b> 24.6% <b>services:</b> 73.8%	<b>agriculture:</b> 25.5% <b>industry:</b> 26.2% <b>services:</b> 48.4%
<b>Foreign Trade</b>	<b>Export:</b> \$1.547 trillion (2014 est.) motor vehicles, machinery, chemicals, computer and electronic products, electrical equipment, pharmaceuticals, metals, transport equipment, foodstuffs, textiles, rubber and plastic products <b>Imports:</b> \$1.319 trillion (2014 est.) machinery, data processing equipment, vehicles, chemicals, oil and gas, metals, electric equipment, pharmaceuticals, foodstuffs, agricultural products	<b>Export:</b> \$176.6 billion apparel, foodstuffs, textiles, metal manufactures, transport equipment  <b>Imports:</b> \$240.4 billion machinery, chemicals, semi-finished goods, fuels, transport equipment

TRANSPORTATION INFRASTRUCTURE		
<b>Geography Total area</b>	357.022 sq. km	783,562 sq. km
<b>Railways</b>	<b>total:</b> 41,981 km <b>standard gauge:</b> 41,722 km 1.435-m gauge (20,053 km electrified) <b>narrow gauge:</b> 220 km 1.000-m gauge (75 km electrified); 39 km 0.750-m gauge (24 km electrified) (2008)	<b>total:</b> 12,008 km <b>standard gauge:</b> 12,008 km 1.435-m gauge (3,216 km electrified) (2012)
<b>Railways (m) per capita</b>	0,52 m.	0,15 m.
<b>Railway density per unit area</b>	0,117 km	0,015 km
<b>Roadways</b>	<b>total:</b> 645,000 km <b>paved:</b> 645,000 km (includes 12,800 km of expressways) <b>note:</b> includes local roads (2010)	<b>total:</b> 385,748 km <b>paved:</b> 352,268 km (includes 2,127 km of expressways) <b>unpaved:</b> 33,486 km (2012)
<b>Roadways (m) per capita</b>	7,96 m	4,72 m
<b>Roadway density per unit area</b>	1,8	0,49
<b>Coast line</b>	2.389 km	7.200 km
<b>Waterways</b>	7,467 km (Rhine River carries most goods; Main-Danube Canal links North Sea and Black Sea)	1,200 km (not available for transportation)
<b>Pipelines</b>	condensate 37 km; gas 26,985 km; oil 2,826 km; refined products 4,479 km; water 8 km (2013)	gas 12,603 km; oil 3,038 km (2013)
<b>Ports and terminals</b>	<b>major seaport(s):</b> Baltic Sea - Rostock; North Sea - Wilhelmshaven <b>river port(s):</b> Bremen (Weser); Bremerhaven (Geeste); Duisburg, Karlsruhe, Neuss-Dusseldorf (Rhine); Brunsbuttel, Hamburg (Elbe); Lubeck (Wakenitz) <b>oil/gas terminal(s):</b> Brunsbuttel Canal terminals <b>container port(s):</b> Bremen/Bremerhaven (5,915,487), Hamburg (9,014,165)	<b>major seaport(s):</b> Aliğa, Ambarlı, Diliskelesi, Ereğli, Izmir, Kocaeli (Izmit), Mersin (İçel), Limanı, Yarımca <b>container port(s) (TEUs):</b> Ambarlı (2,121,549), Mersin (İçel) (1,126,866) <b>LNG terminal (import):</b> Izmir Aliğa, Marmara Ereğlisi
<b>Merchant marine</b>	<b>total:</b> 427 <b>by type:</b> barge carrier 2, bulk carrier 6, cargo 51, carrier 1, chemical tanker 15, container 298, liquefied gas 6, passenger 4, passenger/cargo 24, petroleum tanker 10, refrigerated cargo 3, roll on/roll off 6, vehicle carrier 1 <b>foreign-owned:</b> 6 (Finland 3, Netherlands 1, Switzerland 2) <b>registered in other countries:</b> 3,420 (Antigua and Barbuda 1094, Australia 2, Bahamas 30, Bermuda 14, Brazil 6, Bulgaria 12, Burma 1, Cayman Islands 3, Cook Islands 1, Curacao 25, Cyprus 192, Denmark 9, Dominica 5, Estonia 1, France 1, Gibraltar 123, Hong Kong 10, Isle of Man 56, Jamaica 10, Liberia 1185, Luxembourg 9, Malta 135, Marshall Islands 248, Morocco 1, Netherlands 86, NZ 2, Panama 24, Papua New Guinea 1, Philippines 2, Portugal 14, Saint Vincent and the Grenadines 3, Singapore 32, Slovakia 3, Spain 4, Sri Lanka 8, Sweden 3, UK 59, US 5, Venezuela 1) (2010)	<b>total:</b> 629 <b>by type:</b> bulk carrier 102, cargo 281, chemical tanker 80, container 42, liquefied gas 6, passenger 2, passenger/cargo 60, petroleum tanker 25, refrigerated cargo 1, roll on/roll off 29, specialized tanker 1 <b>foreign-owned:</b> 1 (Italy 1) <b>registered in other countries:</b> 645 (Albania 1, Antigua and Barbuda 7, Azerbaijan 1, Bahamas 3, Barbados 1, Belize 16, Brazil 1, Cambodia 15, Comoros 8, Cook Islands 4, Curacao 5, Cyprus 1, Dominica 1, Georgia 14, Italy 4, Kazakhstan 1, Liberia 16, Malta 233, Marshall Islands 70, Moldova 18, Panama 62, Russia 101, Saint Kitts and Nevis 18, Saint Vincent and the Grenadines 13, Sierra Leone 9, Slovakia 1, Tanzania 13, Togo 4, Tuvalu 1, unknown 3) (2010)

<b>Airports</b>	539 (2013)	98 (2013)
	<b>total: 318</b>	<b>total: 91</b>
<b>Airports - with paved runways</b>	<b>over 3,047 m: 14</b> 2,438 to 3,047 m: 49 1,524 to 2,437 m: 60 914 to 1,523 m: 70 <b>under 914 m: 125 (2013)</b>	<b>over 3,047 m: 16</b> 2,438 to 3,047 m: 38 1,524 to 2,437 m: 17 914 to 1,523 m: 16 <b>under 914 m: 4 (2013)</b>
<b>Airports - with unpaved runways</b>	<b>total: 221</b> 1,524 to 2,437 m: 1 914 to 1,523 m: 35 <b>under 914 m: 185 (2013)</b>	<b>total: 7</b> 1,524 to 2,437 m: 1 914 to 1,523 m: 4 <b>under 914 m: 2 (2013)</b>
<b>Heliports</b>	23 (2013)	20 (2013)
<b>Freight Villages</b>	35	17

Basic difference is the choice of transportation mode on behalf of railways. Due to rail's greater capacity and economies of scale, primarily higher transport volumes are transported over long distances by rail at lower costs. 38% of the responding freight villages in Germany reported performing transshipment of goods from road to rail. This leads to lower unit costs of transport and is environmentally friendly. Besides this, transferring goods from road to rail allows for consolidation of consignments to achieve cost savings due to rationalization of transport and economies of scale (Masters, 1980). Actually in Turkey; there are 17 freight villages have railway network but do not realize as it should be. Just %2-5 of total freight is transported by rail. Winkler and Seebacher (2012) confirm that only 13% of the responding freight villages transshipped goods from incoming to outgoing trucks while in Turkey; the 88% of whole cargo carriage is realized by trucks.

Even if they have similar tendencies on the role of reducing the road and increasing the rail; in fact there is a serious difference between these two countries. These two types difference does only not apply to both of these modes, but also to other species. One of the basic differences between two countries logistics policy occurs from the location decision of logistics villages. Hierarchy between the logistics villages in Germany is reflected in a significant way to the policies. Depending on the division of labor and hierarchy in sectorial distribution the accessibility becomes a substantial issue. However, in terms of Turkey there is no such a hierarchy, there is no division of labor in the context of the sizes for the freight villages. But in Turkey; there is a great development level difference. In fact, some of the characteristics of logistics villages in Turkey may develop by political structures. Indeed, it is known that at the stage of the logistics village location decisions the locations of certain proposals are changed by the role of political preference.

On the other hand, as it is well known, improving logistics performance is at the core of the economic growth and competitiveness agenda. Policymakers globally recognize the logistics sector as one of their key pillars for development. Indeed, inefficient logistics raises the costs of trading and reduces the potential for global integration. This is a hefty burden for developing countries trying to compete in the global marketplace (WB, 2014).

Since 2007, the Logistics Performance Index (LPI) has been informing the debate on the role of logistics for growth and the policies to support it in such areas as infrastructure, service provision, and cross-border trade facilitation. The results of Connecting to Compete 2014 Report of WB point to Germany as the best performing country with an LPI score of 4.12 and Turkey as over-income country with 3,50 (on a scale of 1 to 5). Strikingly high-income countries dominate the top 10 rankings. As expected, most of these countries are major and well-established logistics players with a dominant role in global or regional supply chains, foremost Germany does. As seen in the *Figure 6*, Germany's performance is high in every criterion<sup>2</sup> since

<sup>2</sup> The international LPI analyzes countries in six components: (1) The efficiency of customs and border clearance, (2) The quality of trade and transport infrastructure, (3) The ease of arranging competitively priced shipments, (4) The

2007. Turkey's performance is better in much more technology oriented criteria and worse in the ones related with physical infrastructure. In a detailed view, it is clear that the basic problem results from modal split of Turkey and inter modality deficiencies. Although by passing years Turkey is closer to compensate the difference, he still takes place in the upper middle class.

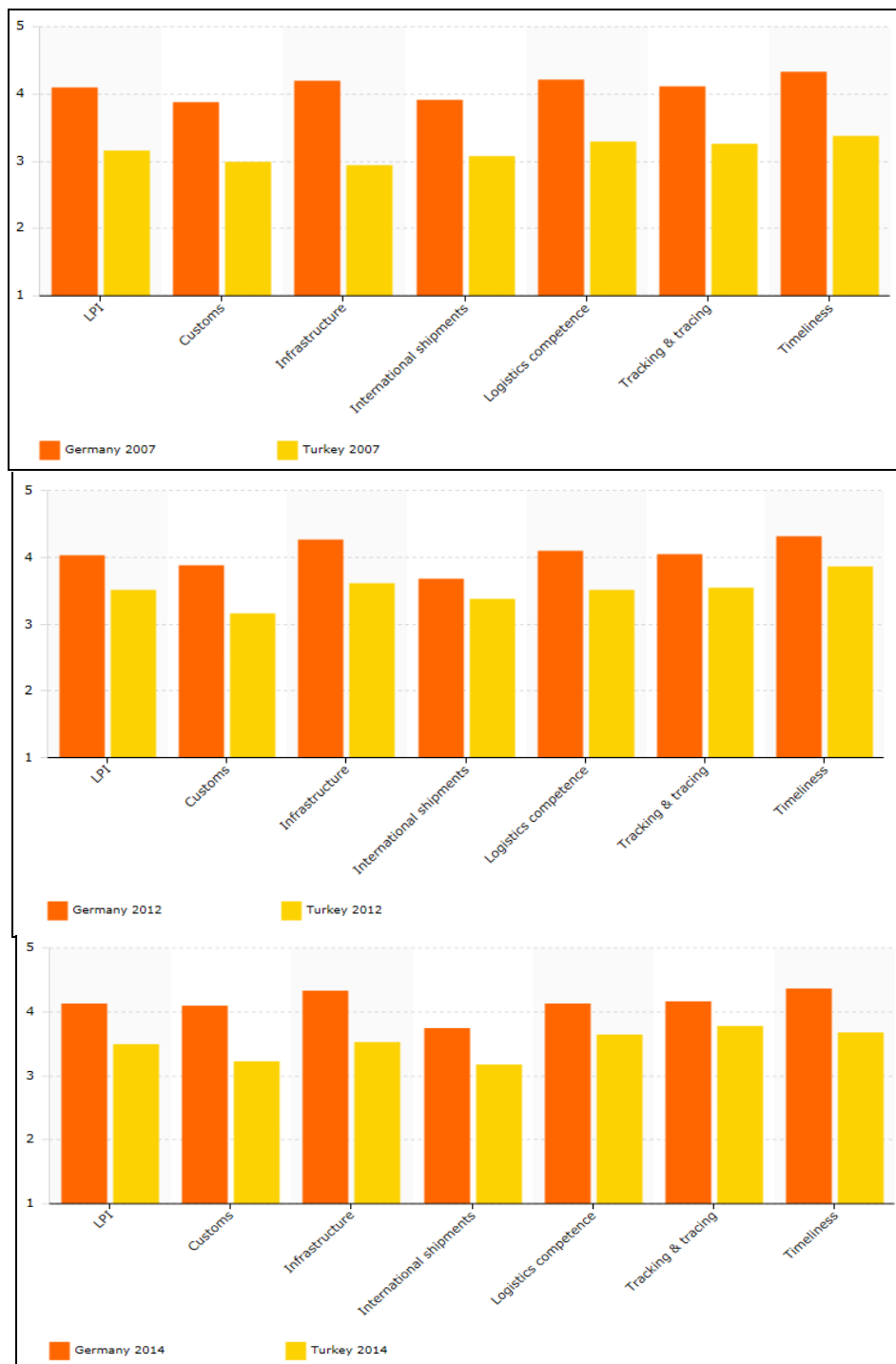


Figure 6. The logistics performance of Germany and Turkey in 2007, 2012 and 2014. (<http://lpi.worldbank.org/international/scorecard>, Last Accessed: 05,06,2015)

competence and quality of logistics services—trucking, forwarding, and customs brokerage, (5) The ability to track and trace consignments, (6) The frequency with which shipments reach consignees within scheduled or expected delivery times.



## 5. CONCLUSION AND DISCUSSIONS

Turkey's longer term economic policies are directed towards 2023 with a target of reaching an export volume of about 500 billion USD. Besides the investments on the domestic infrastructure, a strategic shift is pursued in the transportation modal mix: from rail to road. In order to reach this aim, Turkey needs to support the country's ambitions in growing transport and logistics sector on the basis of unique and close geo-strategic positional markets.

The efficient mobility of people and freight is a prerequisite for modern economic success. Due to increasing globalization, transportation of freight and logistics play an ever important role in Turkey's ability to compete in the global market. Global supply chains require a large number of high-performing physical interfaces, such as container terminals, seaports and/or freight villages, to establish a perfect material flow along the entire world. From this point of view; Germany is one of the best performed countries all over the world. Likewise, Turkey needs a kind of a "benchmarking" in order to overcome transportation and logistics infrastructural and strategic problems.

When Turkey and Germany's logistics performance is compared regarding transport indicators and the property of the logistics villages; Germany, has been observed as an important model not only for Turkey also for many countries. Reasoning behind Germany's logistics performance is to be the product of an extremely rational and strategic planning. Germany has been executed construction of basic infrastructure since the World War II years; at the same time he is constantly renewing and trying to integrate to the environmentally friendly contemporary systems. All approaches and practices are planned for a more sustainable environment and economy. In Turkey; there are basic infrastructural deficiencies yet. One of the most key defects in Turkey is the absence of a logistics master plan. That is why many of the issues are addressed individually without a master plan regarding the future of freight traffic and logistics which leads investments lack of aim and coordination. So referring to the problems is not the only issue but also must guide to the financial sources.

In order for logistics to remain a catalyst for growth and employment in Turkey, authorized institutions should first and foremost create the necessary conditions in transport infrastructure. Turkey has real deficiencies in rail network as is seen in World Bank Performance Index. The imbalance of modal split should be one of the problems to overcome. To implement highly efficient transshipment points that contribute to high-performing supply chains, specific resources provided by freight villages are required to put intelligent multi-modal transport chains into practice.

Although Germany possesses a very extensive road and rail network, in the last few years the volume of traffic in the road freight segment in particular has risen much faster than net investment in roads and bridges. According to the latest forecast from the Federal Transport Ministry, by 2025 Germany will see increases in goods traffic of some 70%. The danger will thus increase that road infrastructure develops into a factor limiting economic growth.

The policy areas for Germany are generally environment and cost efficiency oriented. For road transport, modernization and renewal have priority while refurbishing and upgrading rail network is taken into priority as well. The expansion of green and climate friendly rail services has to be accepted by the public. Efficient seaport connections are also essential for German economy, in particular connections by rail. There is much potential in inland navigation for relieving congestion on the roads and railways, but so far it has remained untapped. (1) Strengthen Germany as a logistics center, (2) enhancing the efficiency of all modes of transport, (3) exploiting the strengths of all modes of transport by interlinking transport infrastructure in an optimum manner, (4) promoting the compatibility of transport growth with environmental protection and climate change mitigation and (5) supporting good conditions of working and training in the freight transport industry are basic topic titles that is taken into account in master plan.

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Appendix 1.

FREIGHT VILLAGES IN GERMANY						
LOCATION OF LOGISTICS VILLAGE	AREA IN SQM (*1000)	MODES OF TRANSPORT				
		AIR	ROAD	RAILWAY	INLAND WATER	SEA
BREMEN	4960	X	X	X		X
HAMBURG	100		X	X		
KIEL	2700		X	X		X
LUBECK	623		X	X		
ROSTOCK	680		X	X		X
OSNAGRUCK	460		X	X		
KOLN	800		X	X	X	
HEME-ERNSCHER	200		X	X	X	
HANNOVER	350		X	X		
SALZGITTER	1100		X	X		
WOLFSBURG	34		X	X	X	
LEIPZIG	4100		X	X		
DRESDEN	390		X	X	X	
SUDWESTSACHSEN	1131		X	X		
BERLIN -OST	960		X	X		
BERLIN-SUD	1500		X	X		
BERLIN-WEST	1272		X	X	X	
FRANKFURT	1070		X	X		
AUGSBURG	710	X	X	X		
KASSEL	600		X	X		
ERFURT	2800	X	X	X		
KOBLENZ	1500		X	X	X	
TRIER	450		X	X	X	
ULM	550		X	X		
STUTTGART	530		X	X		
NURMBERG	2550		X	X	X	
RHEINE	1400		X	X	X	
INGOLSTADT	520		X	X		
REGENSBURG	3400		X	X	X	
EMSLAND	450		X	X	X	
GOTTINGEN	70		X	X		
JADE WESER PORT	1000		X	X	X	
MAGDEBURG	1780		X	X		

Appendix 2.

FREIGHT VILLAGES IN TURKEY							
LOCATION OF LOGISTICS VILLAGE	AREA IN SQM (*1000)	MODES OF TRANSPORT					SITUATION
		AIR	ROAD	RAILWAY	INLAND WATER	SEA	
ESKİŞEHİR-Hasanbey	625	X		X			OPEN
SAMSUN-Gelemen	330	X		X		X	OPEN
BALIKESİR-Gökköy	210		X	X			UC
KAYSERİ-Boğazköprü	1511	X	X	X			UP
K.MARAŞ-Türkoğlu	797	X	X	X			UP
İZMİT-Köseoğlu	748	X	X	X			OPEN
İSTANBUL-Halkalı	220	X	X	X		X	OPEN
ERZURUM-Palandöken	327	X	X	X			UC
MERSİN-Yenice	415		X	X		X	UC
KARS	315	X	X	X			UP
BİLECİK-Bozhöyük	400		X	X			UC
SİVAS	200	X	X	X			UP
UŞAK	140		X	X			OPEN
DENİZLİ-Kaklık	120	X	X	X			OPEN
KONYA	1000	X	X	X			UP
MARDİN	400	X	X	X			UC
İSTANBUL-Yeşilbayır	1000	X	X	X			UP

total area: 8.758.000 sqm

UC: Underconstruction, UP: Under Project