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INTERMODAL TRANSPORTATION: CONSIDERATIONS IN PREFERENCE AND THE PROBLEMS BETWEEN EUROPE AND TURKEY

Balca Berfin UYGUÇ¹

Bengü SEVİL OFLAÇ²

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ABSTRACT

Intermodal transportation has become increasingly important, as global supply chains tend to spread their activities in diversified countries. Intermodal transportation has its own issues that should be investigated in a deeper sense. Therefore, through conducting semi-structured interviews with logistics companies, this study aims to analyze the considerations in intermodal preference and problems faced during intermodal operations between Europe and Turkey.

Keywords: Intermodal Transportation, Preference Considerations, Problems, Europe, Turkey, Qualitative Technique

JEL Codes: O18, R42, L91

İTERMODAL TAŞIMACILIK: TERCİH NEDENLERİ VE AVRUPA-TÜRKİYE ARASINDAKİ PROBLEMLER

Özet

Global tedarik zincirlerinin farklı ülkelerde faaliyetlerini genişletmesiyle intermodal taşımacılığın önemi giderek artmaktadır. İntermodel taşımacılığın derinlemesine araştırılması gereken kendine has bazı problemleri bulunmaktadır. Bu nedenle, bu çalışma lojistik firmaları ile yapılmış yarı-yapılandırılmış mülakatlar yolu ile intermodel tercihinin nedenleri ve Avrupa-Türkiye arasındaki intermodel operasyonlar sırasında yaşanan problemleri analiz etmeyi amaçlamaktadır.

Anahtar Kelimeler: İntermodel Taşımacılık, İntermodel Tercih Nedenleri, Problemler, Avrupa, Türkiye, Kalitatif Teknik

JEL Kodları: O18, R42, L91

¹Customer and Sales Representative, MSC Turkey, balcauyguc@yahoo.com

<http://orcid.org/0000-0001-8860-0147>

²Assoc. Prof. Dr., Izmir University of Economics, Department of Logistics Management, bengu.sevil@ieu.edu.tr
<http://orcid.org/0000-0002-8617-4284>

1. INTRODUCTION

Intermodal transportation has emerged as a result of developed global trade and increased competition (Çavuşoğlu ve Şakar; 2013) and it occurs as a cost efficient option in logistics business enabling the utilization of different resources and transportation mode.

Intermodal transportation is defined as the movement of goods in one and same loading unit or road vehicle while using two or more modes of transport without handling the goods in changing modes (ECMT, 2001). Several benefits (e.g. cost reduction, carbon footprint reduction) can be attained by the use of intermodal transportation. However, many problems have also been cropped out in intermodal transport chains due to incompatibilities among organisational interfaces and systems involved in transport operations (Sulbaran and Sarder, 2013).

Turkey aims to develop a comprehensive strategy for the improvement of intermodal transport by establishing policies/reforms in order to create an integrated multimodal transport system that facilitates access to national and international markets guaranteeing the country's competitive position (TCTSER, 2013). As a bridge between Asia and Europe, Turkey has the potential of being a logistics hub (TUSIAD, 2012; Bakırcı, 2012). However, as the development of intermodalism increase all over the world, due to infrastructural inadequencies and lack of awareness, intermodal transportation in Turkey still cannot reach its desired place (Vitoşoğlu and Evren, 2011).

This study aims to provide an overview for intermodal transportation perception in Turkey and problems related to intermodal transportation operations between Europe and Turkey. Even though there are many studies focusing on economic impacts of intermodal transportation in Europe and Turkey, there are no prior studies which have approached specifically to the problems of intermodal transportation between Turkey and Europe. The purpose of this study is to address this gap in the literature and to analyze the problems for generating more detailed insight. Furthermore, Europe and country specific findings would provide practical implications for the industry.

Therefore, research questions of the study are as follows:

- What are the main considerations in intermodal preference?
- What are the obstacles between Europe-Turkey intermodal transportation?
- Are there any mode specific problems in intermodal transportation?

In the following part of the paper, literature review is presented. In the third part, we provide the details regarding methodology and data analysis. In the findings section, outcomes of semi-structured interviews are classified and lastly, in the conclusion, we tender discussions and limitations of the study.

2. LITERATURE REVIEW

In logistics literature, intermodal transportation is an area attracting considerable amount of attention. While several researchers studied intermodal systems modelling (e.g. Corry and Kozan, 2008; Bruns et al., 2014; Lin et al., 2014), some others explored the EU intermodal policies and networks (e.g. Horn and Nemoto, 2005; Van Klink and Van Den Berg, 1998; Tsamboulas et al., 2007). Charler and Ridolfi (1994) discussed the modes, corridors and nodes for intermodal transportation in Europe by addressing the intercontainer flow. Debrie and Gouvernal (2006) focused on Western Europe and pointed out the intermodal rail actors, their roles and services by mentioning about the cooperation policies to be built. Horn and Nemoto (2005) viewed the intermodal policies adopted in EU, Japan and US and presented the differences and communalities. Šakalys and Palšaitis (2006) introduces an approach in order to modernize and develop the intermodal infrastructure in new associated European Union countries by utilizing an OR approach. In a more general view, recently Langen et al. (2017) searched for the intermodal connectivity for barge and railways in Europe and employed an empirical analysis in an exploratory sense for exploring the inland-to-inland services and service frequencies. This study is comprehensive in scope and involves the railway link with Turkey. In another recent study, Agamez-Arias and Moyano-Fuentes (2017) reviewed the intermodal freight distribution literature in their study. Çavuşoğlu ve Şakar (2013) investigated the integrated marketing efforts of world's intermodal ports through web site content analysis.

Apart from those, some studies do exist in the literature that solely focus on Turkey specific issues in intermodal transportation. Deveci and Çavuşoğlu (2013) reviewed the reports in order to investigate the intermodal railway transportation risks and threats. In another review article, Kaynak and Zeybek (2007) put emphasize on the importance of intermodal terminals in Turkey by setting the international best practices. Kasapoğlu and Cerit (2011) focused on the railway intermodal container transportation by conducting a survey and through a descriptive analysis, they established the infrastructure and service quality link between railways and intermodal transportation. From a more general view, Gümüş (2013) conducted a descriptive study on general perceptions of logistics and mode usage in Turkey.

By conducting a case study, Şeker (2016) described the use of intermodal in Turkish automotive industry. Even though there are many studies on different intermodal transportation types in Europe and Turkey, up to our knowledge, there are no prior studies addressing the intermodal transportation problems between Turkey and Europe.

3. METHODOLOGY

Semi-structured interview technique is selected as the mean of data collection for detecting perceptions and opinions of respondents regarding the issue (Barriball and While, 1994). We conducted seven semi-structured interviews through judgemental sampling with the employees of logistics companies performing intermodal transportation operations (Table 1). The themes of the interviews were predetermined as considerations for intermodal transportation preference and problems faced in intermodal transportation between Europe and Turkey. In order to reduce the probability of interviewer error and enhancing the validity and reliability of the research findings, audio recording was used with permissions.

Table 1: Brief Information for Companies

Company	Operations	Countries of Operation	Duration of the Interviews	Position of the Interviewee
Company Gn	International partial transportation, air transportation, road transportation, warehousing and distribution services, port operations, cargo insurance, cross and transit trade services, bulk cargo services	Germany, Austria, Belgium, Greece, Bulgaria, France, Iraq, Iran, Romania, Holland	22 minutes	Board Chair
Company G	Sea transportation, intermodal transportation, bulk shipping, project transportation, air transportation, full and partial truck transportation, railway transportation	Europe, Middle East, Russia, Turkish Republics	25 minutes	Business Development Manager
Company E	Ro-Ro, block-train operations, air transportation	Germany, Romania, Italy, Bosnia, France, Greece, Hungary, Spain, Poland, Bulgaria, Ukraine	90 minutes	Sales Manager
Company El	Air, sea-air intermodal, live animal and dangerous goods transportation, FCL/LCL container transportation, export and import services, Ro-Ro, road transportation, rail-truck intermodal	Germany, France, Austria, Greece, Albania, Bosnia, Macedonia, Serbia, Croatia, Montenegro, Georgia, Azerbaijan, Iraq, Iran, Syria, Armenia, Turkmenia, Tajikistan, Uzbekistan, Kazakhstan, Mongolia	20 minutes	Sales and Marketing Manager
Company B	Rail intermodal transportation, customs	Hungary, Benelux, East Germany, Austria, South Germany	68 minutes	Sales and Marketing Manager
Company K	Air, sea and road transportation	Africa, Asia Pacific, Europe, Middle East	25 minutes	Branch Manager
Company S	Short-sea transportation, sea, land transportation, customs services	Belgium, Austria, France, Germany, Italy, Romania, Morocco, Spain, Sweden, Romania, England, Ukraine	30 minutes	External Sales Executive

4. DATA ANALYSIS

By following Strauss and Corbin's (1998) procedure, we conducted open, axial and selective coding. In open coding, we pursued the processes of breaking down, examining, comparing, conceptualising and categorising (Grinter, 2005). We assembled the data by making connections between categories in axial coding step (Grinter, 2005). The categories were developed dynamically. Some codes or concepts sharing same or similar characteristics were pulled together into more abstract categories for labelling phenomena. Consequently, with selective coding, we formulated a story line by prioritising some categories over all others.

For reliability assesment part, we pilot-tested the interview structure and conducted interviewer training prior the actual data collection process. Three coders analyzed the transcripts and conducted coding independently. Using Holsti's method (Holsti, 1969) for inter-coder reliability, we arrived the value of 0,81.

Validity can be checked by gathering external information to check the accuracy of responses (Waltz et al., 2010). In this sense, we conducted a document analysis, more specifically, news analysis, that acts as a validating tool for the interview responses. Document analysis, a systematic procedure for reviewing or evaluating documents, both printed and electronic material, requires data to be examined and interpreted in order to elicit meaning, gain understanding and develop empirical knowledge (Bowen, 2009). In this regard, through an electronic database search, we obtained 100 logistics news articles from three newspaper websites: two logistics industry specific and one national news paper. National newspaper is one of the most sold and prominent sources in Turkey publishing important logistics news. Area specific ones are of the important sites for logistics and intermodal transportation news sources. This study limited the time period of news to within 1 year. Newspaper articles between May 2015 and May 2016 were scanned and sorted based on the criterion of having a content related to problems between Europe and Turkey. The problems gathered from the document analysis were categorized as follows:

Road	Sea	Rail	Air
<ul style="list-style-type: none">•Tachometer tainting penalties paid by Turkish transportation companies•Transit document problems- expired transit documents•Problems with Bulgarian boarder gate- truck lines in Holidays	<ul style="list-style-type: none">•Accidents due to owerweighted loading of freight and lack of gross weight calculation of containers•Poisonous paint usage problem in ships•Turkish flagged dry cargo vessels problem in European ports due to incompatibilities with Paris Memorandum	<ul style="list-style-type: none">•Rail privatization issues and the problems of having a single operator• Intermodal time slot changes due to delays in rail operations	<ul style="list-style-type: none">•IATA Tariff Problem in Customs

These findings obtained from the news analysis are mostly in line with the findings of semi-structured interviews.

5. FINDINGS

Two major categories were formed based on the findings of semi-structured interviews: considerations in intermodal preference for logistics companies and the problems faced in Turkey-Europe link in intermodal. Besides, several sub-categories were also established grounding on the statements of the respondents.

5.1. Considerations in Intermodal Transport Preference

Respondents declared different factors that should be considered while preferring intermodal transport in international arena.

5.1.1. Market Coverage

Since the companies try to maximize their competitive advantage, one of the main considerations in intermodal planning is to have door-to-door connection in Europe.

“The most important advantage of intermodal transportation system is providing door-to-door service. Logistics companies which have infrastructure for door-to-door seriously get ahead of the game” (Company G Representative).

Without intermodal transport, geographic market coverage problems may occur.

“In Europe such as Sweden, when a company transports freight to interior points, intermodal transportation is a must since Sweden does not have any ports for maritime transportation. Another example is Germany. Freight transportation to inland locations

is done by rail transportation. It is impossible to reach South Germany without intermodal” (Company K Representative).

Intermodal is a commonly used transportation type in Europe, therefore the number of established services through established networks impacts the preference for intermodal. Besides, the existence of the intermodal network between Turkey and European countries (e.g. Germany, England, France and Austria) is being considered as an important point in providing high market coverage.

“In sea transportation to Germany there are only 1 or 2 services but in intermodal transportation 6 vessels and 3 rail transportation are in operation in one week.” (Company G Representative).

“Containers which are loaded from Turkey arrive in Germany and then are sent to other cities in Europe. Intermodal transportation is commonly used in North and West (Germany, Belgium, Holland, France and England), Scandinavia line (Finland, Denmark, Poland, Czech Republic, Hungary).” (Company E Representative).

5.1.2. Environment Friendliness

Eliminating gas emission is one of the main features of European Union White Paper documents; hence Europe is obliged to decrease gas emission in transportation modes. In line with these regulations in Europe, the findings indicate that the logistics companies have high level of awareness for the environmental benefits (e.g. reduced CO² emissions) of intermodal operations.

“One of the important reasons for the development of intermodal transportation is being an environment-friendly transportation system. If we compare fuel consumption of carrying freight by truck for 2000 km and locomotives that carry 32-36 containers by rail transportation system, combining them in intermodal transportation is useful in order to reduce redundant fuel consumption” (Company G Representative).

“Compared to land transportation, intermodal transportation consumes 50% less energy and pollutes 66% less” (Company B Representative).

“If we use rail plus truck transportation, it is also beneficial for CO² exhaust emission since it is not only truck transportation.” (Company El Representative).

“...we have to show sensitivity to environment. We, all humanity, should think about the future. Carbon emission is the biggest enemy for environment, it depletes ozone

layer. We have to increase intermodal transportation in order to contribute environment by shifting road transportation to rail transportation. So, it is possible to carry freight with block trains rather than 50 trucks.” (Company Gn Representative).

5.1.3. Cost Advantage

Through combining different modes, cost advantage manifests itself as one of the prominent feature for intermodal preference.

“Generally the aim for combining several different instruments has an important reason: cost advantage. Intermodal transportation is highly beneficial compared to road transportation in this sense due to cost advantage.” (Company Gn Representative).

“Intermodal may increase transit time but cost advantage is more important in transportation and it provides marginal profit for consumer and charger.” (Company El Representative).

Customers demand for fixed rates for freight transportation and intermodal rail transportation provides customers this option whereas in road transportation, stock market like changes in market rates may apply.

“Truck rates are like stock market rates that change every week or even every day. But on the other hand, in intermodal transportation customers can obtain a fixed rate for 12 months or more” (Company B Representative).

5.1.4. Type and Volume of Freight

According to intermodal transportation is important for carrying high volume freight.

“Due to increase in volume of freight, intermodal transportation seems as a must. As an example, a big mine company cannot transport its 1 or 1.5 million tons of freight with unimodal transportation. Rail intermodal transportation is the best solution to carry high volume freight” (Company Gn Representative).

Type of product is one of the main considerations in intermodal mode selection due to possible damages.

“We should take type of product into consideration. Once we had ceramics to carry and the route was suitable for intermodal transportation. But we could not use rail-road intermodal because as you know ceramics are delicate and they might be broken during transportation in rail lines.” (Company K Representative).

5.2. Intermodal Transportation Obstacles Between Europe And Turkey

Based on the operational and regulatory differences between Turkey and Europe, some problems may arise during the operations. In Europe, time limitations, environmental regulations and documentation issues seem to create hurdles for logistics companies. Moreover, logistics companies shared some intermodal transportation incidents based on losses, time lags, and infrastructural maintenance halts.

5.2.1. Time Lags

Mode synchronization based time lags may arise since there are multiple numbers of transportation modes. Due to variety in schedules of different modes, synchronization can become problematic and any delay can create a domino effect in connected modes.

“There should be coordination in order to balance transportation modes since each mode is independent from each other. If there is time lag due to a problem occurred in RO-RO transportation then there would be big delays that cannot be mended. So there should be synchronization in order to eliminate mistakes.”(Company E Representative).

“In Europe, rail plus truck transportation is preferred. It might be cheap but train takes off in scheduled days. So freight should be transported in those days. It means arrival of containers should be coordinated with the train’s take-off time. Otherwise delivery time can be lengthened and delays may occur.” (Company El Representative)

Europe has the capacity of river transportation. However, due to irregular flows, the schedules are variable. This variety in schedule times may create some lags in intermodal transportation plans.

“We do not prefer river plus truck transportation in Europe since river transportation is not regular due to sea flow and this may cause time lags.” (Company S Representative)

Besides, in intermodal transportation, regulations and customs controls in European borders may also result in delays.

“When we rent rail wagons, a trailer is landed at 4 o’clock and shipment dispatch is at 6 o’clock. Consider that freight transportation is just-in-time in automotive industry but the driver should pass through x-ray, or freight controls...These all affect timing.” (Company E Representative).

5.2.2. Terminal Cost

During transfers within transportation modes, terminals are used as storage points and companies pay also for those temporary storage points. Moreover, time lags between those mode transfers bring about extra charges for intermodal companies.

“While transferring freight for each intermodal transportation mode, cost of terminal is added.” (Company Gn Representative)

5.2.3. Regulatory Time Limitations in Europe

In Europe en route working hours are limited by law. Thus, if the limited time is expired during operations, drivers have to stop and wait until the next span or they have to pay extra charges.

“In England there are special regulations and restrictions. A company only has 3 hours to discharge its containers in door-to-door transportation. Also, after freight arrives at its final destination, driver turns on the tachometer (a device for measuring vehicle speed or duration of transportation) and for each overrun, the company has to pay 20 or 30 pounds penalty.” (Company S Representative).

5.2.4. Unstandardized Railway Gauge

In rail transportation, there is little or no standardization for load gauge in Europe. Since the load gauge associated with the width and height of a train for fitting bridges or tunnels, some problems may occur.

“Each country has specific regulations. For instance, weight limit is different in different countries. Especially for rail transportation. Each country has different weight limits.” (Company K Representative)

“Rail transportation has limitations for weight or height, thus it is not suitable for every container. Also, freight transportation is limited due to height and width of tunnel. If the freight exceeds the gauge then company would not use rail transportation.” (Company K Representative)

5.2.5. Infrastructural Maintenance Halts in Intermodal

Although intermodal transportation has recently been on the rise in Turkey, the development in this area has not reached its requested level yet and ongoing infrastructural changes occasionally disrupt the intermodal transportation flow to Europe.

“Railway lines that link Anatolia to Europe were in maintenance for a long time and could not be used. Container or tractor-trailers were transported by roadway” (Company G Representative).

“Intermodal transportation has begun (via railroads with Europe) in the mid 80s in Turkey. Since then many companies and operators have operated block trains between Turkey and Europe. However, the last 4-5 years have been very damaging to the market due to infrastructural works in the railroads in Turkey, Romania and Bulgaria.” (Company B Representative).

5.2.6. Deregulation Issues

Since rail transportation is considered as the main feature of intermodal, deregulation plans imply crucial changes in railways which would also act as enablers for the integration of Turkish railways with Europe. In Europe, mostly private sector companies run the railway business in a competitive environment. Whereas, in Turkey railways are governed by TCDD. From logistics companies’ perspective, railway privatization would bring free trade and reshape the business by linking foreign rail lines with Turkish lines.

“Independent from operator companies, we are dependent on TCDD and government. In long term Turkish rail transportation system is expected to be privatized. After privatization if you have a strong rail transportation company, you can buy locomotives and by this way, free trade will start. With special regulations and laws, foreign companies will be able to connect its rail lines with Turkish rail lines since there will be more investments” (Company B Representative).

5.2.7. Loss Problem

Companies note that they have faced with several problems during door-to-door operations due to losses especially in air intermodal transportation. In air intermodal, priority related loss can occur and the intermodal link can be broken.

“There is a limitation for loading and unloading of freight due to balance gauge. For example, in one incident there were 200 containers, 198 containers reached to its destination point but 2 containers were lost. If the volume of aircraft is over the limit, cargo is being unloaded as a general rule. Priority is given to passengers.” (Company E Representative).

5.2.8. Environmental Regulations and Adaptation Problems

Although the companies are aware of environmental necessities for conforming European standards, cost of obedience is stated as an important obstacle. More specifically, while performing intermodal in connection with road transportation cost of running Euro 5-6 vehicles constitute an important portion in total operation costs.

“Cost is important in environment friendly policies. Because, as you step one level further from Euro 5 to Euro 6, it needs more investment, it means more cost.” (Company Gn Representative).

“In road transportation Euro 5 or 6 fuel oil should be used and without Euro certificate no entrance is allowed for any vehicle.” (Company K Representative).

In addition to road transportation, in sea transportation some regulations have recently been changed for protecting human health and sea animal life. For instance, measurement of sulphur has become obligatory with the recently accepted sulphur usage regulation. For sea connected intermodal activities, this new regulation implies more cautions.

“In sea transportation low-sulphur regulation was started both in Europe and America. In vessels, sulphur ratio of diesel fuel oil should be used at least amount, it is being tested periodically.” (Company S Representative).

5.2.9. Documentation Issues

European Union countries provide special rights for their members. Turkey, due to not being a member of EU, does face some documentation issues which may give rise to inequality and unfair competition.

“European Union provides extra rights for the European countries. However, the same rights do not apply for Turkey and Turkish operators expose to extra costs and transit document requirements. Our competitors such as Old East Bloc countries such as Bulgaria and Romania have old fashioned truck fleets that swing higher carbon footprint but European Union allows these countries to pass without any transit documents.” (Company Gn Representative)

European countries provide a limited amount of transit documents. Moreover, the expiry dates for this limited amount of transit documents create another obstacle for the intermodal operations.

“The biggest problem occurs in Italy. In the middle of the year, dozvola transit document is set-aside and transportation process stops. Then Ministry of Communication orders new documents and operators have to wait for 1 or 1.5 month. There is also UBAK document for providing multimodal transportation but this document is not being given to every company. If you have UBAK, then it is easier to pass because it is not cancelled.” (Company Gn Representative).

“In road transportation Italy obliged companies to buy dozvola transit document. Generally, this document is finished by the end of May or June. However, Italy again publishes new ones for August or September.” (Company K Representative).

On the other hand, logistics companies state that they have to obey the terms of international water regulations and some specific certifications have to be obtained in rail intermodal operations for Europe. Containers and wagons should be revised each year and tested whether they are suitable for freight carriage or not.

“We work with ship-owners. So what is important for us is the right delivery of documents such as bill of lading, declaration of export and certificate of free circulation.” (Company El Representative).

“Rail intermodal requires certain conditions to operate the wagons and containers internationally. The wagons must be ECM certified. Revisions to the wagons must be made periodically. Also our containers must be in good shape in order to give no harm to the cargo inside or to any other operating party” (Company B Representative).

“If the trains are not well-groomed, containers might be sent back to Turkey by Bulgaria. Containers must meet the standards.” (Company B Representative).

On the other hand, the respondents also state the ease of intermodal operations for overcoming obstacles.

“We faced with several documentation problems since Europe has quotas for international transportation. On the other hand, problems can be easily overcome in intermodal transportation since European Union countries prefer intermodal more. In Europe document requirement for intermodal is less than unimodal” (Company Gn Representative).

5.2.10. Customer Persuasion Problem

On Turkish side of intermodal link, unaware customers and their inadequate intermodal knowledge cause reluctance for the use of integrated transportation services. According to interviews, it is claimed that, customer demand is one of the specific reasons for underutilized intermodal transportation in Turkey.

“Another problem is explaining our services to customers since they are used to unimodal transportation, it is not easy to persuade them that the transportation of freight would be in the same time period as in unimodal transportation” (Company G Representative).

“Intermodal is not preferred compared to unimodal transportation. In Turkey, we have very limited number of intermodal operators. Also, customers do not have enough knowledge about intermodal. We try to explain intermodal and its benefits in terms of environment and security” (Company B Representative).

6. CONCLUSION

This study aims to reveal the considerations in intermodal preference and problems between Turkey and Europe in intermodal transportation which has not currently been examined comprehensively. Moreover, the contribution of this article is to view the insight of logistics companies regarding intermodal transportation.

Findings indicated that market coverage, environment friendliness, cost advantage, type and volume of freight act as important factors for intermodal preference. For the obstacles part, findings pointed out operational and regulatory differences between Turkey and Europe. In Europe, time limitations, environmental regulations and documentation issues seem to cause some hurdles for logistics companies. Apart from those regulatory issues, losses and time lags may happen, and logistics companies have to pay extra charges for the waits resulting from the transfers between modes. Moreover, due to ongoing development process in transportation and increasing investments, Turkey specific infrastructural maintenance halts may happen during the intermodal operations. Interestingly, unawareness and inadequate knowledge regarding benefits of intermodal cause some perceptual drawbacks on customer side. Besides, we recognize that the declared privatization process has increased expectations in railways and the companies expect to have more intermodal operations with the forthcoming deregulation.

Considering its geographical position, Turkey has the capacity to become a more developed logistics base. In order to enliven transportation industry, a more balanced transportation system between modes should be provided for faster and cheaper coordination. Further, in order to reduce transportation issues between Europe and Turkey, new regulations should be developed. According to transportation policies free trade of freight and transportation policies should concerted together. Next, in Turkey new reforms are essential both legally and structurally. When examined in the framework of intermodalism, lack of infrastructure appears to be a significant issue for Turkish logistics industry. Hence, an integrated perspective should be adopted for transportation infrastructure for each mode while renewal and development operations.

Consequently, in order to reduce the above mentioned intermodal transportation issues, public and private industries, and civil institutions should play wider roles and collaborate. Turkish logistics industry play an important role in intermodal transportation projects both nationally and internationally in order to create sustainable intermodal transportation in Turkey. More intermodal projects are necessary since they would increase Turkey's competitive advantage by enabling the adaptation process to European intermodal links.

Although this research was carefully prepared, we are still aware of its limitations. Due to difficulties in contacting and finding experts in international intermodal transportation area in Turkey, we could not include more companies into our sample. Though, with the current sample size, we reached an important level of saturation in data. Moreover, we also believe that it will be advantageous for the future studies to examine government archives in order to find elaborated documents regarding regulations and developments on intermodal transportation.

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