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Turkey's logistics impact compared to the Netherlands, Germany and Belgium

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Abstract: Developed countries around the world give great importance to the logistics sector. Most of the countries have completed the transformation from the transportation to the logistic sector. Therefore, in order to achieve an idea about countries' logistics infrastructures, the World Bank has started publishing the Logistics Performance Index every two years since 2007. The most current publication was distributed in 2016. In addition to providing information regarding the logistics sector of the countries, this index also provides investment information and opportunities of the countries. When determining the country's ranking, the index considers six key criteria (customs, follow-up and monitoring, logistic competition, timing, infrastructure and logistic competition). In the study, first of all, Spearman's rank correlation method was used to determine which of the six main criteria published by World Bank is the most influential. Later on in this paper, the ports considered as Turkey's logistics areas were compared to the logistics system of the Netherlands, Belgium, and Germany where they conducted on-site surveys. Countries selected for comparison have the best logistics areas in the Europe and are among the first countries in the Logistics Performance Index published in 2014. The existing Turkish ports have been compared with these countries and efforts have been made to identify the gaps of Turkey in the logistics sector and suggestions and recommendations have been made.

Keywords: logistics; spearman rank correlation test; logistics performance index; communication; cost of logistics; combined transport; logistics legislation; Turkey.

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1 Introduction

International commerce is growing globally and the competition in this sector is very high. Countries are strengthening their commercial activities to develop their economical relations, attract foreign investments within their own borders and to ensure their presence in the competition (Saygılı and Erdal, 2013). With the beginning of the 21st century it is possible to define two major powers affecting the world. These are 'globalisation' and 'communication'. The combination of these two has ensured more modern transport planning and make it understood better (Ortuzar and Willumsen, 2011).

Transport and logistics infrastructure is the most important component of competition. Turkey has recently accelerated its investments in the logistics sector by turning its position into an advantage. However, investments should be planned properly. Ports and logistics centres are the most important components of the logistic sector and need to be extended throughout the country with the right policies. According to Logistics Performance Index, which gives insight into the attractiveness of the countries to the investors, Turkey ranked 30th in 2014. However, it dropped to 34th position in 2016. Although the six main components are influential in the logistics performance index, economically every stage of the freights, from the production point to the consumption point, is critically important. One of the most important logistics areas is activity. Before the study was conducted, technical visits were made to the first three ranking countries in the 2014 Logistics Performance Index. Onsite technical visits were carried out with prepared technical inquiries. Thus, an opportunity was found to compare the logistics system in Turkey with the logistics systems in the Netherlands, Belgium and Germany.

Comparisons were completed considering the predictions including management of logistics, their infrastructure, opportunities in combined shipping, and legal arrangements in logistics sector. Considering the fact that Turkey has seen fast growth in the logistic sector over the last ten years and although many strategy reports and action plans have been published, the logistics sector has not been brought to any desirable position. In this study, the aim was to determine the factors such as why the logistics sector cannot come to any desired position in Turkey.

In the study analysis, a rank correlation test was conducted to determine which of the factors used to determine the countries' logistics order in the Logistics Performance Index was the most influential. The analyses made in the countries were prioritised according to the order of action of the compounds that most affected the sequencing. Therefore, it has been attempted to determine the sector priorities in Turkey.

2 Logistics sector in Netherland, Belgium and Germany

2.1 Netherland logistics sector

In this section, in order to have general information about the logistics and transportation investments of the Netherlands, survey studies on the Netherlands' logistics policies were completed at the port of Rotterdam. In the study, combined transportation, logistics centres, funds, port policies, financing, infrastructure, management and competition were emphasised. These topics also considered as parameters taken into account for the ranking of countries in the Logistics Performance Index. This study was carried out by the Dutch ministry of infrastructure and environment and Rotterdam port management. Rotterdam harbour has also been subject to technical review. The port of Rotterdam is the largest in Europe and is ranking the fifth largest in the world. Just because of this fact, examining the port of Rotterdam will provide information on the Netherlands' logistics and transport policies, as well as providing opportunities for comparison with Turkey's port sector (Aliağa Chamber of Commerce, Directorate General for Railway Regulation, 2015).

During the study visit, as mentioned above, many topics were discussed and opportunities were found to make observation on many issues.

First of all, the funding in combined transportation, financial support and policies were examined. No financial support is provided for the development of combined transport in the Netherlands. The sector benefits from transportation modes in accordance with its own needs. The Dutch government is only empowering infrastructure and enabling operators to take advantage of transport modes easily. Since each mode of transport has its own legislation, no regulation covers combined transport. It is especially important to state that each of these legislations is complementary to each other (Aliağa Chamber of Commerce, Directorate General for Railway Regulation, 2015).

Regarding logistics centres, research has been done on the planning of these areas, legislation related to site selection, and the management model. It has been found that there is no master plan for the creation of logistics areas in the Netherlands. Hence it has been found that more research is needed to meet the needs of the industry. However, certain criteria are required for the establishment of logistics areas. This means, after an area has been identified as a logistic area, it has been understood that the infrastructure design is made using very specific criteria (reconstruction legislation, necessary permission procedures, etc.). There is also a strong business alliance between port authority and operators for the management of these areas. Currently, an existing model provides management between private sector-port management and Dutch institutions. Presently there are no funds available for the creation of logistics areas. In addition, there is not any legal basis for the funds and no resources for supporting the companies. In this respect, the sector is making investments in line with its own needs. One of the most important points to be made is that the customs system in the Netherlands is very strong in logistics areas (Aliağa Chamber of Commerce, Directorate General for Railway Regulation, 2015).

The Dutch government's greatest strength in the logistics sector is undoubtedly the waterways and ports. In the Netherlands, where port policies are very strong, it has been observed that there is a strong business partnership between port operators and state policies. All investments made in the port sector are carried out in parallel with government policies. Within the ports, the government provides its own services in some

regions (Aliağa Chamber of Commerce, Directorate General for Railway Regulation, 2015). This fact suggests the reason why the Rotterdam and Amsterdam ports are so strong and effective. Public investment and support, such as strong back-area support and customs clearance, are very effective at making these ports a centre of attraction for the operators. Even only the port of Rotterdam gives ideas on many subjects. If we give an example from the port of Rotterdam, the Rotterdam port is the largest port in Europe with approximately an annual throughput capacity of 450 million tonnes. The port area includes 12.500 ha with approximately 6.000 ha used as operational area. Rotterdam port's coastal length towards the inland is 40 km's. The port has also a seriously developed inland waterway transport. Approximately 30,000 seagoing vessels and 110,000 inland vessels visit the port of Rotterdam every year (Rotterdam Port, 2015).

Table 1 Netherlands sector analysis

	Question item	*Netherlands*
Combined	Policy	Existing
	Financial support	Non-existing
	Legislation	Non-existing
Logistic centres	Plan	Non-existing
	Legislation replacement	Existing
	Procedures for area allocation for private sector	Existing
	Management model	Existing
Funds	Special funds for logistics areas	Non-existing
	Legal base of Funds	Non-existing
	Criteria for funds	Non-existing
	Funds for companies	Non-existing
Port policies	Cooperation between port management and government policy	Existing
	Public influence on port	Existing
	Private-public support relationship	Existing
	Port policy controversies	Non-existing
Financing	Income accounting method	Existing
	Cost balance	Existing
	Operational support	Non-existing
Infrastructure	Body responsible for infrastructure	Existing
	Infrastructure access fee	Existing
	Public service	Existing
	Coordination	Existing
	Emergency plan	Existing
Management	Area operation structure	Existing
	Purchasing land	Non-existing
	Infrastructure design responsible	Existing
	Independent port or logistics management	Existing
Competition	Multiple operators in railway transport	Existing
	Incentives for operators	Non-existing
	Consultation with operators in planning	Existing

In the Netherlands, there is an agency responsible for the logistic area infrastructure and supporting them with transportation types. Hence, logistics area management is also organised in the form of infrastructure and superstructure management. In this case, operators are charged for infrastructure use. In addition, a strong coordination and public service for the entire organisation is provided in logistics areas. The government also provides a strong cooperation between all actors related to the sector for all infrastructure investments.

One of the most striking features of the Dutch government regarding logistics is the existence of an independent port authority. This type of management makes port investments more productive and effective. It also makes the port function in a very organised and efficient manner. There is an infrastructure design officer responsible for all logistics activities using this management style.

The answers to the questions asked in the onsite visits were obtained from the port authority of the Netherlands, pro-rail and one-to-one interviews with the technical personnel. Having achieved a high rank position in the logistics performance index, the importance of Rotterdam port is an irrefutable fact for the Netherlands. Besides the questions asked in the study visit, the questions asked about general policies and legislations, are summarised in Table 1.

2.2 Belgium logistics sector

The questions asked during the study visit in the Netherlands were also asked in Belgium to the port of Antwerp authorities and transportation personnel. The Belgian logistics and transportation sector has been highly developed, and a large number of opportunities for observation were found for this study.

The Belgian government is currently developing policies for the combined transport development. It has been found that some sanctions have been legally applied for the operators for the transition from road to railway. Also, unlike the Dutch logistics sector, some financial support is provided from investors to improve combined transport. For instance, operators who use railways may be exempted from some of the transportation taxes compared to operators using the roads. Although, there is support in the form of government policy and some financial assist, all of this is done as a part of strategic planning and there is no legal legislation for the development of combined transport. Each mode of transport has its own legislation.

The planning of logistics centres, including ports, is being carried out continuously throughout the country. Legislative regulations are made for logistic areas in order for the selection of locations. In Belgium, where a management model for logistics centres and ports have also been developed, there are studies on public-private sector business associations and private sector businesses. No special funding is provided for the creation of logistics areas.

In Belgium, where harbour policies are highly developed, the most striking feature is the fast clearance of the arrival cargo through port of Antwerp customs. The commercial goods are then circulated throughout the European Union after their entrance has been registered at this port. In Belgium, where there is a strong working relationship between the port operation and the state policy, studies are performed very frequently. In addition, income accounting methods have been developed for operating income and costs of logistics centres and ports. There are separate investor institutions for the logistics and

transportation sector, as well as, infrastructure and superstructure operators in the railways and logistics areas within the business administration. In logistics sections where infrastructure is costly, public service liability is applied. In addition to the creation of emergency action plans in any adverse conditions in the logistic areas, there is coordination among all the institutions of infrastructure from the construction to operation.

Table 2 Belgium sector analysis

	Question item	*Belgium*
Combined	Policy	Existing
	Financial support	Existing
	Legislation	Non-existing
	Plan	Existing
Logistic centres	Legislation replacement	Existing
	Procedures for area allocation for private sector	Existing
	Management model	Existing
Funds	Special funds for logistics areas	Non-existing
	Legal Base of funds	Non-existing
	Criteria for funds	Non-existing
	Funds for companies	Non-existing
Port Policies	Cooperation between port management and government policy	Existing
	Public influence on port	Non-existing
	Private-public support relationship	Existing
	Port Policy Controversies	Non-existing
Financing	Income accounting method	Existing
	Cost balance	Non-existing
	Operational support	Non-existing
Infrastructure	Body responsible for infrastructure	Existing
	Infrastructure access fee	Existing
	Public service	Existing
	Coordination	Existing
	Emergency plan	Existing
Management	Area operation structure	Existing
	Purchasing land	Non-existing
	Infrastructure design responsible	Existing
	Independent port or logistics management	Existing
Competition	Multiple operators in railway transport	Existing
	Incentives for operators	Non-existing
	Consultation with operators in planning	Existing

All kinds of logistic investments to be made to a region (in a wide range from transport links to logistics areas, customs service to legal regulations) are performed with a strong

coordination between the private and public sector. In addition, infrastructure access fees are applied in logistics areas and rail transportation.

In Belgium there is an independent port administration for the management of logistics areas and ports. Purchase of land in logistics areas is not allowed. However, operators are allocated areas by lease. Field operations are managed from a single location. On the other hand, cargo tracking and traceability are carried out in all areas and ports, and timely delivery is very essential. In this way, freight can be controlled by an independent management of all operations in the logistics areas.

In Belgium, where railway operations are also well developed, operators can function in port and logistics areas.

An example from Belgium can be given as Antwerp port. The Antwerp port of Belgium is regarded as the door to Europe. The port is made attractive with its strong transport connections and EU bar coding on goods arriving in the port (Aliağa Chamber of Commerce, Directorate General for Railway Regulation, 2015). The port is also ranking the 11th of the largest maritime freight volume among the 20 greatest ports in the world (Antwerp Port, 2015). The port has the added advantage of its geographical location which enables loading and unloading to be expedited very fast. With its 80 km's inland coast line the Antwerp port is one of the best in Europe.

All of these studies are summarised in Table 2, in the form of titles existing or not.

2.3 Germany logistics sector

Germany is ranked as the first country in the logistics performance. When Germany's logistics sector is examined, it is seen that it has a much more developed system than other previously studied countries.

First of all, there are government policies to improve combined transport. In the financial support area, it has been found that there are various incentive systems to improve the port and railway transport. For example, various policies and incentive systems have been established, such as tax exemption to incentive railway transport, reduction of infrastructure access fees at certain times, and issuance of special legislation for the creation of areas where freight transportation from railways to roads will be achieved. For logistic centres and ports there are site selection criteria, legislation and management styles for opening these areas. Independent port and logistics authorities are able to make quick decisions to manage these areas and to develop their infrastructure and further develop management models.

In Germany, there are various funds for the creation of logistics areas. Various methods of funding are provided by the government if they show in perennial economic analysis that investors' investments will contribute to the region and the country's economy (Federal Railway Authority, 2011).

The application for logistics areas (ports, logistics centres, etc.) establishment is carried out in Germany using the following criteria:

- only financing with private capital should not make the facility economical
- the incentive should not be distorted by competition
- if the previous project has not started yet since the acceptance of a grant decision; shall be deemed to be incentive in accordance with the review made by the approval authority for a planned loading-unloading facility and its sole components

- the incentive money must be proven to be used for the benefit of the economy
- the incentive system can be used if the loading and unloading facility is based on legal and economic ownership (about the top), and they have the right to legally and genuinely exclude any obstacles to the conduct of combined carriage and to connect to the public transport network.

Table 3 Germany sector analysis

	Question item	*Germany*
Combined	Policy	Existing
	Financial support	Existing
	Legislation	Existing
Logistic centres	Plan	Non-existing
	Legislation replacement	Existing
	Procedures for area allocation for private sector	Existing
	Management model	Non-existing
Funds	Special funds for logistics areas	Existing
	Legal base of funds	Existing
	Criteria for funds	Existing
	Funds for companies	Existing
Port policies	Cooperation between port management and government policy	Existing
	Public influence on port	Existing
	Private-public support relationship	Existing
	Port policy controversies	Existing
Financing	Income accounting method	Existing
	Cost balance	Non-existing
	Operational support	Existing
Infrastructure	Body responsible for infrastructure	Existing
	Infrastructure access fee	Existing
	Public service	Existing
	Coordination	Existing
	Emergency plan	Existing
Management	Area operation structure	Existing
	Purchasing land	Non-existing
	Infrastructure design responsible	Existing
	Independent port or logistics management	Existing
Competition	Multiple operators in railway transport	Existing
	Incentives for operators	Non-existing
	Consultation with operators in planning	Existing

On the other hand, in terms of transport modes, Germany is one of the most developed countries in railway transport. The private sector literally can carry freight for railway

transport. In Germany, where harbour policies are highly developed, the back areas of ports are strengthened by road and rail. The customs system works extensively and effectively in logistics areas. Infrastructure investments are made in cooperation with the private sector through coordination.

Experts point out that the infrastructure for logistics delivery throughout the country has been solved systematically and that there is no need for a general master or strategy plan.

Germany, which provides a strong harbour policy, financing support, infrastructure network, customs clearance system, management model and good competition between actors, is ranked as the first in 2010, 2014 and 2016 in the Logistics Performance Index.

The port of Hamburg can be given as an example for the logistic model in Germany; it is one of Europe's most advanced and also Germany's most advanced port. This port serves a large area covering Austria, Czech Republic, Denmark, Germany, Hungary, Italy, Poland, Slovakia and Switzerland.

An average of 10,000 vessels arrive at the port per year. An average of 1,200 freight wagons arrive at the port that has a 43 kilometres long dock. There are 7,300 logistics companies operating in the port area and it ranks as 15th among the developed ports in the world (Hamburg Port, 2015).

All the studies were completed by Mr Udo Sauerbrey's support, who is a German logistics expert from railistics and they are summarised in Table 3.

2.4 Turkey logistics sector

Turkey's logistic sector has developed during the last period with a tendency for more rapid growth. Also, for the last few years the importance of establishing logistics centres and ports in Turkey is increasing exponentially.

The Turkish exporter's assembly logistics committee has published a logistics strategy paper in 2011 for the logistics master plan (Tanyaş et al., 2011). In addition to the strategy paper, The Turkish state railways (TCDD) have introduced the concept of logistics centres to the country by building logistics centres (Turkish State Railways, 2015). It is foreseen that with the finalisation of the planning of the logistics centres, and their starting operations, the centres will contribute annually with approximately 40 billion $, create an additional 26 million tonnes transport, and provide 8 million m2 container stocking and handling areas to the logistics sector (Attaining and Accessing Turkey, 2014).

The work started by the TCDD general directorate around different regions of Turkey is still in progress (Attaining and Accessing Turkey, 2014).

The İzmir Kemal Paşa Logistics Center, developed by the Ministry of Transport, Maritime Affairs and Communications (MoTMC) is still under construction (Rail Systems Department, 2014). Although, all of these studies have been going on a long time, none of them has been opened fully for operation yet. Namely, Turkey has not got dry ports (they are not in connected to any transport mode) which are not run at full capacity.

On the other hand investment related to the ports are continuing with great speed. The Ports of Çandarlı, Filyos and Mersin are planned to become the locomotives in the logistics sector in the country. Table 4 shows the total handled freight statistics of the first six months of 2015. While a total of 7.523.257 tonnes of cargo were handled during the

first six months of 2015 the total amount of that year is 31.631.781 tonnes of cargo (Rail Systems Department, 2015).

Table 4 Total cargo handled in ports of Turkey

Ports	*Total handling*		
	Piece	*TEU (20 – foot equivalent unit)*	*Ton*
Aliağa	37.579	54.769	494.344
Ambarlı	177.937	271.419	2.907.270
Antalya	19.904	21.602	272.173
Bandırma	1.705	1.720	27.887
Çeşme	3	6	55
Gemlik	41.722	62.243	588.440
Ports	*Total handling*		
	Piece	*TEU*	*Ton*
İskenderun	11.025	17.824	192.025
İstanbul	6.319	10.415	82.236
İzmir	43.499	60.989	615.699
Karabiga	19	25	323
Kocaeli	57.232	88.902	942.838
Mersin	73.670	114.741	1.293.588
Samsun	5.860	6.627	74.397
Trabzon	2.303	2.521	31.982
Total	478.777	713.801	7.523.257

Source: Rail Systems Department (2015)

The researchers were not able to perform an application related to most of the same surveys conducted in the analysed countries, Netherlands, Belgium and Germany, because Turkey does not have a special authority for the management of the logistics centres and ports as these countries do.

There is not an independent structure for the management of the ports nor is there any incentive system for establishing logistics centres or ports, however an action for developing a port management model for Turkey has been put in the 10th Development Plan Transition from Transport to Logistics Programme.

Consequently in the current structure of Turkey:

- incentive system
- port or logistic centre management
- dry port or logistics centre (in connected with sea port)
- regulation related to the infrastructure standards of logistics areas
- regulation related to selection of location of logistics areas or port.

Regarding above items, Turkey has not any regulation (Table 5).

Table 5 Turkey sector analysis

	Question item	*Turkey*
Combined	Policy	Not quite
	Financial support	Non-existing
	Legislation	Non-existing
Logistic centres	Plan	Non-existing
	Legislation replacement	Non-existing
	Procedures for area allocation for private sector	Existing
	Management model	Non-existing
Funds	Special funds for logistics areas	Non-existing
	Legal base of funds	Non-existing
	Criteria for funds	Non-existing
	Funds for companies	Non-existing
Port policies	Cooperation between port management and government policy	Non-existing
	Public influence on port	Existing
	Private-public support relationship	Existing
	Port policy controversies	Existing
Financing	Income accounting method	Existing
	Cost balance	Non-existing
	Operational support	Non-existing
Infrastructure	Body responsible for infrastructure	Existing
	Infrastructure access fee	Existing
	Public service	Non-existing
	Coordination	Existing
	Emergency plan	Non-existing
Management	Area operation structure	Existing
	Purchasing land	Existing
	Infrastructure design responsible	Existing
	Independent port or logistics management	Non-existing
Competition	Multiple operators in railway transport	Non-existing
	Incentives for operators	Non-existing
	Consultation with operators in planning	Non-existing

Although logistics in Turkey is not institutionalised, tasks related to logistics have been included in the foundation laws of the Ministry for Customs and Commerce, European Union Ministry, Ministry of Economy and the Ministry of Transport, Maritime Affairs and Communications (Tabak and Yıldız, 2015).

The Turkey Exporters' Assembly (TEA) established the logistics council. Apart from these developments the Prime Ministry has issued the Turkey logistics coordination committee circular, defining the committee's structure as shown below, stating that the committee will be making advisory decision regarding logistics. However, effective and actual planning and structural works have started with the ten. Development plan studies for the first time in Turkey (Tanyaş et al, 2011).

Considering all these issues, it would be fair to assume that logistics centres and ports in Turkey have been deliberated as separate. It is obvious that a comparison of issues such as institutional structures, combined transport and legislation is required to ensure that ports and logistics centres are operated properly and for the country to rise higher on the Logistics Performance Index published by the World Bank (2016).

3 Comparison study

In this section, the priorities of the parameters affecting the order of countries in the Logistic Performance Index have been determined via Spearman rank correlation test. The countries where technical visits were paid were the Netherlands, Germany and Belgium. Comparing Turkey with these countries, the aim was to determine the factors that primarily affect the ranking of Turkey in Logistic Performance Index.

In 2015, it is seen that the Netherlands' Rotterdam port, Germany's Hamburg port and Belgium's Antwerp port on their own took much higher load (bulk and liquid cargo) than all the ports in Turkey (Table 6). This situation suggests the needs for the priority determination of policies in Turkey regarding logistics and transportation.

Table 6 Total handled freight

Country	*Total handled freight (ton)*
Turkey (all ports)	31,631,781
Germany (Hamburg)	137,800,000
Netherlands (Rotterdam)	466,383,000
Belgium (Antwerp)	196,712,000

Source: Rotterdam Port, (2015), Belgium-Antwerp Port (2015), Germany-Hamburg Ports (2015) and Rail Systems Department (2015)

The comparison study has been made with a questionnaire based on questions replied by using two options 'existing' or 'not existing'. The objective here is to determine whether there is any study in the Netherlands, Germany, Belgium or Turkey regarding the question item (Table 7).

The study focused primarily on the six components impacting the general logistics sector rankings of countries, which are customs, infrastructure, international shipments, quality logistics services, tracking and tracing, timeliness. Table 8 shows a sample table published in 2016 by the Logistics Performance Index. By comparing the data of 2007–2010–2012–2014–2016 for this index published by the World Bank, the component with the highest degree of impact has been defined.

Table 7 Survey coding

	Question item	*Netherlands*	*Belgium*	*Germany*	*Turkey*
Combined	Policy	Existing	Existing	Existing	Not quite
	Financial support	Non-existing	Existing	Existing	Non-existing
	Legislation	Non-existing	Non-existing	Existing	Non-existing
Logistic centres	Plan	Non-existing	Existing	Non-existing	Non-existing
	Legislation replacement	Existing	Existing	Existing	Non-existing
	Procedures for area allocation for private sector	Existing	Existing	Existing	Existing
	Management model	Existing	Existing	Non-existing	Non-existing
Funds	Special funds for logistics areas	Non-existing	Non-existing	Existing	Non-existing
	Legal base of funds	Non-existing	Non-existing	Existing	Non-existing
	Criteria for funds	Non-existing	Non-existing	Existing	Non-existing
	Funds for companies	Non-existing	Non-existing	Existing	Non-existing
Port Policies	Cooperation between port management and government policy	Existing	Existing	Existing	Non-existing
	Public influence on port	Existing	Non-existing	Existing	Existing
	Private-public support relationship	Existing	Existing	Existing	Existing
	Port policy controversies	Non-existing	Non-existing	Existing	Existing
Financing	Income accounting method	Existing	Existing	Existing	Existing
	Cost balance	Existing	Non-existing	Non-existing	Non-existing
	Operational support	Non-existing	Non-existing	Existing	Non-existing
Infrastructure	Body responsible for infrastructure	Existing	Existing	Existing	Existing
	Infrastructure access fee	Existing	Existing	Existing	Existing
	Public service	Existing	Existing	Existing	Non-existing
	Coordination	Existing	Existing	Existing	Existing
	Emergency plan	Existing	Existing	Existing	Non-existing
Management	Area operation structure	Existing	Existing	Existing	Existing
	Purchasing land	Non-existing	Non-existing	Non-existing	Existing
	Infrastructure design responsible	Existing	Existing	Existing	Existing
	Independent port or logistics management	Existing	Existing	Existing	Non-existing
Competition	Multiple operators in railway transport	Existing	Existing	Existing	Non-existing
	Incentives for operators	Non-existing	Non-existing	Non-existing	Non-existing
	Consultation with operators in planning	Existing	Existing	Existing	Non-existing

Table 8 2010 logistics performance index ranking

Country	*Overall LPI score*		*Customs*		*Infrastructure*		*International shipments*		*Logistics quality and competence*		*Tracking and tracing*		*Timeless*	
	Score	*Rank*	*Score*	*Rank*	*Score*	*Rank*	*Score*	*Rank*	*Score*	*Rank*	*Score*	*Rank*	*Score*	*Rank*
Germany	4,23	1	4,12	2	4,44	1	3,86	8	4,28	1	4,27	3	4,45	2
Luxembourg	4,22	2	3,90	9	4,24	4	4,24	1	4,01	10	4,12	8	4,80	1
Sweden	4,20	3	3,92	8	4,27	3	4,00	4	4,25	2	4,38	1	4,45	3
Netherlands	4,19	4	4,12	3	4,29	2	3,94	6	4,22	3	4,17	6	4,41	5
Singapore	4,14	5	4,18	1	4,20	6	3,96	5	4,09	5	4,05	10	4,40	6
Belgium	4,11	6	3,83	13	4,05	14	4,05	3	4,07	6	4,22	4	4,43	4
Austria	4,10	7	3,79	15	4,08	12	3,85	9	4,18	4	4,36	2	4,37	7
UK	4,07	8	3,98	5	4,21	5	3,77	11	4,05	7	4,13	7	4,33	8
Hong Kong	4,07	9	3,94	7	4,10	10	4,05	2	4,00	11	4,03	14	4,29	9
USA	3,99	10	3,75	16	4,15	8	3,65	19	4,01	8	4,20	5	4,25	11
Switzerland	3,99	11	3,88	10	4,19	7	3,69	14	3,95	14	4,04	12	4,24	14
Japan	3,97	12	3,85	11	4,10	11	3,69	13	3,99	12	4,03	13	4,21	15
United Arab Emirates	3,94	13	0,84	12	4,07	13	3,89	7	3,82	18	3,91	18	4,13	18
Canada	3,93	14	3,95	6	4,14	9	3,56	29	3,90	15	4,10	9	4,01	25
Finland	3,92	15	4,01	4	4,01	16	3,51	30	3,88	16	4,04	11	4,14	16
France	3,90	16	3,71	17	4,01	15	3,64	20	3,82	19	4,02	15	4,25	13
Denmark	3,82	17	3,82	14	3,75	24	3,66	15	4,01	9	3,74	25	3,92	30
Ireland	3,79	18	3,47	25	3,77	22	3,83	10	3,79	20	3,98	16	3,94	29
Australia	3,79	19	3,54	22	3,82	18	3,63	21	3,87	17	3,87	19	4,04	21
South Africa	3,78	20	3,60	18	3,78	21	3,62	23	3,75	22	3,92	17	4,02	24
Italy	3,76	21	3,45	27	3,79	19	3,65	17	3,77	21	3,86	20	4,03	22
Norway	3,73	22	3,57	20	3,95	17	3,62	25	3,70	24	3,82	22	3,77	39
Spain	3,73	23	3,48	24	3,72	25	3,63	22	3,73	23	3,82	23	4,00	26
Korea, Rep.	3,72	24	3,45	26	3,79	20	3,58	27	3,69	25	3,78	24	4,03	23
Taiwan, China	3,70	25	3,23	34	3,57	26	3,57	28	3,95	13	3,59	31	4,25	12
Czech Rapublic	3,67	26	3,58	19	3,36	35	3,65	18	3,65	26	3,84	21	3,94	28
China	3,66	27	3,32	31	3,75	23	3,70	12	3,62	27	3,68	28	3,90	31

Source: Worl Bank (2016)

Table 9 Test results throughout the years

2007	*S7*	*2010*	*S10*	*2012*	*S12*	*2014*	*S14*	*2016*	*S16*
Customs	0.933	Customs	0.932	Customs	0.931	Customs	0.915	Customs	0.950
Infrastructure	0.935	Infrastructure	0.949	Infrastructure	0.954	Infrastructure	0.958	Infrastructure	0.954
International shipments	0.943	International shipments	0.851	International shipments	0.934	International shipments	0.938	International shipments	0.962
Quality logistics services	0.957	Quality logistics services	0.955	Quality logistics services	0.970	Quality logistics services	0.966	Quality logistics services	0.974
Tracking and tracing	0.942	Tracking and tracing	0.913	Tracking and tracing	0.959	Tracking and tracing	0.953	Tracking and tracing	0.971
Timeliness	0.917	Timeliness	0.898	Timeliness	0.929	Timeliness	0.913	Timeliness	0.963

Table 10 Grouping of logistic performance index components and survey results

Table 9 (prioritisation)		*Table 7 (comment)*
		'3 existing', '1 non-existing'
Rank	*Component*	*Listing of the criteria most missing in Turkey*
1	Quality in logistic and competition	• strong cooperation port policies • emergency plan • independent structure • development of common strategies
2	Infrastructure	• legislation for logistic centre location choice • free railway transport • public service in infrastructure • combined transport policies • strong cooperation for port policies
3	Tracking/tracing	• combined transport policies • strong cooperation port policies • development of common strategies
4	International shipping	• combined transport policies
5	Customs	• development of common strategies • combined transport policies
6	Timeliness	• development of common strategies
		'2 existing', '2 non-existing'
1	Quality in logistic and competition	• financial support for combined transport • management model for logistics centre
2	Infrastructure	• financial support for combined transport
3	Tracking/tracing	• management model for logistics centre
4	International shipping	• management model for logistics centre
5	Customs	• management model for logistics centre • financial support for combined transport
6	Timeliness	• management model for logistics centre • financial support for combined transport
		'1 existing', '3 non-existing'
1	Quality in logistic and competition	• legislation for combined transport • special funds and requirements for logistics areas
2	Infrastructure	• planning for logistics centre • special funds and requirements for logistics areas
3	Tracking/tracing	
4	International shipping	• cost balance
5	Customs	•
6	Timeliness	• special funds and requirements for logistics areas

For the research, the important ports of the top three countries of the 2014 logistics performance index Germany, Netherlands and Belgium have been studied at their locations. Interviews with the authorities in these places have been conducted. By comparing the data of the logistics performance index and taking into consideration the development and strategic plans of Turkey, the study aims to find which areas need to be developed as a priority in Turkey.

In Table 9 using the Spearman rank correlation test, it is obvious that throughout the years logistics quality and services has the highest effect on the performance.

From Table logistic quality and competition at the top on the list followed by infrastructure, tracking and tracing, international shipping, customs and timeliness, it can be deduced that the quality of logistics, competition and infrastructure are the most important variables affecting the ranking of the countries. Table 7 shows the surveys related to the countries and the results are coded with an existing/non-existing status. Thus Table 7 is a sort of status analysis of the countries. The surveys made here have been grouped under titles according to the six criteria defining the country performance in the World Logistics Performance Index (quality of logistics and competition, infrastructure, tracking and tracing, international shipping, customs and timeliness). For example, the work listed under the infrastructure or customs has been introduced according to the impact on the work. The results in Tables 7 and 9 were able to be compared in the Table 10.

Table 10 shows policies, actions or institutional structures that exist in high level countries of the logistics performance index and that are missing in Turkey, compared with priority actions of the logistics performance index.

The main objective of this study has been to deliberate the parameters that exist in the other countries and that are missing in Turkey. For example, 'three existing', 'one non-existing' means that it is only missing in Turkey. For example, the 'infrastructure' parameter in Table 10 shows 'public service in infrastructure'. It means that only Turkey does not have this, 'two existing' and 'two non-existing' means that another country and Turkey do not have this, and 'one existing' and 'three non-existing' means that two other countries and Turkey do not have this parameter.

All these issues are taken into consideration in the comparison of the existing and non-existing table and the survey results. In Turkey, the success of the quality of logistics and competition as important parameters is not satisfactory in terms of the strong strategic cooperation between the government and port policies. Not having emergency plans, lack of coordination in the development of common strategies and most importantly not having an independent logistics or port authority are major disadvantages.

Compared to the other countries, Turkey misses one of the most important and material links of the logistic activities and the logistics chain, a legislation for Infrastructure, and does not have liberated railway transport. In addition to other major failings compared to other countries in Infrastructure, there are no contracting or legal concept for private sector to work with public support in logistics sectors and clear policies for the development of combined transport are not being developed and implemented in Turkey.

Another issue is financial support for combined transport which as a system is very successfully implemented in Germany, carrying Germany to be one of the best countries in the logistic sector, but is missing in Turkey. Establishing logistics centres and that

these centres do not have any management model can also be evaluated as a disadvantage.

Another important issue is that certain funds are not being provided for the private sector to establish logistics areas or to develop combined transport.

Ensuring cost benefit analysis is done in the logistics area and ensuring the cost balance is quite important. The cost benefit balance is largely ensured in Germany with very little imbalances. On the other hand in the Netherlands the balance is entirely kept.

4 Conclusions and recommendations

The analysis has been focused on the reasons for Turkey's lack of success in logistics sector despite its favourable geographical location in this study.

In a closer look at the World Bank Logistic Performance Index, it is apparent that competition and quality in logistics has the greatest impact on the logistics performances of the countries. Logistic infrastructure is the second most impacting indicator.

Germany, Netherlands and Belgium were studied at their locations and issues that are not implemented in Turkey but are applied in these countries and usually throughout the country were analysed in detail. Taking all of these considerations into mind, it is apparent that a number of actions that are currently not included in the 10th Development Plan of Turkey or that should be prioritised are missing in Turkey.

First of all, it is apparent that an independent structure for the management of ports and logistics areas in Turkey should be established. In addition to this, developing emergency plans against any unforeseen events, increasing public and private sector cooperation and thus realising common strategy and investments are of the utmost importance. One major setback for Turkey is that a number of different institutions are tasked with logistics investments creating problems with not having a single authority for investments, resulting in idle investments or inefficient utilisation of public resources.

Having a number of ministries (ministry of transport, maritime affairs and communications, ministry of customs and trade, economy ministry) similarly tasked related to logistics, as well as the dissemination of similar task among the Directorate General underneath the ministry of transport, maritime affairs and communications points to a result of inefficient sectoral investments.

Also, not having incentive funds for combined transport, nor any legislation or standards for the establishment of logistics areas will presumably result in a lessening of the expected impacts.

Some very important issues are the strengthening of the logistics infrastructure, the delay in the liberalisation of the railway transport in Turkey, as well as the low share of railway transport, and strengthening the railway and road connections with ports. Railway infrastructure investments are quite expensive, thus making it much more important to choose the correct transfer centres, with road, seaway and even airway integration, to ensure optimal utilisation of these areas in order to increase the share of railway transport.

It is also of a high importance that management structures are set up for logistics areas or ports managements, to ensure organisation and operations are conducted as quickly as possible.

The Turkey development plan is sadly lacking in projections for all of these issues discussed above; there is no mention of the establishment of an independent port or

logistics area management. Nor is there any clear projection about whether any study should be made for forming combined transport legislation or establishing incentive funds. It is also obvious that a strong relationship should be formed between the private sector and the public sector. To ensure that logistics areas are established, port policies are defined and infrastructure investments are expedited, these deficiencies should be remedied.

Port management model action, however, is mentioned in the development plan, but there some doubts as to the execution of the action and the implementation in practice.

Producing a master plan including all the issues discussed above, paying attention to the political influences of the country in general and the economic and political influences of the neighbouring countries, and keeping in view all influences from customs to infrastructure will be of utmost benefit.

As a priority, the port location choices in Turkey in general should be reviewed, the infrastructures should be finalised, emergency plans should be in place to be referred to in case of unforeseen event during handling or any other situation, the related legislation should be prepared as soon as possible and a strong mechanism for investments between public and private sector should be established. Policies for combined transport should be implemented in practice as soon as possible and the railways should be liberated with strengthened infrastructure.

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