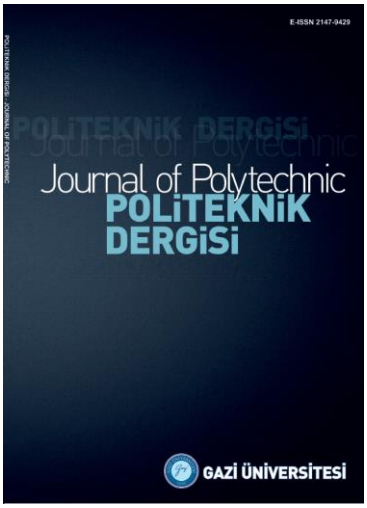

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LPI based comparison of Turkey and Mexican logistics sector

Türkiye ve Meksika lojistik sektörünün lojistik performans endeksi bazlı karşılaştırılması

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LPI Based Comparison of Turkey And Mexican Logistics Sector

Araştırma Makalesi / Research Article

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ABSTRACT

Transportation costs are the main parameters directly affecting the country's economy. This parameter is not only increasing day by day due to unsustainable fossil fuels, but also brings heavy burdens to economies. In case of Turkey, logistic strategies had to be considered inevitably. For this purpose, along general comparison made by taking the data of logistic performance index (LPI) issued biennially by World Bank into consideration, Mexico included in the same category in said index has been taken as the sample and then the logistic sector has been analyzed and compared. As a result, it was shown that Mexico and Turkey had poor transport infrastructure, lack of legislation, lack of independent logistics management and lack of independent port authority. In addition to them, it has been seen that the railway infrastructure should be less developed than behind the road infrastructure and the ports should be strengthened with highway-rail connections. Geostrategically, both countries have a similar structure but also have lack of data on the logistics sector. It has been asserted that regions for combined transport in both countries should be identified and logistics areas should be established.

Keywords: Logistics performance index, transport, competition, performance criteria.

1.INTRODUCTION

Increasing energy costs in recent years have increased transportation costs, while harming nature due to the use of fossil fuels. Reducing transport costs not only benefits the country's economy but also reduces external dependency on a sectorial basis and increases its relevance to the sector's energy resources. So the development in logistic sector and determining right strategies had become inevitable for developing countries and Turkey.

If all the activity from a production point of a commodity to the point of final consumption is defined as a supply chain, the delivery of this commodity to the final point can be defined as logistics procurement. These definitions should be applicable both in the field and in theory.

In recent years, public institutions and organizations, local governments and private sector representatives have gained momentum about logistics in our country. This brings with it the necessity of addressing industry problems with an academic perspective. The logistical performance index, published by the World Bank nearly every two years, provides information on countries' logistic sectors and investment opportunities.

In the light of this information, taking the basic criteria forming the index, this study has compared Mexico with Turkey existing within the same category with it.

2. PREVIOUS AND BASIC CONCEPTS

The concept of logistics, which has become a very big sector nowadays and which has influenced the country economies to a great extent, has been derived from the Greek "logisticos" word. This word also means "science of calculation" and "ability to calculate" [1]. It was observed that logistics, which is used as a military concept until a recent period especially in our country, conforms with the management of all processes of taking a commodity from production area to consumption area [2]. Developed countries understood that they had to give primacy to the imperative of logistic transformation against development plans. This fact was included in Tenth Development Plan under the title of "Program for Conversion from Transportation to Logistics" [3]. All processes included in this cycle have been evaluated as supply chain mechanism.

The supply chain mechanism needs a management as it is in every mechanism [4]. Supply chain management is defined differently in many literature; all the processes from the supply chain mechanism to the delivery of the goods from the producer to the consumer, the organization between the enterprises and the whole process are not only ensured to be carried out strategically but also at the same time, it is defined as the totality which causes the customer satisfaction. Based on this definition, the supply chain mechanism and the management of it are composed of many components. However, transportation has the biggest share among these components. The main factors in the supply chain mechanism are raw material, business area, market and final consumer. It is clear that it is not possible to bring these factors together. In this case, the reality of transportation between the factors is inevitable.

Logistics activities that form the supply chain cycle are identified as raw material (final starting point), processing, packaging, market, distribution, routing [5], warehousing, customs, barcode, distribution and final

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consumer. Each activity directly affects logistics costs. Tabak and Yıldız [6] have classified the logistics cost inputs for Turkey as certain and uncertain costs and they have indicated that the main factors in significant costs were transportation and logistics fields [7]. According to the logistic performance index issued by the World Bank, countries' scoring parameters are in parallel with the logistics activities that make up the supply chain cycle. Regular parameters are determined as clearing, infrastructure, timing, traceability, international transportation and logistics competition.

The overall LPI score is calculated by an econometric analysis of these six components [8]. When studies investigating the effect of LPI points on commercial activity were followed, it was found that a 10% increase in LPI score corresponds to a 69% increase in exports. The ratio of total logistics costs in fuel costs while watching the 60% level in Turkey, this rate is around 30% in developed European countries. On the other hand, the rate of inappropriate means of transport to intermodal transport in Turkey is 90%. As a result of that fact, Turkey's performance is decreased due to the delivery at competitive prices. Turkey's general interest in order to score the LPI levels to Malaysia, 14% in imports, while exports are required to provide 18% increase.

It is not sustainable to provide services with road transport for Turkish logistic sector. Road transport is also inappropriate for the competition with countries in higher levels in LPI index. In terms of LPI index, the infrastructure quality of different transportation types of these countries is higher in ports than the qualities in airway, railway and highway. The dependence on the highway in our country has caused a considerable cost burden on logistics due to the high fuel cost. Besides, it has been determined that the number of vehicles is 90% in order to be suitable for intermodal transportation. All of these have inevitably produced policies to facilitate intermodal transport and increase competition in our country [9].

Tabak and Yıldız [10] have examined the logistics of Germany, the Netherlands and Belgium, which took the top three rankings in the year 2014 according to the Logistics Performance Index published by the World Bank on site and carried out a benchmarking study considering the 2016 LPI data. Questionnaires were made about the legal and structural status of the three countries that were sampled in the study. In addition, the values of LPI in these three countries were evaluated by correlation method and the most important parameters affecting performance criteria were determined. Primary strategies have been set forth according to the result of study.

3. INSTITUTIONAL INFRASTRUCTURE OF LOGISTICS

In order to be able to manage the logistics sector correctly and effectively, the structure of the institutions related to the sector needs to be examined. Although logistics performance influences customs, infrastructure, logistics competition, follow-up / tracking, timing and shipments, it seems that handling and managing them as a whole has a considerable precaution. In this regard, structures of Germany, Netherlands and Belgium which should be targeted by Turkey within the context of vision and mission have been examined, and primary strategies have been introduced in our previous study [10]. However, since we are in the class of middle-income countries and/or developing countries and due to the logistic geography and the geostrategic resemblance, it is thought that the examination of the logistic structure and plans of Mexico would contribute to the national strategy and development plans of our country.

The reason for the investigation of Mexico as a developing country such as Turkey has been determined according to the following parameters:

• It is classified within the same category of "developing countries" with Turkey in LPI (Table 1).

• Geostrategic affinity (Table 2).

• Closer Gross Domestic Product; Mexico's 2016 Gross Domestic Product value is 1,046.00 ($ Billion), while Turkey's is 857.75 ($ Billion) [11].

Table 1. Mexican logistic sector and its comparison with Turkish logistics

Turkey								
Yearr	Roww	Customs	Infrastructuree	Transportt	Competitionn	Monitoringg	Timingg	Countryy
2007	34	33	39	41	30	34	52	150
2010	39	46	39	44	37	56	31	155
2012	27	32	25	30	26	29	27	155
2014	30	34	27	48	22	19	41	160
2016	34	36	31	35	36	43	40	160
Mexico								
Year	Row	Customs	Infrastructure	Transport	Competition	Monitoring	Timing	Country
2007	56	63	53	54	57	48	51	150
2010	50	62	44	77	44	45	54	155
2012	47	66	47	43	44	49	55	155
2014	50	70	50	46	47	55	46	160
2016	54	54	57	61	48	42	68	160

Table 2. Geostrategic vicinity evaluation

TURKEY				**MEXİCO**			
Geostrategic Condition				Geostrategic Condition			
North	South	East	West	North	South	East	West
Black Sea, Georgia	Mediterranean, Syria	Iraq, Azerbaijan, Iran	European Union, Aegean Sea	USA	Guatemala, Belize	Atlantic Ocean, Cuba	Pacific Ocean
EVALUATIONS							
Eastern countries like Black Sea and Russia have a strong country	Being a politically unstable country like the Mediterranean and Syria and being in a state of war	War in Iraq, political situations not in advanced level with Iran	The Aegean Sea in the West and a strong European Union practice	To be a strong country like USA in the north	South, Turkey's very good at political level, a similar figure to the southern Guatemala and Belize are unsubscribed	In the East, Russia bloc countries such as Cuba and the Atlantic Ocean a similar figure in Turkey	The Pacific Ocean in the West

4. MEXICAN LOGISTIC SECTOR AND ITS COMPARISON WITH TURKISH LOGISTICS

The reasons for comparing the logistics sector between the two countries are given in detail in the previous section. In the light of these reasons, we personally participated in the roundtable workshop on the development of the logistics system and logistics system of Mexico in Mexico in March 2015. Taking the documents and information obtained under these subjects into consideration, logistic sector in Turkey has been compared.

Within the scope of the workshop, the effects of logistic performance on trade were emphasized. The reliability of the logistic performance criteria has been questioned [12]. This reliability is said to depend on many variables. In Latin America, countries such as Mexico, Chile, and Panama have been required to focus on parameters such as pricing, scheduling, and infrastructure standards to determine their logistics performance. The Mexican Transport Institute has worked on shipping times, in case that the freights from China are transported through the United States and Mexico. It was stated that if the shipment was carried out through the state of Aguascalientes, it would be faster. Schematically, this suggestion was confirmed on the map (Figure 1)

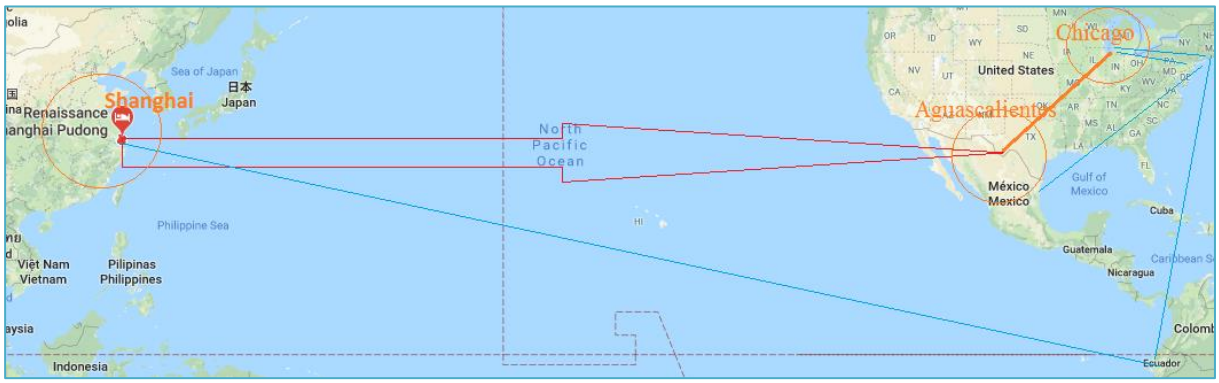

Figure 1. Freight route of Shanghai-Chicago

The duration for transport of any commodity produced in any region of China to Shanghai Port is one day or five days depending on the situation of freight and region. Handling period of freight coming to the port is three days on average; the period for the arrival of product from Shanghai Port to the USA via Panama Canal is ten days. It was indicated that port activities in the USA varied between 1 and 5 days. This period can be prolonged up to nine days due the congestion in railroad activities. It was stated that four days were required to

transport the freight handled in the port to Chicago but this period could be 9 days due to the traffic density. When all these periods are taken into consideration, average period of a freight coming from a production area to the USA can be 19 days or a little bit more, but if we consider the delays, this period can be 33 days [13]. If freights come to the state of Aguascalientes without transporting it directly to the USA, the handling requires one day in Mexican port. This period can be 3 days according to road traffic. If the United States-Mexico border is taken into consideration, border crossing transactions, customs transactions etc. require one day at best. Road transport requires one day or three days. In that case, if there is no delay, the period would be decreased of three days. Even in case of delay, it was shown that decrease would be seven days [13].

The study was done in terms of duration of working period and no cost analysis was done. The distribution of road freight over Mexico is the most skeptical aspect of working. When the road transport is compared with railroad transport in terms of depreciation, the cost of fuel, and the amount of freight transported in a single trip, the disadvantages of road transport should be stated. Because the freight that goes directly to the US may require more time, but it is provided by the combination of sea and rail, which are the most economical transport types in transport modes. Considering this situation, it is necessary to work more thoroughly.

On the other hand, it is inevitable that the Panama Canal is of vital importance for the development of Latin American logistics activities. This once again emphasizes the importance of marine transportation in freight transport.

Considering the above studies, there are three alternatives from China to Europe for Turkey. First one is freight corridor coming through Turkey located on the first middle zone, second one is freight transport realized through Russia, and third one is sea transport made on the ocean [14]. Again, in the study made in Mexico, a classification is made in terms of economic and monetary values, consumption, customs zones and multilateral free trade zones, it is seen that Turkey is located in the region in which the customs transactions are so dense. Then Turkey should be taken out of that region and located in the region in which developed countries are located and economic relations are powerful.

As it is known, Turkey is located in the customs union. But we need to be on the side of multilateral free trade agreements with the aim of strengthening logistical activities and developing more frequent trade with Latin America.

The weaknesses of the Latin American logistics industry in the study conducted by the Mexican Institute of Transportation are as follows.

• There is no perfect alignment between the competition strategy and the supply chain strategy,

• The lack of statistical data for the logistics sector,

• Inadequate compatibility between the public and private sector and inadequate data transfer,

• Firm lacks sectorial analysis.

The parameters that increase logistics costs in Latin America are as follows.

• Problems encountered in infrastructure,

• Weakness in logistics connections,

• Problems in border crossings,

• A solid implementation system in transport types,

• Providing illegal logistics and transportation services,

• Implementing different legislation between countries,

• Security issues insufficient traceability in the supply chain [12].

On the other hand, Mexico is making national logistics master plan as another important example for Turkey. Mexico's backbone in foreign trade is composed of transportation and logistics activities. The work of the Mexican National Infrastructure Plan is also ongoing and includes the period of 2014-2018. When the national plan is examined, it is seen that the investments are on ports and highways. The National Infrastructure Plan focuses on the following two important issues [15].

• Improving the combined transport of Mexico, increasing competition in the performance index, increasing the value added of logistics activities, enhancing transport safety and overseeing all investments in line with economic developments,

• To create a competitive, sustainable, secure and flexible logistics infrastructure.

Taking all these points into consideration, Mexico was intended to prioritize investments and to make National Transportation and Logistics Master Plan at the contest of the Mexican Institute of Transportation to draw up future projections by ensuring data collection in the logistics sector and strengthening the transportation infrastructure of the industrial zones and strengthening of the infrastructure in the logistics sector. Inter-city demand forecasts have been made and planning studies have been initiated to deal with the investments of transportation modes gradually [16].

Mexico has over 80 logistical potential areas, including 15 major logistics nodes and potential logistics nodes (Figure 2). On the map, there are logistic areas expressed by dots and logistic clusters around. It is aimed that this area and the clusters are interconnected by rail as much as possible. This target is also considered to be strengthened by road.

A study has been carried out by the Mexican Institute of Transportation to determine the unit costs of freight transported by road and rail by lengths of km, although there are no legal regulations on combined transport in Mexico yet. The railway freight transport rate in the study is around 4% and freight transport is predominantly made by road transport [17]

Figure 2. Point representation of logistic areas in Mexico

Ports are an important parameter for improving logistical performance. The performances of Mexico's ports are as follows (Table 3).

Handling rates realized in five main ports have been given in Table 3. When it is compared with Turkey, the quantity of freight handled in Turkey is 714.000

containers (TEU), but over 2 million TEU is handled in only Manzanillo Port of Mexico [18,19].

Quantity of freight handled in Mexican ports is higher than the quantity in Turkey. The main reason of that is Mexico is surrounded with ocean in two sides and the fact that freights coming from Far East can be transported to Northern regions of the USA via Mexican ports. Although the transportation is fast, non-economic situations can be faced due to the delivery via road transport.

Table 3. Cargoes carried at Mexico's ports in 2015

Port	Transshipped Containers (TEU)	Transshipped Freight at ports in 1h (Tons)	Transshipped packages at ships at ports in 1h (Tons)	Handled at one hour (Tons)	Transshipped freight by cranes in 1h (Tons)
Ensenada	139 938	34.6	37.8	46.1	23.1
Lazaro Cardenas	996 654	70.2	85.3	110.6	37.6
Manzanillo	2 368 741	46.0	53.0	62.0	23.0
Progresso	65 583	8.3	9.9	33.9	29.5
Veracruz	847 370	46.7	61.2	83.8	26.2

5. CONCLUSION AND RECOMMENDATIONS

As a result, when we look at Mexico's and Latin America's logistics performance, it is possible to say that they showed similar performance with Turkey. Logistics Performance Index published by the World Bank indicates that Mexico and Latin American countries lag behind Turkey in general. One of the biggest causes is the inadequate transportation infrastructure and the inability

to complete the legal legislation. The workshop in Mexico stated that there is no legislation for combined transport and that there is no legal framework for logistics. Moreover, during the workshop conducted by the Mexican Institute of Transportation, an independent logistics structure could be established. Compared with Turkey, with the absence of an independent body for the port authorities, Mexico has no independent structure that will manage logistic sector, rail freight ratio is at approximately 4%, and it is required to strengthen the ports and the connections between roads and railroads. Similar problems are observed in Turkey.

It is also possible to say that the economic level of the Latin American countries is highly influenced by logistics. It is difficult to say that Mexico's largest trading partner is America, while it is the same as other South American countries and Guatemala in the south. Thus, similar to a disorderly restructuring is also available in Turkey. While the northern part of the country has developed in terms of logistic cluster and railway connection, it is difficult to say the same thing for the southern parts. It is possible to say that the presence of countries with very low income levels in the eastern part of the country, such as Cuba and Haiti, could affect Mexico's international trade.

Therefore, the strengthening of the railway connection of the country needs to be strengthened rapidly by the ports-highway-railway connections, and the necessary legal arrangements must be completed quickly. On the other hand, it is stated that the starting and ending points of road transport in the country cannot be determined. A master plan study is carried out with the aim of collecting sufficient data for this purpose. Because of the lack of sufficient data on freight transport, it has been pointed out that it is difficult to apply the theoretical studies in practice. Nevertheless, it is very important in Mexico, where the density of the ports is very high, that ports are strengthened by railways, that border crossing times are further accelerated, and that customs procedures are revisited.

There are many similarities between Mexico and Turkey. Turkey's eastern region has also underdeveloped system and western region is highly developed. There is irregular structure. Again, ports in Turkey cannot operate with sufficient capacity and they have not enough efficiency. We can also tell that there is not sufficient information about logistic sector in Turkey. Same is true for Mexico. Thus it is apparent that we should gather data about the sector by examining the other countries' systems. On the other hand, freight transport rates in Turkish railroad transport is so low, therefore the connections between railroads and ports should be strengthened. Besides, as it is observed in Mexico, cost analysis should be made for all regions, the most advantaged regions should be identified for combined transportation, and proper logistic areas should be established here.

In addition, transportation master plans should be considered when creating logistics areas [20]. Because The Transportation Master Plan, includes the processes of producing, election and evaluating process for scenarios that can respond to transportation problems.

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