YEDİTEPE UNIVERSITY

INSTITUTE OF SOCIAL SCIENCES

INTERNATIONAL TRADE and LOGISTICS MANAGEMENT

THE EFFECTS OF LOGISTICS CENTERS ON FREIGHT TRANSPORTATION WITHIN TRANSPORTATION MODES

By

Tarık EREN

Submitted to the Pre-Proposal Institute of Social Sciences
for Master Degree of
International Trade & Logistics Management

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ABSTRACT

Logistics Centers are a main part of development in logistics sectors. These places are where all activities related to logistics organized facilities. These activities are briefly; warehousing, handling, transportation, loading-unloading, offices, terminals and distribution centers.

The logistics centers in Europe were founded in the 1990s. These places began to be established under the leadership of TCDD in our country and their history dates back approximately ten years.

In this study, logistics centers in the world and in our country have been studied and researched. The first establishment Samsun (Gelemen) logistics center has been evaluated within the scope of main of logistics centers objectives. Transportation before foundation and after foundation was investigated. Freight transfer between train and road modes status is analyzed. With the cost analysis has been assessed cost- benefit advantage situation in the region. It is evaluated that logistics centers in our country have a great contribution to Turkey economy and Turkey logistics sector especially as an intermodal terminal.

Key words: Logistics, Logistics Center, Samsun (Gelemen) Logistics Center, intermodal terminal, freight transfer, cost-benefit

ÖZET

Lojistik Merkezler lojistik sektörünün gelişiminin ana parçasıdır. Bu yerler lojistik ile ilgili tüm faaliyetlerin organize edildiği yerlerdir. Bu faaliyetleri kısaca açıklarsak; depolama, elleçleme, taşımacılık, yükleme, boşaltma bürolar, terminaller dağıtım merkezleridir.

.Lojistik merkezler Avrupa'da 1990'lı yıllarda kurulmaya başlamıştır. Ülkemizde ise TCDD' nin önderliğinde bu yerler kurulmaya başlanmış ve yaklaşık olarak 10 yıllık geçmişe sahiptir.

Bu çalışmada ülkemizdeki lojistik sektörü, dünya ve ülkemizdeki lojistik merkezler incelenmiş ve araştırılmıştır. Ülkemizde ilk kurulan Samsun (Gelemen) Merkezi konu kapsamında değerlendirilmeye alınmıştır.Kurulmadan önceki taşımacılık durumu ve kurulduktan sonraki taşımacılık durumu incelenmiş olup, kara ve demiryolu arasında yük aktarım durumu tespit edilmiştir. Maliyet analizi ile bölgedeki fayda- maliyet avantajı durumu değerlendirilmiştir. Ülkemizdeki lojistik merkezlerin özellikle intermodal terminali olarak katkısının büyük olacağı değerlendirilmiştir.

Anahtar Kelimeler: Lojistik, Lojistik Merkez,, Samsun(Gelemen) Lojistik Merkezi, intermodal terminal, yük aktarım, Fayda-Maliyet

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LIST OF ABBREVIATONS

CSCMP	Council of Supply chain Management Professionals
LODER	Logistics Association
TCDD	Turkish State Railways
GDP	Gross Domestic Product
3PL	Third Party Logistics Service Providers
EU	European Union
CIS	Commonwealth of Independent States
TRACECA	Transport Corridor Europe-Caucasian-Asia
TEM	Trans European Motorway
BSEC	Black Sea Economic Cooperation Organization
ATS	Air Traffic Service
BOT	Build-operate-transfer
ECO	Economic Cooperation Organization
RO-RO	Roll on –Roll off
RO-LA	Rollende Landstrasse
UNECE	United Nations Economic Commission for Europe
UNESCAP	United Nations Economic and Social Commission for Asia and the Pacific
PPP	The Public Private Partnership
IRR	Internal Rate of Return
PBP	Pay Back Period

PART 1: RESEARCH OVERVIEW

CHAPTER I: INTRODUCTION

1.1. Introduction

As the trade globalization improves, the importance of logistics centers is increasing in the supply chain management. The term “Logistics center” widely indicates the sites organized for applying logistic operations. The other terms referring the logistics centers are freight village, logistic village, distripark , logistic park, logistiques de fret(France), Interporto(Italy).When we can describe logistic centers, we reach a lot of concept about this situation. The term has been used to state centers performing a broad area of logistics role and business activities.

The term logistics centers was first used early 2006 in Turkey. Our country has invested this model recently. Before these places were founded , logistics sector was working a messy. Because they are new in our country, they may not give the desired result. When we think about their usage in the long period our country may get affirmative results. Because European countries have been using this places for a long time. We can see good examples especially Italy, Germany and France.Their logistics economy is progressing regularly. Hence, Our country should focus more on Logistics Centers.

1.2. Purpose of study

This study aims to find to change of modes situation about logistics centers. The main objective is to assess to freight change between roadway and railway in logistics centers. In this study sampling was taken first logistics center Samsun (Gelemen) in Turkey. Provided that it is our aim, Samsun (Gelemen) Logistics Center will be an example for other logistics centers which are established and will be established in the future.

PART 2. LITERATURE REVIEW

CHAPTER 2.LOGISTICS

Logistics is a vital part of our life. Sector is not only involved in moving things from one place to another, but also adds value to our daily life with transported stuff and services. Stuff and services comprises intangible goods for example time, energy, information education etc, tangible commodities are such as products, personnel, equipment, animals etc. When we heard the term, we think to transportation some materials by trucks. But this doesn't show reality. Logistics is everything. Bread that comes to our house, reading newspaper, using light, riding bus, flying plane etc. can be included into this word. We couldn't think warehousing, marketing and production, without logistics.

Council of Supply chain Management Professionals(CSCMP) are explained logistics;

Logistics is the part of the supply chain process that plans, implements and controls the two way effective flow and storage of goods, services and related information from the point of origin to the point of consumption in order to meet customer's requirements. (CSCMP ,2013)

This description is the most general. Because CSCMP is manages all about logistics. Other definitions as follow.

From the Newcastle University Dr.Md Zahurul İslam are defined logistics;

"The term "logistics" originates from the ancient Greek word λόγος (logos,-ratio word, calculation, reason speech orientation) and such as logistics word has been in used for a much longer time than the current business logistics concept. The word logistics itself originates from the military discipline. There were divisions in the military who were responsible for the supply of necessary arms ammunition and rations as and when they were needed for example when they had to move from their own base a to forward position. In that situation the logistics division would provide all the necessary support the move the arms, ammunitions, tents, foods etc. In the ancient Greek, Roman and Byzatine empires, there were military officers with the title "Logistikas" who were responsible for financial, supply, distribution matters. Not surprisingly The Oxford English dictionary defines logistics as "The branch of military science having to do with procuring, maintaining, transporting material, personnel and facilities." Another dictionary defines logistics as "The time related logistics positioning resources." Logistics also commonly seen as a branch of engineering which creates "people systems" rather than "machine systems" but the modern logistics concept and practice is about providing cost and time effective services for non military, mainly commercial activities. This services includes transport of goods from one point to another, warehousing them in a suitable places, inventory, packaging, and other administrative activities such as order processing."(Zahurul Islam, 2012)

Logistics states all or some of the shipping, distribution, transportation and meanwhile when needed, the storing processes of goods. When in everything, one of the outcomes of rapid development and specialization in production consumption chain is "logistics" and it became an essential ring in the chain.

If we understand better than what mean of Logistics , a product move from one point Istanbul, to another point is Bursa, then while this product is transporting what we will do something about product to move another point.

Logistics gives possibility for the transmission of enterprises products to ultimate consumers at lower costs and on time without thinking distance in the world trade in which international competition is harsh and it is impossible to increase market shares, and also contributes to enterprises functioning for global aims.(Engin, 2008)

Logistics and Supply Chain complement each other. It includes activities in support of each other.

Logistics management can focus on internal or external one or both ones in a flow based on a chain from supplier to end user (supply chain). The main functions of logistics management mean purchasing, carrying, storage, inventory input, providing correct information, organization and planning of these activities. Logistics managers associate information resulting from each one of these functions by coordinating sources in an organization. Logistics basically have two different dimensions. One of them is storage which provides the continuity of material flow during transport network, while the other one coordinates the chain of sources for finalizing the project (Baziotopoulos, 2008).

Logistics management is accepted as a part of supply-chain management and defined as implementation, storage, controlling and planning of forward and opposite directional flow efficiently and effectively from starting point to consumption point about all kinds of products, service and information to meet customer needs (Erdal, 2008).

“Logistics” refers to the inbound and outbound flow and storage of goods, services, and information within and between organizations. As a managerial activity, early conceptions of logistics focused on its role in the distribution of products and as a way to support an organization’s business strategy and to provide time and place utility. Prior to the 1980s, logistics was primarily concerned with the outbound flow of finished goods and services, with an emphasis on physical distribution and warehouse management. During the 1980s, industry globalization and transportation deregulation led to the expansion of logistics beyond outbound flows to include recognition of materials management and physical distribution as important elements. In 1986, the CLM (considered by many to be the pre-eminent professional organization for academics and practitioners in the logistics field) defined logistics as: “the process of planning, implementing, and controlling the efficient, cost-effective flow and storage of raw materials, in-process inventory, finished goods, and related information flow from point of origin to point of consumption for the purpose of conforming to customer requirements” (see www.clm1.org). During the 1990s, accelerated market changes due to shrinking product lifecycles, demand for customization, responsiveness to demand, and increased reliance on information technology led to logistics being defined as “the process of strategically managing the procurement, movement and storage of materials, parts and finished inventory and related information flow through the organization and its marketing channels” (Christopher,1998)

Logistics is the set of activities that plans and executes the delivery of goods and raw materials from suppliers to end-users. In the past two decades, logistics has become one of the most rewarding growth sectors within the world economy, driven by a number of factors. These include the expansion of global trade, relocation of manufacturing towards low-cost countries, the rise of global brands and retailers, developments in production and communication technologies, inventory reduction, consolidation in industry, and the emergence of new logistics and supply chain services (Rushton and Walker, 2007).

CHAPTER 3. LOGISTICS IN TURKEY

Turkey aims to be one of the top 10 global economies until 2023. Appropriate macroeconomic growth over the last years has led to growth of international trade. Trade in our country has been increasing in a powerful way. Besides Turkey reinforces its importance in the world trade. In 2012, 1.2% of trade in the world have performed by our country. This area has a big advantage thanks to being surrounded by sea on three sides and extends to Asia to Europe and Africa to Russia. Due to this advantageous position 2 trillion freight are being transported. By 2025, the share in world trade is targeted at 1.5%.

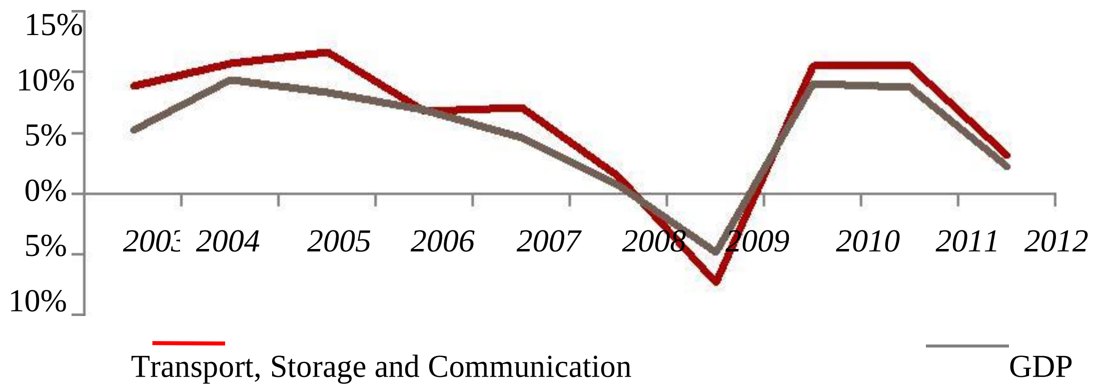
According to LODER, Turkey's current logistics industry size is estimated to be USD 80-100 billion and is predicted to reach USD 108-140 billion by 2017. (LODER, 2013)

The progress of the logistics sector is carried out with strong economy. The growth of the logistics is supported by several industry sectors. The sector is indirectly affected from this development. International logistics firms are willing to invest due to connection Asia and Europe and strong potential economy. 65 % of Turkey's population are under the age of 55. This situation shows that the majority of the country's population is young, dynamic and high rated. Young and strong work force provides a very large contribution to the logistics sector. Because it is a large and complex field, investors demonstrate the great importance skilled labor force. Turkey aims to major center with long coastal, developing railway and increasing highway connections.

It is estimated that by 2023, total freight carried in the centers/villages will reach a total of USD 500 billion. According to TCDD's investment program, TCDD plans to spend TL 514.9 million on building these logistics centers/villages. Turkish 3PL companies will take advantage of these decreasing costs and will increasingly move into international markets through ventures and acquisitions. For example, Horoz Logistics has started airway and seaway transportation between Turkey and Africa through Bolloré Africa Logistics. The Economist Intelligence Unit projects Turkey's GDP growth at 3.5% in 2013 and over 5% per year between 2014 and 2017.Between 2013 and 2017, Turkey's GDP is expected to grow more rapidly than the average of all 27 EU countries, as well as the Eastern European and CIS countries. Turkey is in close proximity to other leading emerging markets where foreign trade has been increasing: Foreign trade volumes of the Middle East, African countries and CIS countries are following a growth trend.(The Republic of Turkey Prime Minister Investment Support and Promotion Agency, 2013)

Figure 3.1: GDP and Transport, Storage an Communication Growth Rates in Turkey 2003-2012

GDP and Transport, Storage and Communication Growth Rates in Turkey, 2003-2012



Source: Logistics Association , 2013

Logistics industry constitutes approximately 10-15% of the total global Gross Domestic Product and is an integral portion of Turkey’s economy. After rebounding from the 2008-2009 global economic crisis, Turkey achieved a strong GDP growth of almost 9% till 2012. Even with economic activity relatively subdued, the growth in GDP and within the transport, storage and communication sectors had an impressive 2.2% and 3.2% of growth**,** respectively in 2012. Turkstat indicates that the average growth in the fields of transportation, storage and communication was 6.4% between 2003 through 2012.(The Republic of Turkey Prime Minister Investment Support and Promotion Agency, 2013)

A dynamic logistics industry, combined with a large international road vehicle fleet, underscores Turkey’s potential to become one of the most significant logistics hubs and transit countries in the region. Turkey has an extensive and well-maintained east-west road network. Among the important international networks and corridors passing over its national territory are TEM Network, BSEC, ECO and TRACECA Corridors, Euro-Asian

Transport Linkages and Pan-European Corridor IV. Following a package of legislative reforms, the legal framework for international road transport is now consistent with the EU policy. The market is fully liberalized, and the private sector is highly involved in road transport operations. Some 96 % of passengers and 92 % of freight are transported by road in Turkey. This dependence on road transport creates vulnerabilities. Indications such as congestion, environmental downsides, border-crossing problems, road taxation, restrictions on road traffic, permit shortages and customs constraints are some examples. (Intermodal Transport, 2009)

Unfortunately, railway transport mode did not adopt exactly. Despite it started well on the basis, railway connections has been put in inadequately and investment in many regions has been omitted. Because existing railway occurs on certain areas, applied service is realized in a specific cities. Service quality and capacity are being desired to develop with investment in recent years.

Turkey wants to use all transportation modes effectively and efficiently instead of being dependent on road transport. Infrastructure projects and investments for the future are desired to be developed. For example, it aims to be different with railway construction on bridge.

Maritime transport is one of the independent sectors. All main ports access to railway is available. 2 million tons of storage capacity and almost 46 million tons of productions per year is a remarkable indicator.

Turkey has a very large airspace around 1 million km². 50 thousand km of this airspace is controlled by ATS. Beside it is over three big continents (Asia, Europe, Africa). The industry is moving quickly in recent years. With Build-Operate-Transfer (BOT) model provides to build new airports with many benefits. The BOT Application is carried out with measured regulations and renewed infrastructure policies. In this way, the Turkish Air Transport needs is being trying to resolve. Turkey has an important potential to develop intermodal transport because of its position. For instance, Mersin Container port project, the Kars-Tiflis project, Marmaray Project, and Çandarlı and Filyos port projects.

Recent incentives in Turkey, such as those for conventional block train operations, imply that there are potential supply and demand factors in the market in favor of an intermodal system, provided that there are several options which can sufficiently meet the needs of stakeholders in terms of speed, reliability and flexibility. A 20% increase in the use of rail ferries for national transport between 2005 and 2006 offers another example of the potential demand for intermodality in Turkey. At present, there is no specific national legal framework or provisions in Turkey to govern national and international intermodal transport or to facilitate a shift from long-haul road transport to rail and/or coastal shipping. Turkey also does not yet have financial or regulatory incentives in place to foster intermodal transport operations, such as the tax exemptions and subsidy schemes in Western European countries that provide contributions to investments and initial operational costs for intermodal transport and terminal operations considered as “public services”. The only exception seems to be the exemptions from excise tax on fuel for RO-RO vessels plying the Marmara Sea. (Intermodal Transport, 2009)

CHAPTER 4. LOGISTICS CENTERS

Freight Villages and Logistics Centers improve to logistics efficiency and productivity. The evaluation of logistics activities always implies the increase of the road goods transport. One of the main objectives of the states is reduce to environmental pollution and create to aggregated logistics area. All modes should used effectively and efficiently, besides this modes need to ensure sustainability. A lot of definitions are created by various authorities. These are Municipalities, Ministries of Transport, Europlatforms (EEIG) association, domestic and foreign private investors and financial institutions etc. Europlatforms explains as follows:

"A Logistics Center is the hub of a specific area where all the activities relating to transport, logistics and goods distribution – both for national and international transit – are carried out, on a commercial basis, by various operators. The operators may be either owners or tenants of the buildings or facilities (warehouses, distribution centers, storage areas, offices, truck services, etc.) built there." (Europlatforms, 2004)

In order to comply with free market rules, Logistics Center must be accessible to all companies involved in the activities set out above. A Logistics Centers must also be equipped with all the public facilities necessary to carrying out the above-mentioned operations. If possible, it should also include public services for the staff as well as users equipment. In order to encourage intermodal transport for goods handling, a Logistics Center should preferably be served by a variety of transport methods (roads, rail, sea, inland waterways, air). It is vital that a Logistics Center be managed as a single and neutral legal body (preferably by a Public-Private-Partnership) if synergy and commercial cooperation are to be ensured. Finally, a Logistics Center must comply with European standards and quality performance in order to provide the framework for commercial and sustainable transport solutions.

We can say InLoc (2006) emphasizes almost the same description "logistic center a center in defined area within which all activities relating to transport , logistics and distribution of goods are carried out by various operators on commercial basis. (Lu, 2006)

A logistic center must be open to allow access all companies involved in the activities set out above. It should also be equipped with facilities serving different modes of transportation.

Gilbert GALLONI implied similarly definition:

“Freight village is defined areas within which all activities relating to transport logistics and distribution of goods both for national and international transit, are carried out by various operators.”(Galloni,1999)

Summarily, “Logistic Center is simply a village planned and built to best manage all the activities involved freight movement.”(Europlatform, 2004).

The concept “logistics centers” normally states those sites mostly organized for execute logistics activities. These concepts may vary according to the traditions and practices of the country for example we may to identify;

“1- Centerslogistiques de fret

2- Garesroutières de marchandises

3- Logistics park

4- Platform freight terminal

5- Interporto

6- Centro integrado de mercancias

7- Güterverkehrzentrum

8- Transport center

9- Freight village

10- Transport center” (Europlatform, 2004)

Freight villages are widely used in trade and transport all around the world. In international bibliography, “the term Freight Village is often used interchangeably with the terms: Gueterverkehrszentren in Germany, PlatformesMultimodales/ Logistiques in France, Interporti in Italy, Logistics Park/Logistics Center in China, or even with the more general term Dry Port and Inland Port, etc.” (Wu , Jiani 2013)

Freight village consists of “several buildings and handling places surrounded by traffic areas and directly connected to external roads, railways, waterways or airports” (Gudehus&Kotzab, 2009).

United Nations Economic Commission for Europe (UNECE) (2001) defines a Freight Village from the cluster perspective: “geographical grouping of independent companies and bodies which are dealing with freight transport (e.g. freight forwarders, shippers, transport operators, customs) and with accompanying services (e.g. storage, maintenance and repair), including at least a terminal ”(UNECE, 2001)

United Nations Economic and Social Commission for Asia and the Pacific (UNESCAP) (2007) regards a Freight village as “an area of land that is devoted to a number transport and logistics facilities, activities and services, which are not just co-located but also coordinated to encourage maximum synergy and efficiency.”(UNESCAP , 2007)

Three important guiding elements of the Freight village concept are pointed out by Europlatforms:”territorial planning alongside infrastructure rationalization, transport quality, and intermodality development.”(Higgins & Ferguson, 2011).

UNESCAP (2009) identifies three distinguishing features of the Freight village concept: “an intermodal terminal that is connected to major freight corridors; a nearby seaport, shared access to other facilities, equipments and services; a centralized management and ownership structure.” (UNESCAP, 2009)

Some writers stated that on functionality of logistic center “ Logistics center is particularly territory where such services as cargo transfer, storage and distribution over the territory of one or more countries, customs mediators, insurance, maintenance and repair of transport facilities, etc. are provided”(Lingaitis, Fadina, 2004)

Services provided by logistics center ‘depend on the predominant function, size and range of operation’ (Meidute, Vasiliauskas, 2005). Proposing no differentiation between terms of logistics and distribution center Meidute, Vasiliauskas (2005) use these criteria to divide them into:

“a) International Logistics Distribution Centers.

b) Regional Logistics Distribution Centers, those are intermediate link in the logistics channels, and fulfilling regional distribution service tasks.

c) Local Logistics Distribution Centers, those in most cases are end links of a distribution network.” (Rimiene and Grundey , 2007)

Logistics Center is actually a part of a larger structure. With the combination of these consists of a larger area. We call these areas are Distripark .They have the most advanced technological possibilities, information systems, intermodal and multimodal transportation facilities, detailed value added services.

“Container ports are generally a preferred choice to set up Distripark, since they are already closely located to various inland transport facilities and highly skilled workforce.” (Rimiene and Grundey , 2007)

When we review the history, basic logistics functions were shipping, receiving, warehouse, order picking, break-bulk, freight consolidation and containerization. Today, due to extraordinary technological conditions provides many distribution activities have been automated, the functions of computer have accelerated and information systems has become a basic function in every field. These developments provide overnight service and access to wide customers. Consequently, value-added services such as including inventory control, labeling and bar coding, vendor management, and customer service management, packaging operations increase total logistics management quality. . Logistics Centers may be set up and operate according to position , function and their objectives and they offer various opportunities. In order to achieve customer satisfaction and competitive advantage should examine current economic, social, political balance. Due to the freight flow in distribution centers is accelerating, cross docking is being used everywhere. Thanks to this activity, the delay being reduced to the lowest level. The material could be delivered in 4-5 days at the normal time; But It can be delivered in less than 24 hours now. Normally, distribution center is becoming less than 100 workers. But, Thanks to value added service is increased the number of workers is expected to increase service. The most important factors are to be considered when choosing the location of the logistics center are as follows: At the lowest cost, the possibility of being easily accessible, maximum customer satisfaction. I stated these are basic ones. If we want to explain main criteria, these are close to customer and what customer needs, forecast market trends, vendor and supplier communication, proximity transportation service, the assessment of communications infrastructure, training needs , quality analysis, proper worker analysis and placement, regulations and instructions. Transport connections are critical tasks to be performed effectively and efficiently.

This is why most European Logistics Centers are located in hub points for transport and distribution activities. “The widespread of logistics centers services indicates not only that their number is increasing substantially but also that their functionality is changing.” (De Koster, Warffemius, 2005).

Some definitions of about logistics centers are listed in the table 4.1.

Table 4.1. Definitions of Logistics Center

Definition	Authors	Emphasis on
Logistics center As Freight village Or Logistics node	Breitzmann, Wenske (1999)	transport, logistics and goods distribution functionality
	Kondratowicz (2003)	freight transport modes
	Rushton, Croucher, Baker (2006)	geographic coverage
	Meidute, Vasiliauskas (2005)	facilities include warehouses, distribution centers, storage areas
	Europlatforms (2004)	offices, truck services, etc
	InLoc (2006)	public services, full territory access management and ownership issues

Freight terminal As Distribution center	Pegrum (1963) Holtgen (1996) Wiegmans, Masurel, Nijkamp (1998) Ballis, Golias (2002)	freight transport modes change handling operations value-added service
Distribution center As Logistics center	Reynaud, Gouvernal (1987) Holtgen (1996) Kia, Shayan, Ghotb (2003) Lu and Yang (2006)	consignments grouped or splited transport organization center freight transport modes change located at nodal points in the system
Distribution center As Warehouse	Bowersox, Smykay, LaLonde (1968) Cavinato (1989) Johnson,Wood (1996) Lu, Yang (2006) Zidonis (2002	product flow in contrast to storage value-added services rapid delivery
Warehouse	Minalga (2001) Zidonis (2002) Urbonas (2004)	place for inventory storage connecting link between producer and customer

Source: (Rimiene and Grundey, 2007)

We can see from Table 4.1 that specific criteria and standards have been evaluated. The authors told not only logistic center but also logistics node, distribution center, freight village, freight terminal. They have different characteristics and they are varying according the number of services provider.

“Logistics center (Freight village / Logistics node / Distribution center) is a special intermodal hub (nodal point) in the transportation system, including different logistics facilities, where separate operators are providing number of services, connected to transportation, logistics and distribution in established geographical coverage.’ In this point, only public hubs are considered as Logistics Center. Geographical coverage is used in sense of describing local, regional, international significance of a hub. The resuming point can be made stating that evaluating presence and scope of the factors from Logistics center definition, Logistics centers can be considered as Freight village, Logistics node or Distribution center as well. The rectified concept would be a platform for further research.” (Rimiene and Grundey, 2007)

TCDD Logistics Centers constitute a different viewpoint by defining more general. Remarkable point is mentioned as logistics village and they stated that to be particular rules.

“Logistics village is defined as a certain field in which all activities are done by various managers about national and international transportation, distribution of logistics and goods. Logistic villages are defined as regions in which formal institutions related with logistics and transportation companies are located, have effective connections for transportation mode, have opportunities such as storage, repair-maintain, handling, charge-discharge, scale, dividing, compounding and packing loads, etc., and have equipments and transit areas at low cost, high speed, more security between transportation modes”(TCDD, 2009)

4.1. THE MOST IMPORTANT ELEMENTS

The Logistics Center concept is based on three important elements:

4.1.1 Territorial planning alongside infrastructure rationalization

4.1.2 Transport quality

4.1.3 Intermodality development (Europlatform, 2004)

4.1.1. Territorial Planning: Alongside Infrastructure Rationalization: If we go to the definition of logistics center, we can better understand. It is multipurpose place which transportation, logistics, handling loading-unloading etc. provides by various operators. It should be area where logistics activities occur automatically, infrastructure has been rationalized and the region planned in detail. The safety of the environment should not be forgotten while performing these activities, the place should be used in the most optimum way.

4.1.2. Transport Quality: Companies aims must be high quality standards in order to reach perfect level in today's competitiveness. This target is basic requirement to minimize the effect of the globalization in the world. Freight transport has become in global nowadays and the competition among product is growing. Thus, the sector must need to find efficient and future oriented solutions in these situations. This is expressed in the following way; eliminate waste and solutions oriented management. Specialization must be the main qualities. Logistics Centers can perform an important service in terms of transportation, warehousing, value added services. The main objectives within logistics centers are to aim to high quality standard and produce the following transport purposes;

"1- Optimization of the logistics chain

2- Optimization of lorry utilization

3- Optimization of warehouse utilization

4- Optimization of manpower organization

5- A decrease in the total transport costs

6- A decrease in the total industrial costs

7- A decrease in personnel costs

8- An increase in the transport operators total turnover." (Europlatform, 2004)

4.1.3. Intermodality: Road transport is the most used transport mode within Europe. According to information given by White Paper, The road transport demand is increasing, in contrast railway tend to decrease. Continuing the demand in road transport has been constantly increasing over the last 20 years. The main objective of logistics Center should be logistics operators and freight flows must be made in a coordinated and balanced way. For this reason, Freights must be moved long distances with block trains in order to increase the amount of freight in railway.

4.2. FEATURES of LOGISTICS CENTERS

We can explain a logistics center has a more properties than freight terminal. Although logistics centers have a lot of works, they integrated with the general various functions. In respective of logistics center, there are highly aspects in the academic works.

4.2.1. Infrastructures: The most critical unit of logistics center is warehouse. Intermodal terminal is as important as warehouse. The warehouse is main movement point in transportation. There are a lot of different kinds of warehouses. These may change according to the variant of freight handling operator and operator interest field.

•General warehouses for storage

•Large warehouses (for logistics activities)

•Warehouses with rail-road interchange

•Warehouses with raised docking bays

•Air-conditioned warehouses

•Intermodal Terminal

“Examples of intermodal terminals are Interporto di Bologna- Intermodal terminal Interporto di Verona Quadrante Europa – Intermodal terminal”(Europlatform, 2004)

4.2.2. Services: All activities planned, organized, and constructed to facilitate the freight flow. Even if a simple village, the freight to be transported must be compatible with infrastructure, to be value added services and correspond local needs.

“The services normally found with a Logistics Center are:

• Customs district

• Post office/Public telephones/Bus services

• Areas for parking and loading/unloading operations

• Restaurants/cafés

• Filling station with vehicle washing facilities”(Europlatform, 2004)

For many operators performing has many advantages. These operators are logisticians , service providers, transport operators. Some of these advantages include the following:

• To create the main connection point road/rail/port

•Fast transfer center

•Active using logistics Service and to be able to coordinate each other

• Benefit from the public

4.2.3.Organizational Structure: “The Private Public Partnership (PPP) It is the most widely used and effective structure which is able to take advantage for the logistics centers. Capital is mostly shared between public and private sector. They have different percentages. Public sector usually constitute main shareholder. The existence of public sector reasons is planning of location and infrastructure. Besides financial support is one of the main necessities. Because Logistics Centers require large warehouse and huge investments there may be urban problems. The private sector cannot perform alone because of a long term investment. Therefore public support requires especially financial. Because logistics centers was established in large area, it provides a very large contribution to the local economy and regional development. For this reason, it should be taken into consideration on infrastructure planning and structuring of the region.

4.2.4. Shareholders:”On the basis of what has been priory stated, the share capital of most companies is subscribed between:

• National and local territory planning Public Authorities

• National and local railway companies

• Local transport associations

• Chamber of Commerce

• Banks

• Insurance companies

• Industrial associations”(Europlatform, 2004)

4.3. BENEFITS of LOGISTIC CENTERS

All transportation modes must be able to use effectively and efficiently in order to increase competitiveness and reach global markets. Benefits from economies of scale are important aspect in here. Logistics center are structures should no longer be a sine qua non for the countries. These have a lot of properties. We can explain these properties such;

1- By optimize of manpower and maximum benefits

2- Create a rapid development field to develop combined transport

3- Increase the rate of profit by reducing operational cost of the company

4- Semi trucks and trucks traffics reduction and traffics regulation

5- Prevention of environmental pollution by encouraging the use of railway

6- Airway, road, maritime, rail is common to interconnect the transport mode

7- Provide acceleration for container loading and unloading operations

8- A positive acceleration on regional development and create a competitive environment

9-All transport modes in a single center collection and logistics and supply chain of executing properly

10- To provide storage optimization with intelligent storage systems.

11- Reduce road maintenance and provide cost advantages.

CHAPTER 5. LOGISTICS CENTERS EVOLUTION

The expression of Logistics Center has important history .It has emerged in the 1960s. As the concept has undergone a change in recent years. During this period, concepts related to logistics have been changed. Especially production, warehousing, distribution, transportation was influenced. The Authorities have failed to reach consensus on common definition. While many definitions are used, General definitions as follows:, distribution center, central warehouse, logistics center, freight terminal, transport node, logistics platform, freight village, logistics depot, distripark etc.

Best way to understand what is what is to look back through years of evolution, while logistics centers meaning and understanding have been shaped. During the late 1950's physical distribution management began to materialize as an important business activity (Lynagh, 1971). 'Marketing concept' along with market segmentation, cost-profit squeeze, electronic data processing was the facts, which implemented the system approach and put the ground for physical distribution management. Twenty-five years have seen this concept of combining all the functions of distribution together into a system mature and into a major field of business study.The years since 1965 have been characterized by a refinement in basic concepts (Bowersox, 1969).In 1960's logistics was a synonym for physical distribution. In 1985 Jones and Riley introduced the term Supply Chain Management as a tool to manage inventory for gaining competitive advantage. Eventually inventory management services became a subject for sale. Logistics center concept emerged along with a concept of logistics outsourcing (3rd Party Logistics). The consolidation of Distribution Center is a new trend in global logistics management, with a reduction in an inventory costs often being cited as one of the main benefits .

"The following reasons have often been cited for adopting the consolidation system:

1. Reduced facility investment cost.

2. Increased service quality.

3. Lower total inventory cost." (Teo et al., 2001).

With globalization multinational companies are headed to certain places. Global Market needed new market strategy. According to European experience, Consolidation has a really important place for logistics development. Competition has increasing. Thus it can be sent to longer distances at the lowest cost. In order to meet customer expectations, product assembly and customization is an important place.

According to the case study report received from United Nations Economic and Social Commission for Asia and the Pacific (ESCAP) (2002), The development of logistics centers has shown in there stages. Data on the development shown in the table 5.1. Logistics centers do not provide only basic activities. They are determined value added services according to the effective and needs. They offer services such as semi finished production, labeling, handling, customer customization. This particularly refers to quality and the future of logistics services company.

"In many cases, these services overlap or include third-party logistics services, such as inventory management, inspection, labeling, packing, bar-coding, order picking and reverse logistics, etc. The main VAL activities are ;

1-Receiving goods, breaking shipments, preparing for shipment, returning empty packaging

2- Simple storage, distribution, order picking

3-Countrylizing and customizing, adding parts and manuals

4-Assembly, repair, reverse logistics

5- Quality control, testing of products

6-Installing and instruction

7-Product training on customer's premises."(Rimiene and Grundey, 2007)

In order to create a good market environment must be high quality services, at the lowest environmental impact and customer satisfaction. The main factors in the development of the logistics centers are function development, quality of service extensions and creating forces on single point.

Many writers in the World are using different names as logistics, warehouse, and transportation. The main objective is service performed is named as goal oriented. It basically made taking into account the characteristics of the warehouse and distribution center. The hierarchal structure of logistics facilities definition is determined according to their performance. To better understand this situation, it need to examine Figure 5.1 Logistics Facilities Hierarchy. It refers to the smallest activities 1st level. 3rd level is expressed at the most general and broad perspectives.

“The intersection arrows between different levels show that either connected facilities names can be brought into higher or lower level, depending on how one or another author defines the facilities. The closest connection among the definitions is represented by linkage of unidirectional arrows.”(Rimiene and Grundey, 2007)

Figure 5.1. Logistics Facilities Hierarchy

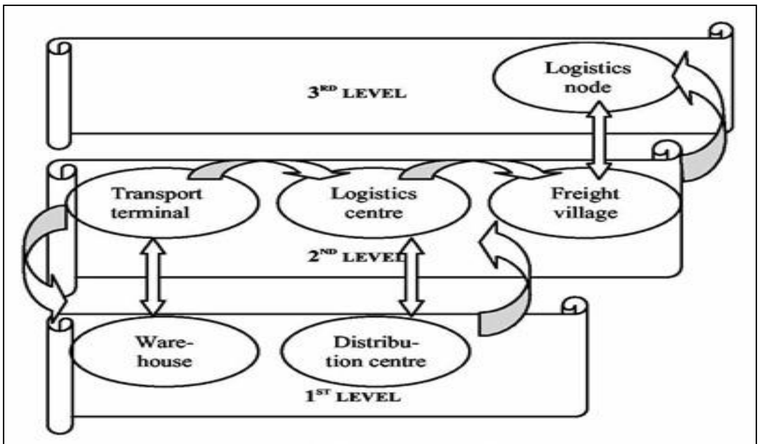


Figure. Logistics facilities hierarchy

Source:(Rimiene and Grundey, 2007)

This model can be applied when different concepts within the facility. When we look at the resources, according to the type of facility the name of the model is changing. These definitions are used in different ways in different authors. The concept of logistics center in Lithuania is shown as storage facility.

This table shows the evolution of logistics centers according to years. There section is indicated in the form. These sections are explained 1960-1970 period, 1980 early 1990 period and 1990 until the present.

Table 5.1. Logistics Centers Evolution

1960s - 1970s	1980s – early 1990	Mid 1990s - present
		Materials management Distribution services (national/global)
	Bonding	Import clearance Bonding Inbound transportation
Receiving	Receiving	Receiving
	Cross-docking	Cross Docking
Storage	Storage	Storage Inventory management and control Shipment scheduling
Order processing Reporting Picking	Order processing EDI* Reporting Picking	Order processing EDI* Reporting Picking
Order assembly (Re) packaging	Order assembly (Re) packaging Stretch-shrinkwrappin	(Product) subassembly Order assembly (Re) packaging Stretch-shrink-wrapping
Palletizing/unitizing Label/mark/stencil	Palletizing/unitizing Label/mark/stencil	Palletizing/unitizing Label/mark/stencil
Shipping Documentation	Shipping Documentation Outbound Transportation	Shipping Documentation Outbound Transportation Export documentation FTZ* operation JIT/ECR/QR* services Freight rate negotiation Carriers/route selection Freight claims handling Freight audit/payment Safety audits/reviews Regulatory

		compliance review Performance measurement Returns from customers Customer invoicing

Source: (Rimiene and Grundey, 2007)

Abbreviations*: EDI – electronic data interchange, FTZ – free trade zone, JIT – just-In-time ECR – efficient customer response, QR – quick-response

“Logistics center definition can be used to cover either of them in response to:

- geographical coverage;
- services provided;
- transport mode transfer”(Rimiene and Grundey, 2007)

“The event of freight village has been put on the agenda in Europe from the last decades of 1960s. Considering service of freight village “Freight Village Quadrante Europa” in Verona/Italy for approximately 30 years, it can be said that there is a concept of freight village (logistic village) although EU concept was not available at that time”(Aydın ve Öğüt , 2008)

CHAPTER 6. LOGISTICS CENTERS IN THE WORLD

6.1. LOGISTICS CENTERS IN EUROPE

Increased global trade makes countries closer together. Therefore it has become the transportation economy because of sales volume increasing. In transportation economy, just like everything else, it has also disadvantages. Especially, adversely affect access to city traffic. These cause truck traffic in city centers. It also adversely affects the health of life. The idea of logistics center appeared to find solutions in European countries.

It is stated that the covered area of logistics center and the number of logistic center in the below.

Table 6.1. The European Union Member States in the Council of Logistics Center

and Planned to be Establishment in Turkey of Logistics Center Number

Country	Field Range (acre)	The number of Logistics Center
Italy	240.000- 11.000.000	21
Spain	140.000- 1.000.000	21
Denmark	420.000- 2.100.000	6
France	540.000 - 740.000	2
Greece	700.000	1
Hungary	1.000.000	1
Portugal	220.000	1
Ukrainian	-	1

Lüxembourg	-	1
Turkey	113.500-566.770	12

Source:Tanyaş et al, Türkiye ve Avrupa Köylerinin Karşılaştırmalı Analizi" , XI. Üretim Araştırmaları Sempozyumu, 23-24 Haziran 2011

Logistics center concept has a history which is rooted to the 1960's. It is seen that the first buildings constructed around these dates. After this time, Enhanced Logistics Village was formed by increasing experience. These in Freight Villages are applied continuous freight flow, intermodal terminal, value added services new business model and multimodal transportation services. Germany and Italy are the countries where most of the logistics villages are located.

Sogaris (France) is freight village which is first established in the world. After The establishment of Sogaris, in many countries of Europe were being established similar facilities. Especially Denmark, Italy, France, Greece, Netherlands are leading countries. Although they have many different names, they perform similar tasks. European continent has progressed successfully in the freight villages. A large literature and information sharing takes place within the continent. Besides, The European is supporting most studies to build a global distribution. At the beginning of the year 2000s, Best Urban Freight Solutions (BESTUFS) target to create a global information center. They want to take advantage the whole community freight transport information and their applications.

"This interest in continental-wide sharing of concepts and information is replicated at the national level in several countries, most notably Denmark through its Foreningen Af Dansske Transport center, and Germany through the Deutsche GVZGesellschaft(DGG)."(M. Boile et al, 2008)

Table 6.2.Typology of Freight Facilities: European Examples

	Roissy-SOGARIS, France	NTC, Denmark	GVZ Bremen, Germany	Berlin-Brandenburg Region, Germany	Interporto Bologna, Italy	Distriparks, Rotterdam, the Netherlands
Facility Type	Logistics Center Freight Village	Logistics Center Freight Village	Logistics Center Freight Village	Logistics Center Freight Village	Logistics Center Freight Village	Industrial Park
Objectives	Mitigate congestion - Promote intermodal - Support business	- Relocate freight facilities out of cities - Improve environment - Improve safety - Support business	- Relocate freight facilities out of cities - Mitigate congestion - Promote intermodal - Consolidate industry - Resolve conflicting land use - Promote regional development	- Mitigate congestion - Promote intermodal - Promote regional development	- Consolidate industry	Sustain international competitiveness - Provide distribution capacity for the greater Rotterdam metro area
Size (acres)	133	494	895	GVZ Wustermark –520 GVZ	494	Emhaven distripark 106

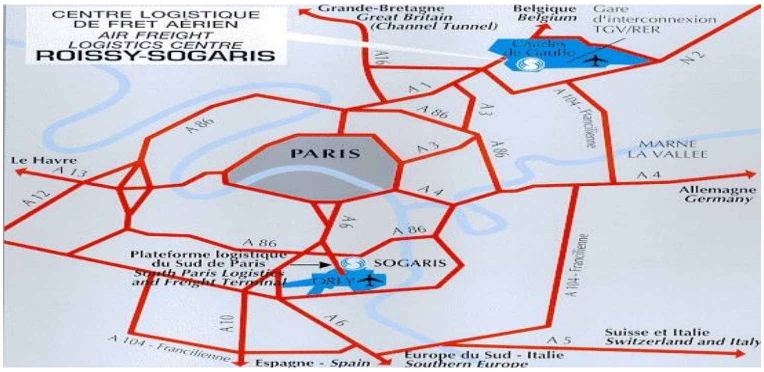
				Grossbeeren –759 GVZ Freienbrink - 321		
Mode	Intermodal/rail/road/near airportIntermodal/rail/road/near airport	Intermodal/rail/road/sea	Intermodal/rail/road/water/near airport	Intermodal/rail/road	Intermodal/rail/road	Truck
Operation and Management	SOGARIS (80% public and 20% private	The NTC, Ltd	GVZE Bremen	GVZE	Interporto Bologna SPA (52% public and 48% private)	Port Authority
Institutional Form	Public Private Partnership	Public Private Partnership	Public Private Partnership	Public Private Partnership	Public Private Partnership	Private
Public Involvement	Regional & local government	Central, regional and local government	Central & regional government	Central & regional government	Central, regional and local government	n/a
Tenants	100	15	114	n/a	81	n/a
Industrial	Yes	Yes	Yes	Yes	Yes	Yes

Activity						
Services	Customs office, post office, health care, public transit Restaurant, cafeteria, security, gas station	Post office, custom service Bank, shower	Parking, customs services, gas station	Bank, restaurant, bar (all located in a central administrative building)	Customs office post office, transit Bank, bar, restaurant	None

Source:(Cerreño et al., 2008)

This table shows important Logistics Center of general properties in Europe. Especially it shows that Germany, France, Netherlands, and Italy countries of general places. We can see table Netherland has not called Freight Village or Logistics Centers. They called as Industrial Park. Interporto (Italy) and Sogaris (France) of Logistics centers have private and public properties. As of Acre(Size) Germany has an important share among other countries.

Figure 6.1. Location of Roissy-SOGARIS



Source: Cerreño et al., 2008

6.1.1. France – Roissy-SOGARIS.

One of the first examples of logistics centers freight village with Truck terminal has been established to stimulate with aim of the transportation sector. Roissy - SOGARIS have truck-rail intermodal transportation facility and 133 acre area. It has feature link to A86 and A6 highway and close to Orly Airport. This situation shows Figure 6.1 The Logistics Center Freight Village has approximately100 warehousing, and distribution, transportation, and a variety of labor support services (e.g. customs office, rest rooms, post office, health care center, public transport, restaurant and fast food, gas station).

“Four department (similar to counties in the UnitedStates)–Paris,Hauts-de-Seine,SeineSaint-Denis,andVal-de-Marne own roughly 80 percent of the shares, combined. The Société Anonyme de Gestion Immobilière (SAGI) has approximately 15% of the shares, while Caissed’EpargneGroup has another 4%. The remainder is held by various private companies.”(Cerreño et al., 2008)

6.1.2. Denmark –Nordic Transport Center (NTC). It was established in 1989 and 494 acre in size. It is 6 miles from the city of Aalborg. NTC was found by the Port Authority and public entity. The settlement was selected outside the city by authorities. Because it was chosen to increase environmental quality and suit city plan. Thanks to road, rail sea connection, it is able to reach international and national markets.

“More than a dozen transportation and other related companies are settled in Nordic Transport Center, including warehouses, distribution centers, and intermodal container terminals. While no trade or retail activities are settled in the NTC, labor support services include a post office, customs services, a bank, and shower facilities.”(Cerreño et al., 2008)

6.1.3. Germany–Güterverkehrszentrum (GVZ). We explain in here with two examples.These are GVZ Bremen and GVZ.

6.1.3.1. GVZ Bremen.GVZ : Bremen is one of the oldest logistics centers. It was found in 1985 by local authorities.GVZ Bremen was designed to solve the existing problems in urban areas. To improve regional economy was intended to cargo facilities by moving to different area. Therefore this have three different modes (road, rail, inland waterways) and as to distance near Hamburg, Bremerhaven and Wilhelmshaven ports is great importance.

“Bremen is the largest LC Freight Village assessed in this study. The facility located on 895 acres and accommodates roughly 114 companies, with 5,500 employees.”(Cerreño et al., 2008)

Figure 6.2. Freight Villages and Urban Distribution Centers in Berlin-Brandenburg

Source: Cerreño et al., 2008

6.1.3.2. The purpose of logistics Center and Urban Distribution Center is aim to develop Berlin-Brandenburg region. The overall objective in this system is reduce traffic congestion to the minimum and encourage the use of rail and inland waterways. Figure 6.2 is showed as pictorial of the system.

“The three GVZs, represented by large red circles, are located outside the metro region, to the West (Wustermark, 520 acres) ,to the South (Grossbeeren, 759acres) and to the East (Freienbrink, 321 acres).The smaller circles represent the UDCs the two solid circles are currently in operation and the open circles are under development. The GVZs focus on long-haul freight operations, while the UDC activities center on local distribution of goods.”(Cerreño et al., 2008)

This system is aiming to solve to reduce truck trips for urban distribution.

6.1.4. Italy–Interporto Bologna. Interporto Bologna is one of the LCFreight Villages in Italy. Italy’s government and Italy’s State Railways aim was to gather the scattered freight operations.

Interporto was constructed in 1971 by Interporto Bologna SPA, a "joint-stock company. Twenty public and private entities own stocks in the Bologna Freight Village; public agencies(Bologna District, Bologna County, Bologna Chamber of Commerce, Italian Railway Company) have approximately percent of the stocks."(Cerreño et al., 2008)

Bologna have great commercial and industrial importance as strategic place. Bologna-Ferrena line offers rail service. Rail facilities offers intermodal and container services. It services restaurant and bank as Sogaris Logistics Centers in France.

Figure 6.3. Interporto Bologna

Source: Cerreño et al., 2008

Figure 6.4 .Distriparks in Rotterdam

Source: Cerreño et al., 2008

6.1.5. The Netherlands – Distriparks in Rotterdam. The one of the European examples is a settled in the Port of Rotterdam in the Netherlands (Figure 6.4.).The aims of the establishment are to ascend competition among international market and to meet the distribution needs of the Rotterdam metro.

This Logistics Center Freight Villages have not multimodal transport and cargo operations. These are using intermodal and container terminals. Because these have not multimodal transport and freight transfer facilities, These aren't called Freight Village. These facilities are defined Distripark.

Bordering the Port of Rotterdam, the Three Distriparks each have their own commodity focus:"Emhaven focuses on high quality product storage and handling; Maasvlakte focuses on containers storage; and Botlek specializes in chemicals storage. .(Cerreño et al., 2008)

6.2. OTHERS

The importance of Logistics Sector is increasing in the World. It is turning into small town with the concept of globalization. Companies and States want to find solutions to logistics cost and problems. It is appeared the concept of logistic center in the world to find solution. This solution is established to Freight Village (Logistics Center) where organize logistics activities. Logistics Center around the world are shown in the table 6.3.

Table 6.3. Logistics Centers in the World

EUROPE	
Denmark	Denmarks Transport Center, Hoeje-Taastrup Transport Center, Nordic Transport Center, Skandinavisk Transport Center, Taulov Transport Center
France	Rungis-Sogaris
Germany	GVZ-Dresden, GVZ-Bremen NW, GVZ Weil am Rhein, GVZ Nuremberg, GVZFrankfurt/Oder (ettc), GVZ Osnabrück, GVZ Herne-Emscher, GVZ Kiel, GVZ Kassel,GVZ Hamburg, GVZ Bremen SW, GVZ Rostock, GVZ Koblenz
Greece.	Promachon S.A
Hungary	Budapest Intermodal Logistics Center

Italy	Interporto di Bologna, Interporto Marche, Interporto di Novara, Interporto QuadranteEuropa,Interporto di Padova, Interporto di Parma, Interporto Rivalta Scrivia,Interporto di Rovigo, Interporto di Torino, Interporto di Venezia, Interporto di Verona
Portugal	Terminal Multimodal Do Vale Do Tejo S.A.
Spain	Bilkakobo-Aparcabisa, Centro de Transportes Aduana de Burgos, Centro deTransportes de Coslada, Centro de Transportes de Irun, Centro de Transportes deMadrid, Centro de Transporte de Vitoria, ZAL Port de Barcelona, Zona Franca deBarcelona, ZAL Gran Europa, Centro De Transportes de Benavente, Cimalsa,Ciudad del Transporte de Pamplona, Ciudad del Transporte de Zaragoza, PlatformaLogistica de Zaragoza
Ukraine	Liski-Ukrainian State Center of Transport Service
United	DIRFT Logistics Park, Keypoint: Swindon’s premier logistics park, Kingmoor Park,
Kingdom	Port of Tyne, Wakefield Europort, Birch Coppice business park
ASIA	
Singapore	Keppel Distripark, Pasir Panjiang Distripark, Anexandra Distripark
China	ATL Logistic Center Hong Kong, Beijing Airport Logistics park, Shenzhen Pinghu Logistics, Huaihai Integrated Logistics Park, Shanghai North-West ILP, Nanjing Wangjiawan ILP, Tradeport Hong Kong
Korea	Gwangyang Port Distripark, Busan New Port Distripark, Gamcheon Distripark
Taiwan	Far Glory FTZ, Taisugar Logistics Park
Malaysia	Northport Distripark-Port Klang
NORTH AMERICA	

US	CenterPoint development in Joliet IL, Alliance TX, Pureland Industrial Complex NJ, Raritan Center NJ, Heller Industrial Park NJ, Hunts Point NY,Winter Haven FL,Mesquite Intermodal Facility/Skyline Business Park TX, Guild's Lake Industrial Sanctuary, Oregon, Dallas Intermodal Terminal / Dallas Logistics Hub TX, Rickenbacker Intermodal Facility OH, California Integrated Logistics Center Shafter CA, Salt Lake City Intermodal Facility UT, Cumberland Valley Business Park PA
Canada	Atlantic Gateway-Halifax Log

Source: Feasibility of Freight Villages in the NYMTC Region Task 3 – Description of How a Typical Freight Village Works , 2008

The data table 6.3. is derived from data prepared in 2008 may differ from the current situation.

6.2.1 Keppel Distripark (Singapore)

Singapore is one of the most important city in the World. It is located between Malaysia and Indonesia. It has excellent seaport, and airport, developed infrastructure, accessible network, wide range of business environment. Consequently, Singapore has become modern international base, qualified logistics center and distribution hub.

Singapore government provide many incentives their related business. These incentives are tax benefits, creating Free Trade Zone.

Figure 6.5. Keppel Distripark

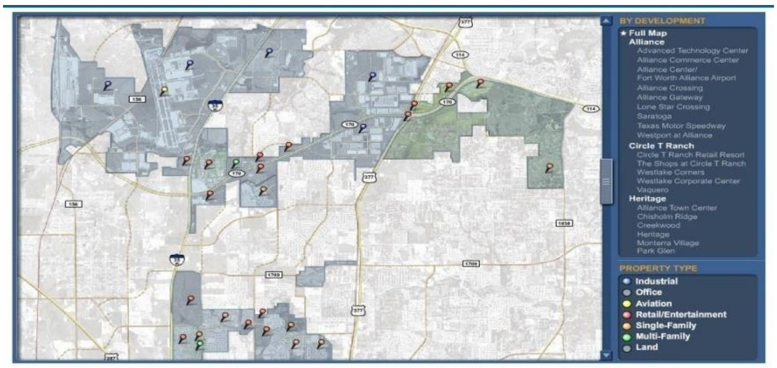
Source:https://www.singaporepsa.com/our-business/shippers-services Available on site13.06.2015

Keppel Distripark is settled to meet the needs distribution and collection in Singapore. “Keppel Distripark is plant with large storage facilities. It is attached to PSA’s container terminals via a flyway that permit freight to be quickly delivered and from the port. It is settled on a 23-hectare site along Singapore’s Southern Seafront. There are 41 warehousing modules in KD, including four blocks of warehouse space, a five-storey office block, and open storage yards. KD has a 13 meter-high ceiling to support high rack automated storage and recovery systems.”(M. Boile et al, 2008)

It is using water and road transportation modes. It has environmental area for people life, planned business opportunities, room facilities for the offices of the company. It has value added services such as bar coding ,online tracking without the need of customs procedures. Total areas are 230.000 sqm (acre). In this area about 113.000 sqm (acre) is used as warehouse.

6.2.2. Alliance Texas(United States)

Figure 6.6. Alliance Texas



Source: http://www.alliancetexas.com Available on site 11.06.2015

Alliance Texas has master-planned, mixed-use community settled in north Fort Worth. Alliance Texas propeses a various commercial real estate property options, including new industrial area and office area and retail. Aliance Texas is settled to in the United States. It has provide to inland transportation. It connected state and interstate highway. It has intermodal, rail, air and interstate modes.

“Alliance Texas provide air cargo handling, third part logistics, aviation activity, intermodal, workforce recruitment, rail facilities, automotive, distribution and warehouseservices. This facility has 143 companies. Total surface areas are 68.795 sqm

(17.000 acres). In this area about 3,035,154 sqm is used as warehouse.”(M. Boile et al, 2008)

6.3. EUROPLATFORM

EUROPLATFORMS is the only European Association of Freight Villages and Logistics Centers. The organization was established December 18th 1991 and has since worked in the field of transport and logistics. EUROPLATFORMS' main purpose is to promote and expand the concept of Logistics Centers in Europe and worldwide and to create and develop relations among existing Logistics Centers in Europe and with similar groupings internationally. As of December 2011 the members include around 70 Logistics Centers that manage Logistic Centers all over Europe, in which over 2.600 transport and logistics companies operates.

EUROPLATFORMS aims to be actively involved in development and implementation of transport and logistics centers in all European countries. The main objectives of EUROPLATFORMS are:

“1.To expand and promote the main idea and projects related to Logistics Centers in Europe;

2.To create and develop added value relations among the existing Logistics Centers in EUROPE and with similar groupings outside Europe;

3.To provide information concerning the Logistics Centers to EU, UNECE, OECD as well as to states, territorial communities, organizations and all connected businesses;

4.To protect common interests related to the activities of its members;

5.To promote, for itself and its members, the attainment of economic and financial aids for supporting sustainable transportation in the member centers;

6.The study, adoption and the starting-up of initiatives, projects, activities or services, which could be of general interest for most of the associated Logistics Centers; and

7.To contribute in the Pan-European and Cross-Mediterranean transport integration and partnership through the promotion and introduction of the Logistics Center concept.” (Europlarforms EEIG, 2015)

“In Europe, increasing emphasis is placed on the existence of a neutral legal body to operate the LCFreight Villages.”(Cerreño et al., 2008)

Indeed, according to EUROPLATFORMS, the establishment of “ a neutral legal body ”is the very first step of the development of a logistics center. Furthermore, public private partnerships (PPPs) are suggested as preferable means for setting up these neutral parties, so that financial risk from such large-scale investments may be shared among participating sectors.The public sector can provide necessary transportation infrastructure and public utilities, and provide a variety of incentives such as tax breaks and long-term leases to attract businesses, while the private sector can provide the capital for constructing terminals, warehouses, distribution centers, and other related facilities. All five European LCFreight Villages reviewed for this study (Sogaris, France; Nordic Transportation Center, Denmark; GVZ Bremen and GVZ BerlinBrandenburg, Germany; and Interporto Bologna, Italy) were developed, managed, and/or operated by operating bodies based on public private partnerships

CHAPTER 7. LOGISTICS CENTERS IN TURKEY

Logistics centers are a place includes both national and international transport, logistics warehousing and distribution which is managed by various operators. Both they are integrated to all transportation systems and they assist to lower costs.

“Seen as the heart of modern freight transport, enhancing combine transport as integrated with other Transportation systems began to be established logistics centers.”(TCDD, 2015)

Logistics activities are made significantly with overland in our country. Although a lot of investments are implemented, target of logistic activities and logistics centers generally didn’t exactly started and slighted. Though World and especially European countries especially developed about subject, Turkey unfortunately realizes to the importance recently. Consequently, TCDD responded needed, they were the first to start the necessary and investment. Because railway is the most cheapest and the most environmentalist method. Furthermore, European countries chose significantly this option.

Due to developing markets in the World and Turkey is thought to be necessary to launch logistic centers. Some activities in certain areas are needs to be merged. The issues of Logistic centers are started to state in the 2000s years in Turkey .The first Logistics center was built in 2006 by TCDD .Various public and private sector contributed to establish for Samsun(Gelemen) was erected first logistics centers in Turkey, then put into operation in 2007.

This figure illustares that opened services , 1st stage of completion and continued construction and ongoing project logistics centers in Turkey

Figure 7.1. Logistics Centers in Turkey

Source:www.tcdd.gov.tr Available on site 09.05.2015

The freight stations are stuck in the city center, as in Europe. Efficient road and sea transport links and in area that may be preferred by loaders , which can respond to need of freight logistics, modern technology and in accordance with economic development, first Organize Industrial Zone close to and potential of load is very high, Istanbul (Halkalı/Yeşilbayır), İzmit (Köseköy), Samsun (Gelemen), Eskişehir (Hasanbey), Kayseri(Boğazköprü), Balıkesir(Gökköy), Mersin (Yenice), Uşak, Erzurum (Palandöken), Konya (Kayacık), Denizli (Kaklık) ve Bilecik (Bozüyük) including 12 units started to build as logistic centers. With Kahramanmaraş (Türkoğlu), Mardin, Kars, Sivas, Bitlis (Tatvan) and Habur logistic centers number of logistics centers will be 19.

Samsun (Gelemen), Uşak, Denizli (Kaklık), İzmit (Köseköy), Eskişehir (Hasanbey) and Halkalı operation of logistics centers were opened. Balıkesir (Gökköy), Bilecik (Bozüyük), Mardin, Erzurum (Palandöken) ve Mersin (Yenice) are being constructed currently.

In Logistic Centers, Rated as constitute the core network rail train, maneuvering, loading, unloading areas of TCDD, storage, warehousing and other logistics of the field to be done by the private sector/planned to be constructed and operated.

The main purpose of the establishment of the logistics centers during transportation, the use of vehicle , manpower organization, warehouse usage, the optimization logistics chain with a reduction in total transportation and personnel costs , transport operators by providing an increase in total business volume to reach a high quality level.

The activities of logistic centers; Freight transport related services to clients giving to the best of administrative , technical and social to meet all needs, transportation and handling as well as achieving customer satisfaction by increasing the quality the commercial potential of the regions in which they are located and they will contribute to the economic development.

“Logistics center of the region, economic, social and cultural development of the region as a substantial contribution to regulate the traffic.”(TCDD, 2015)

When TCDD is establishing logistic center, It take into consideration two criteria.

“These are;

1. It is being linked with organized industrial zones.

2. Load carrying potential will be made to areas of intensive”(Aydın, G.T., Öğüt, K.S., 2008)

In Logistic Centers will have trailer park, container park, customs areas, customs brokage services, office services, security services, education areas, loading and unloading activities, restaurant and food services, social and administrative facilities, maintenance and repair services, fuel filling locations, bonded warehouses, warehouses, mail services, installation hazardous material, installation of private goods.

7.1.Samsun (Gelemen) Logistics Center

It was constructed in the 1 st phase in Gelemen(Samsun), The Turkey’s first Logistic center was commissioned in 06.07.2007.Project activities have been completed the second phase, tender process has started.

“ Gelemen Logistics Center is being established in area of 330 thousand m2.when will be completed ,the amount of the annual rail freight transport will increase from 500.000 tons/year to 1.100.000 tons/year. Through logistics center mainly iron ore, scrap, rolls, sheet, copper, clinker, containers, cement, coal, timber, wheat, food, flour, fertilizer products such as transportation and distribution will be carried out.”(Karadeniz and Akpınar, 2011)

Samsun is the most populous and harbor town. Highway connecting the region with the Black Sea Region, Central Anatolia and Eastern Anatolia. Most of the Black Sea Region socio-economic development is one of the cities , Tekkeköy district is located in Organized Industrial Zone. In early years of the Republic recognized the importance of Samsun an railway was built and connected to the Black Sea Region. 16th the largest Samsun province of Turkey and 4 transport property are one of the rare cities that have. Consequently Both port and rail, it is considered that such an investment is appropriate for the feature to be here.

7.2.Gökköy (Balıkesir) Logistics Center

Gökköy position is established on the land of 200 thousand m2.When it starts to operate, the amount of freight carrying will increase 390.000 tons/year to 1.000.000 tons/year. From logistics center, will be transported automobile, container, plywood, marble, food, kaolin, fibers and synthetic materials, coal and iron ore, military supplies ,various products.(Karadeniz and Akpınar, 2011)

“ Building of 247 sqm with 59,560 sqm concrete area, ramps and loading areas available which Balikesir (Gökköy) 1 million tons of capacity at the Logistics Center logistics sector in Turkey will be provided to our country of 211 thousand square meters of logistics space will be gained.”(TCDD, 2015)

Gökköy(Balıkesir)Logistics Center will become very important position in Europe and Asia with line. It will play an important role in the movement of products available in the region, Asia and Europe.With the opening of Tekirdağ-Bandırma train ferry loads to Europe , with the opening of the Bakü-Kars- Tiflis railway which will connect to Asia, thus produced products can be easily in Balıkesir region. It was opened on 15 March 2015.

Figure 7.2. Balıkesir(Gökköy) Logistics Center

Source:http://www.ufukulastirmasen.org.tr Available on site 26.05.2015

7.3.Hasanbey (Eskişehir) Logistics Center

"It was built approximately 630.000 m2.After the activities of Hasanbey Logistics Center , the amount of freight carrying will increase from 215.000 tons/year to 566 tons/years In logistics center Mainly will be shipped tiles, feldspar, iron, ceramics, construction materials, household appliances, container, magnetite, food, water and coal."(Karadeniz and Akpınar,2011)

Eskişehir is one of the Turkey's railway junction. All trains pass through Eskişehir to Istanbul from Ankara. TULOMŞAŞ(locomotive factory) railway company located in Eskişehir, will be held in Eskisehir's first national high speed train place makes it attractive in different. way . Transport intensity caused by rapid development of urban ,the ones created by high –speed train transport from Ankara to Eskisehir , and organized industrial zones in order to create a common connection subtracting freight station outside the city, it was decided to set up logistics center in the region. This logistics center was opened on 19 March 2014.The provision of urban development of freight traffic to be collected in a central weight class and was created to provide a central point of distribution services will provide cost and flexible advantages.

Figure 7.3. Hasanbey (Eskişehir) Logistics Center

Source: http://tr.railturkey.org, Foto: Yapıray Available on site 24.05.2015.

7.4.Boğazköprü (Kayseri) Logistics Center

Approximately 1.511 thousand m2 logistics center planned to be built on 111 thousand m2 of land expropriation work is largely completed and continues the work of the rest of expropriation. In addition, prepared infrastructure and building projects ,it has started road construction and infrastructure tenders. When Boğazköprü Logistics Center's begin to operate, the amount of freight transport will increase approximately from 717.000 tons/year to 1.782.000. From Logistics Center will be moved iron, pipe, fodder, container, sheet metal, ceramics, coal, cotton, zinc, furniture, cables, tires and military equipment.(Karadeniz and Akpınar, 2011)

Logistics Center, 4 km away from Kayseri Organized Industrial Zone, the industrial goods produced in the inner city and access to foreign and internal markets in order to ensure was established. It has also container park. Studies are carried out in coordination with the northern railway works. Currently located in the city's railway with "Kayseri Northern Passage Variant" project is aimed to be in the center.

7.5. Köseköy (Izmit) Logistics Center

Köseköy Logistics Center , plan and project which a total of 765 thousand m2 will be built on the are area are being prepared.151 thousand m2 of land has been expropriated, which is required for the first stage. First stage construction work is continuing. Logistics center, In Addition Kocaeli, in conjunction with other means of transportation to serve the whole of the Marmara Region and to organize their transport activities oriented to foreign trade are planned.

“Köseköy Logistics Center with passing of the activity the amount of load carrying nearly 600.000 tons/year to 1.500.000 tons/year will be come out. Logistics Center will contribute to transport mainly like products automobile, automotive spare part, chipboard, petroleum products, containers, clinker, gypsum, iron, cellulose, the raw material, water, and borasit and enamel steel sheet.”(Karadeniz and Akpınar, 2011)

Izmit is the port and industrial city , which connects Asia and Europe, is the most developed city of the country within the manufacturing industry . Rapid population growth, the presence of heavy industrial plants, unplanned use of Derince and Yarımca ports have led to environmental degradation and it has created a need for the reorganization of the infrastructure. As result This Logistics Center will contribute to solve this problems and all sectors will develop every in area.

7.6 .Halkalı (Istanbul) Logistics Center

No doubt Istanbul, as well as in many other subjects, in the field of national and international is the center of Turkey. From Istanbul, Halkalı district on the European side comes to the forefront. Indeed, the international road and railway freight moved with more than half of TCDD Halkalı facilities and customs pass. This situation increases the district’s traffic and urban developments adversely affected. Logistics Center being established in Istanbul aims to modernize these problems and minimize transportation services.

Halkalı Logistics Center has some of differences ,one of which is to provide Ro-La transportation. For this, proper roads and ramps were constructed. In Istanbul customs bonded warehouse of around scale was completed concreting operations. Ispartakule position is defined as expansion area. Accordingly, connected each other two logistics will emerge in the future.

“When they go into operation, the amount of load carrying will be 944.000 tons/year to 2.000.000 tons/year.”(Karadeniz and Akpınar, 2011)

Significant part of international transportation occur from here to demonstrate the importance this logistics center. To reduce the impact of urban traffic; to perform import and export operations effectively, efficiently, and quickly; facilitate customs procedures are the significant to create Halkalı.

7.7. Mersin (Yenice) Logistics Center

Mersin (Yenice) Logistics Center the process of project was completed which nearly 640 thousand m2 will be built. Land expropriation is continuing. Accordingly to the location of the organization ;13 km port of the Mersin, D-100 highway 1.5 km , Railway station is 2.2 km away. When its activity starts, the amount of the load carrying 418.000 tons/year 896.000 tons/year will come out. It will be shipped container, vehicle, machine, spare part, agriculture tools, iron, steel, pipe, food, cotton, ceramics, chemicals, cement, shipping military material, packaging products in Logistics Center when it come to start.

“No doubt the port of Mersin has been developing industry, increasing population and first of all Çukurova, Mediterranean-facing with extensive hinterland , Turkey’s is the most important door. This situation requires a specific center to organize activities freight transportation in Mersin In fact, it is not only Mersin, planning new logistics centers such as Adana and Iskenderun logistics potential centers should also be take into account.”(Karadeniz and Akpınar, 2011)

Mersin is the important place of intersection of highway, seaway, airway . It enhances to charm which to allow for intermodal transport and is done in a modern and wide areas for loading and unloading. This place will be goods of transfer point which we send to the Middle East. Consequently the investment to be made here is considered to contribute to the future of the Mediterranean and Turkey.

7.8. Uşak Logistics Center

They have started to work in the station area landscape and the railway station will be built in Uşak position,”When Uşak Logistic Center will be activate, the amount of load carrying will increase 113.000 tons/year to 246.000 tons/year. From logistics center will be shipped ceramics, container, blankets, yarn, marble, plastic raw material, machine equipment and food products.”(Karadeniz and Akpınar, 2011)

Because the region is in the middle of the most important centers in Anatolia, the highway and railway of the intersection is the important main arteries.

“In total in the region has 1.832 km state road, 1.725 km provincial road and 16.312 km village road. A total of 11 times by means of the railway passes through the area. The total railway length is 988 km. But with ongoing YHT project will increase this figure. % 15.3 part of total passenger transport and freight transport of % 6.8 part in Turkey is made from region.”(Zafer, 2015)

7.9. Erzurum (Palandöken) Logistics Center

Palandöken Logistics Center will play a key role between East and West. This will contribute to development to the Eastern Anatolia and Turkey. Erzurum, Eastern Anatolia of Turkey that control and door opens will be the central hub. It is considered by authorities may enter into service at the end of 2016.

“Palandöken Logistics Center is planned to serve on a land of 327 thousand m2 in the Aziziye borough. When This begin to activity, the amount of load carrying will increase 200.000 tons/year 437.000 tons/year. From Logistics center received the investment plan in 2008 will be shipped automobile, coal, iron, flour, bricks, tiles, container, ceramics, food, water, beverages, fertilizers, feed, military equipment and feed.”(Karadeniz and Akpınar, 2011)

Figure 7.4. Erzurum (Palandöken) Logistics Center

Source :http: //www.medyadogu.com Available on site 26.05.2015

After the completion of the first stage of the project’s work, Erzurum(Palandöken) Logistics center will start the construction of second stages.(ww.medyadoğu.com, 2015)

7.10. Kayacık (Konya) Logistics Center

The matter of on the establishment of Logistics Center studies between TCDD and Konya Municipality are ongoing and the distribution project is prepared.

“When logistics Center that planned to be established on a land of 300 thousand m2 starts to operate, the amount of freight transport will increase from 634.000 tons/year to 1.679.000 tons/year. It will transport coal, cement, marble, various foods, fertilizer, sugar, agricultural instrument, container and military equipment the logistics center”(Karadeniz and Akpınar, 2011)

In respect of borders, Konya is center of Turkey. According to area, It also the largest city in Turkey. It have great importance in order to transport Mersin Port, to move from there to the Middle East. It really important to build Logistics Center in Konya, it also notable to interest of TCDD.

7.11. Kaklık (Denizli) Logistics Center

Denizli is a city which the presence of large marble deposits and their necessity transportation from the port of Izmir (Alsancak) has created to set up requirements a logistics center. It will transfer to the sea from the railway inside Logistics Center.

The expropriation of land to establish of Kaklık Logistics Center has been completed and building work has started. Kaklık Logistics Center is a place that with a thriving textile industry made a reputation and considerable amount of textile export abroad in recent years.

“When it start to activity, the amount of freight carrying will increase from 150.000 tons/years to 500.000 ton/year. From logistics Center will be shipped marble, coal, clinker, textile products.”(Karadeniz and Akpınar, 2011)

7.12. Bozüyük (Bilecik) Logistics Center

Bozüyük is one of the district of Bilecik. Due to strong industrial sector and the central location in the transportation, it is becoming an important logistics center. Targeted to establish of Logistics Center in connection with Organized Industrial Zone is planned and the budget is reserved. “It has opportunity to benefit from three transport modes thanks to

Gemlik port link with rail Logistics Center that will provide 1.9 million tons of capacity to the logistics sector and it will be set up on a area of 132 thousand m2.”(Karadeniz and Akpınar, 2011)

Bozüyük is a city that has a large production capacity. It is the one of the most important destinations in the production of many product and especially ceramics. Because of the problems in the expropriation process works has stopped. When it start to activity, it will be shipped ceramics, various machine part, egg, fish, yarn, air condition foam, plaster block.

Table 7.1. Logistics Center Area and Current Freight Potential of TCDD

Lojistik Center	Total area(m2)	Current Freight Potential(tons/year)
İstanbul (Halkalı)	1.060.000	944.000
Kocaeli (Köseköy)	765.000	600.000
Eskişehir (Hasanbey)	630.000	215.000
Samsun (Gelemen)	333.000	500.000
Balıkesir (Gökköy)	200.000	390.000
Kayseri (Boğazköprü)	511.000	717.000
Mersin (Yenice)	640.000	418.000
Uşak	140.000	113.000
Erzurum (Palandöken)	327.000	200.000
Konya (Kayacık)	300.000	634.000
Denizli (Kaklık)	120.000	150.000

Source:(Aydın ve Öğüt, 2006)

We seen that Istanbul (Halkalı) is the biggest area among logistics centers. Besides It will has the maximum freight potential. Uşak logistics center is the smallest area and the minimum freight potential.

When the activity of logistics Centers, Turkish logistics sector will gain approximately 27 million tons per year with possibility of additional transportation.

Table 7.2.The Expected Freight Amount of the Logistics Centers

Number	Logistics Centers	The Amount of Freight (Ton)
1	Yeşilbayir	6.161.784
2	Halkali	2.000.000
3	Köseköy	2.000.000
4	Bozüyük	1.944.000
5	Balikesir	1.000.000
6	Eskişehir	1.366.000
7	Uşak	246.000
8	Kaklik	500.000
9	Konya	1.679.000
10	Samsun	1.156.000
11	Kayseri	1.782.000
12	Yenice	896.000
13	Erzurum	437.000
14	Kahramanmaraş	1.852.000
15	Mardin	1.500.000
16	Sivas	1.000.000
17	Kars	412.000
18	Bitlis (Tatvan)	1.000.000
19	Total	26.931.784

Source:yukdairesi@tcdd.gov.tr, 2015. It was interviewed by telephone and was taken by e-mail. Available on site 29.05.2015

When we can look at 7.1., We can see 12 logistics centers. Because the necessity of other regions in Turkey, TCDD are decided to build more 7 logistics centers. This table shows that the expected freight amount of logistics center in Turkey. After it will put into operation Yeşilbayır, it will has the most amount of freight. Uşak is the smallest area and the less amount of freight.

CHAPTER 8. INTERMODAL TRANSPORTATION

8.1. Highway Transport

Road transport is most preferred modes freight and passenger in transport modes. Trucks, semi trailer, trailer etc. is used in this mode. To develop some country has a vital important. We don't think without road transport to the economy function. The globalization of world trade has led to the emergence of new perspectives. This also influences the amount of the carried load and flow direction. We feel that value of sector in extraordinary situation and war.

"To transport goods by road transport, international road goods transport regulations and the agreement between the sender and the carrier, expressed as providing direct door to door delivery of goods at a certain price also supports other kinds of transport is a transport system."(Koban ve Keser, 2007).

"Within International Transportation System, starting and ending in the entire transport process usually used highway. (Çancı ve Erdal, 2009) As we understand from the here, the transport is unconceivable without road transport. Because whatever happens, It happens by the beginning or end with by means of mode.

Road transport in Turkey is at the heart of all transport systems. Because every time the head and the last ends with highway transportation. Large investments are made to reduce the cost of the end and head. To move by road the most appropriate, the least cost, the most shortest is great importance for companies and governments.

Beginning from the 1950's, road transport has experienced a significant development process and now, it is considered as the dominant transport mode of Turkey. Due mainly to long-time neglecting of railway and maritime physical infrastructure, road transport as being the most appropriate mode for door-to-door transportation have given rise to concentration of freight and passenger transport on road network in Turkey.

"As of 2010, having 91,7 percent of passenger and 89,4 percent of freight transport, road transport constitutes a great share among the transportation modes in Turkey. As of the same year, share of road transport for passenger and freight are 85 percent and 44.3 percent respectively for EU-25. Transport demand in Turkey (measured in passenger-kilometers and tone-kilometer), has been growing. However, 6 freight transport, which is being realized 89,4 percent by highways, increases heavy commercial vehicle traffic as well as creates unsafe situation on the roads. Furthermore, high density of heavy vehicle traffic leads to quicker deterioration of the road structure.”(Republic of Turkey Ministry of Transport and Communications, 2011)

Road transport has developed rapidly after the Second World War. The rapid development of road transport is explained by two important features of this mode. This is to be fast and is defined as a home away from home a the flexibility of being able to reach any two point. They can go on the road all kinds of vehicles road motor transport.

“Due to this flexibility, the highway have brought great convenience in transportation mode and become dominant and widespread.”(Nebol, 2008)

Table 8.1.Country Comparisons of the Amount of Highway Freight Transport

Country	2006	2007	2008
England	171.181	171.477	-
Germany	330.016	343.447	341.532
Greece	34.002	27.791	28.850
Italy	187.065	179.411	-
Bulgaria	13.765	14.624	15.332
Romania	57.288	59.524	59.386
Turkey	177.399	181.330	181.935

Only domestic transport (Million, tons –km.)

Source: http://www.slideshare.net/atillakar/ Lojistik Üs Kavramı Türkiye ve Avrupa Analizi Available on site 27.06.2015

As we have seen from the this table in road transport sector England and Germany are quite ahead. The usage of freight transport by road in Europe is at a low level. Turkey is advanced many of European countries in this transport sector. Turkey has approximately 65.000 km of highway. Total road conditions in Turkey will also be shown table 7.2.This situation is a significant level compared with European countries in the table. It shows that our infrastructure is inadequate compared to Germany and England.

Table 8.2. Total Highway Transportation in Turkey

According to the Surface Type Highway Network (km)							
As of the date of 01.01.2015							
	Asphalt Concrete	Surface Coating	Parquet	Stabilized	Soil	Other Roads	Total
Highway*	2 155	-	-	-	-	-	2 155
State Roads	13 446	17 415	72	67	29	251	31 280
County Roads	2 476	26 862	201	824	570	1 541	32 474
Total	18 077	44 277	273	891	599	1 792	65 909

*The length of the highway is included in the main body and the connection path, the subway and in the arms of junction are not included.

Source.http://www.kgm.gov.tr/Sayfalar/KGM/SiteTr/Kurumsal/YolAgi.aspx Available on site 27.06.2015

As we have seen from this table attaches importance to the construction of the highway. Turkey is trying to do our part in accordance with EU transport policy. The control vehicle inspection stations station is done with the supervision of the Ministry through the private sector.1990 and older model truck, tankers, buses, vans, and truck type vehicles began to withdraw from the market. The purpose this activity help in resolving the problem of environmental pollution, reduce traffic congestion, increase competiveness, providing them with benefits by providing an opportunity for the renewal of vehicles. An obligatory part of the digital tachograph system and thus contributing to traffic safety and navigation is provided.

8.2. Railway Transport

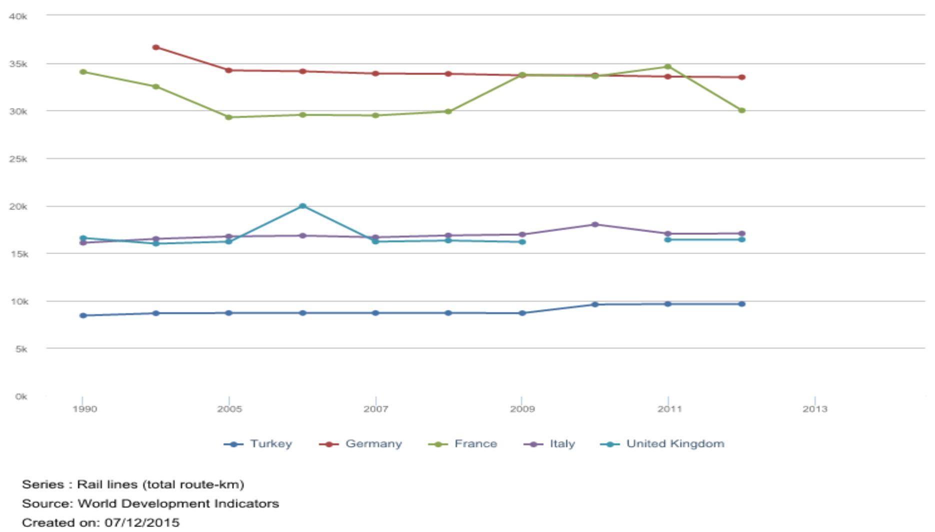
Rail transport is a process of carrying of transporting freight, passenger and commodity from place to place on the iron tracks. The type of transportation type must used until the end of the Second World War. This transport brings a solution especially road traffic accidents and congestion. This also provides a great contribution to preservation of the environment. Railway began with development of the steam engine, has shown improvement to speed 500 km per hour trains and reaching a total of 100000 tons trains weight.

“The cost structure of railway in the transportation of loads over long distances and large amount of this mode is advantageous. A disadvantage of railways, transport is limited to the lines of the current ray. It is not flexible such as motor highways.” (Nebol, 2008)

Rail transport in Turkey is carried out by TCDD. The modernization and innovation efforts are try to get rid of stagnant. Attaching importance to the high speed railway construction process is planned to be extended to all the country’s borders. With Istanbul Bosphorus railway project will become easier between European and Asia transport.

Our Institution’s total conventional main line length is 8.846 km where 8.336 km belongs to the main lines and 510 km belongs to second lines. When 2.363 km secondary lines are added to this length, our total conventional line length reaches up to 11.209 km. The length of our High Speed Train line is 888 km. The total length of our conventional and high speed train lines add up to 12.097 km. We have currently 3.304 km electrified and 4.035 km signaled lines and the rate of our electrified and signaled lines in the total length of our tracks is 27,3% and 33.4% respectively.(TCDD ,2013)

Table 8.3. Turkey and European Countries Railway Lengths(total route-km)



Source: http://databank.worldbank.org/data//reports.aspx Available on site 12.07.2015

Due to fact that Turkey has about 12000 km of railroad, according to powerful European countries shows a low amount of transportation was made. Turkey railway of length is less than compared with Europe’s leading countries. Therefore we must support to build new railway in order to make it less costly and rapid development of this sector of transport.

Table 8.4. Evolution of total freight transport by rail - change between 2011 and 2012 - in million ton-km and %

	Total				
	2003	2011	2012	Change (Mio tkm)	Change (%)
EU-28	:	422 594	*407 502*	-15 092	-3.6
EU-27	:	420 156	*405 170*	-14 986	-3.6
BE	7 293	7 593	:	:	:
BG	:	3 291	2 907	-384	-11.7
CZ	15 862	14 316	14 267	-49	-0.3
DK	1 985	2 614	2 278	-336	-12.9
DE	78 464	113 317	110 065	-3 252	-2.9
EE	9 670	6 271	5 129	-1 142	-18.2
IE	:	105	91	-14	-13.3
EL	456	352	283	-69	-19.6
ES	11 743	9 948	9 957	9	0.1
FR	46 835	34 202	32 539	-1 663	-4.9
HR	:	2 438	2 332	-106	-4.3
IT	20 299	19 787	20 244	457	2.3
CY	:	:	:	:	:
LV	17 955	21 410	21 867	457	2.1
LT	11 457	15 088	14 172	-916	-6.1
LU	525	288	:	:	:
HU	7 614	9 118	9 230	112	1.2
MT	:	:	:	:	:
NL	4 705	6 378	6 142	-236	-3.7
AT	16 866	20 345	19 499	-846	-4.2
PL	47 407	53 746	48 903	-4 843	-9.0
PT	2 073	2 322	2 421	99	4.3
RO	:	14 719	13 472	-1 247	-8.5
SI	3 018	3 752	3 470	-282	-7.5
SK	10 113	7 960	7 591	-369	-4.6
FI	10 047	9 395	9 275	-120	-1.3
SE	20 170	22 864	22 043	-821	-3.6
UK	18 734	20 974	21 444	470	2.2
LI	:	10	10	0	0.0
NO	2 627	3 574	3 489	-85	-2.4
CH	:	11 526	11 061	-465	-4.0
ME	:	:	73	:	:
MK	:	479	423	-56	-11.7
TR	8 612	11 303	11 223	-80	-0.7

Estimates in italics (missing countries estimated by the corresponding 2011 figure).

Source:http://ec.europa.eu/eurostat/statisticsexplained/index.php/Railway_freight_transport_statistics Available on site 12.07.2015

We show that our country is less than Europe’s leading countries according to total freight transport. This one of the important reason is Turkey have not enough railway and necessary investment. The most used transport mode in Turkey is road. Road is necessity but this mode should use first point and last point. Developing world and technology is required rapid, secure environment, mitigated traffic congestion. The aim of a lot of company and government reduce cost and increase maximum profit. If we compare our country to Germany, it will reveal extraordinary change. Because Germany realized the important of this mode in the early 1800s. To reach this railway length and freight of transport is not dream for the Turkey. But Sustainable economy and social life is the most important to occur this dreams.

8.3 . Maritime Transport

Sea transport is moved from one place to another place of freight shipments and passenger by means of sea transport vehicle. In maritime transport has include river transport, on the lake transport, domestic sea transport. Nowadays we define as sea transportation container transport. Maritime transport is the highest transport mode among transportation modes from the past in the world. Maritime situation in global trade has become the most important sector. This mode is preferred due to the ease of carrying long distances and cost advantages. One the reasons this development of the maritime is to become unit load and it is emergence of container transport. With transportation, we are going to have opportunity to send at a time and the most remote places.

Position in the emerging country economies of maritime transport, therefore the importance of ports and sea vehicles is also increasing. Among the major advantages of maritime transport are especially industrial raw materials that make up loads at a time moving large tonnage. “Other transport method according to the cheap cost (the transport by sea said it is cheaper than of the railway 3.5, according to highway 7,the airline is 22 times.) Oil, natural gas and mining of significant part exist under sea and the formation of three quarters of the world’s water are among the factors that increase the importance of maritime trade.”(Yenal,2011)

Turkey is an important place due to the fact that by surrounded on three sides. Mediterranean, Black Sea, The Marmara inland sea is great opportunity for Turkey. Connecting Asia and Europe, leading cultural tourism, trade and energy routes crossed is a country. Due to its locations, functions as a bridge between continents and provide the opportunity of transit transport. Unfortunately, shipping is not used in our country as it should be.8333 km coastline and the current sea are not used effectively and efficiently.

Table 8.5 Maritime Fleet and Ports 2003, 2011 and 2013 (1000 tonnes)

	Maritime fleet size (deadweight tonnage, 1 000 DWT) ([1])		Largest port, 2011 Name of port and quantity of goods handled (1 000 tonnes)	
	2003	2013		
EU-28 ([2])	201 459	306 682	Rotterdam	434 551
Argentina	481	533	San Lorenzo-Puerto San Martín	41 541
Australia	2 263	1 947	Port Hedland	246 672
Brazil	5 497	3 232	Tubarão	136 572
Canada	1 507	3 371	Vancouver	122 499
China	25 529	68 642	Shanghai	590 439
India	10 286	15 876	Jawaharlal Nehru (Nhava Sheva)	65 746
Indonesia ([3])	4665	14 267	Tanjung Priok	39 997
Japan ([4])	17 379	20 409	Nagoya	186 305
Mexico	1 207	1 835	Lázaro Cárdenas	29 653
Russia	9 904	6 784	Novorossiysk	81 050
Saudi Arabia	2 343	1 421	Jeddah	52 026
South Africa	59	63	Richards Bay	86 374
South Korea ([5])	10 610	17 720	Busan	281 513
Turkey	8 674	10 215	İzmit (Kocaeli)	54 997
United States	11 293	12 353	South Louisiana	223 633
World	841 735	1 628 783	Shanghai	590 439

([1]) Deadweight tonnage is the weight measure of a vessel's carrying capacity. It includes cargo, fuel and stores. Canada and the United States: break in series.
([2]) 2013 maritime fleet size: includes data for 2010 for Austria.
([3]) Largest port: 2010.
([4]) Largest port: freight tonnes.
([5]) Largest port: revenue tonnes.
Source: Eurostat (online data code: mar_mg_aa_pwhd), the United Nations Conference on Trade and Development (Maritime transport indicators), the American association of port authorities (World port rankings) and port authority data.

Source:http://ec.europa.eu/eurostat/statistics-explained/index.php/

The_EU_in_the_world_-_transport#Maritime_transport Available on site 18.07.2015

As we seen from the table ,The European Union maritime fleet (28) has reached 202 million in 2003 to 307 million in 2013.Despite the increase of the maritime fleet of the European Union(28) , its status in the world market has dropped. But it still maintains leadership in the world. Turkey has increased its fleet 8.7 million to 10.2 million. But according to the10– year period, European Union(28) and World is quite far behind in the growth rate.The largest port in the world and the maximum handling of the port is Shanghai. Within the European Union the leading port ıs Rotterdam with 435.000 handling. Turkey's Kocaeli port is 55.000 quantity of handling, this is far smaller quantity than other specified ports. The biggest reason for the growth our country in recent years is increased maritime trade. The economy has developed in our country. But we are rather down according to level of developed countries. It is understood from the comparisons that we do not have give importance maritime sector.

8.4. Airline Transport

It is increasing the importance of speed in today's transportation. One of the main features is safety besides speed The mode of transportation that meets these properties is air transportation in today. It provides a huge time savings in transportation over long distances. But one of the disadvantages is a slowing of the process of loading and unloading activities. This mode is the most suitable mode in terms of time and speed. It has significant role in international transportation for generally less developed countries.

"Air transportation is the displacement of the air with an aircraft of people, load(cargo)and mail in a way that benefits place and time"(Gerede et al., 2015)

Table 8.6. Domestic and International Air Cargo Traffic in Turkey

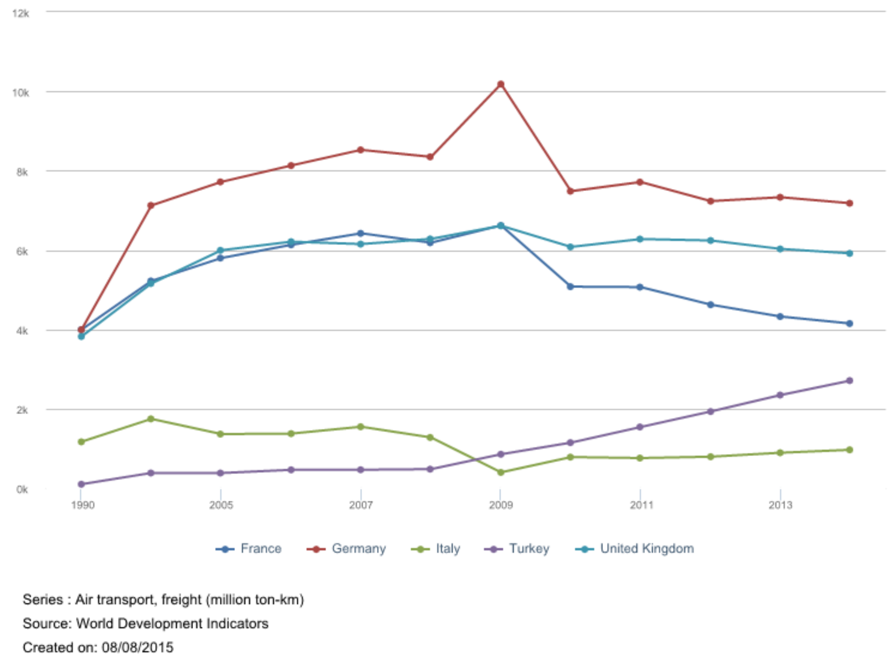
(Luggage+Cargo+Mail;Tons)

Years	Domestic Line	International Line	Total
2002	181,198	698,935	880,133
2003	188,936	742,255	931,191
2004	262,647	860,461	1,123,108
2005	315,858	933,697	1,249,555
2006	373,055	973,934	1,346,989
2007	414,192	1,131,833	1,546,025
2008	399,213	1,130,464	1,529,677
2009	484,833	1,241,512	1,726,345
2010	554,710	1,466,366	2,021,076
2011	617,835	1,631,639	2,249,474

Source: (Bayraktutan and Özbilgin, 2012)

As we understand from the table, domestic and international air cargo transportation increased continuously. But only a slight decline occurred in 2008.Another remarkable point in table is to happen in the international line the vast majority of air transportation. This rate is % 70 approximately in total transportation.

Table 8.7. Air Freight Transport in Advanced European Countries and Turkey 1990-2013 in years (million,ton-km)



Source: http://data.worldbank.org/indicator/ Available on site 25.02.2016

Air transport Turkey is significantly lower than the European countries in 1990. At the end of 2013, Turkey air transportation is more than Italy. Especially Germany is the most succeed other countries. France and United Kingdom situation is almost the same. But France air transportation decreased after 2010. Turkey has made great progress since 2010.Amount carried airway in 2014 has increased almost 3 times according to 2009.

8.5. Intermodal

Intermodal transport is using different meanings. If we can explain, some intermodal transport (or combined transport) is used to describe freight transport in which freight containers are adapted to enable several different types of vehicle to be used to move goods.

When looking transportation resources, various definitions are emerging about multiple types of transport used together. Economic Commission for Europe (UN/ECE), European

Conference of Ministers of Transport(ECMT) and European Commission(EC) by prepared "Combined Transport Terminology" report has included the following definitions.

Multimodal transport: "Carriage of goods by two or more modes of transport."

Combined Transport: Intermodal transport where the major part of the European journey is by rail ,inland waterways or sea and any initial and/or final legs carried out by road are as short as possible.

Intermodal Transport: The movement of goods in one and the same loading unit or road vehicle , which uses successively two or more modes of transport without handling the goods themselves in changing modes.

"By extension, the term intermodality has been used to describe a system of transport whereby two or more modes of transport the same loading or truck in a integrated manner without loading and unloading , in a (door to door)transport chain."(UN/ECE , 2001)

The "concept of logistically linking a freight movement with two or more transport modes is centuries-old," (Muller, 1999)

"Intermodal freight transport is the movement of goods in a single loading unit or vehicle that successively uses two or more modes of transport without handling the goods themselves in changing modes."(Mathisen and Hanssen, 2014) First, materials are collected and suitably loaded into container. The container is the main element of this work. Then can be transported to the desired place by truck or train.

"It has been argued that economic performance is improved because the most suitable transport mode is used on each part of a trip."(OECD, 2001).

"Intermodal freight transportation is the concept of transporting freight using more than one mode of travel in such a way that all parts of the transportation process are effectively connected and coordinated, safe, environmentally sound, and offering flexibility."(Muller,1995) We can say that such loading unit for intermodal transport, containers, swap bodies and semi trailers.

An intermodal system should be defined to include both the points of connections (e.g. ports, warehouses, etc.) and the links between them (e.g. roads, rails, etc.). (ISTEA, 1992)

System Architecture of Intermodal Freight Transportation The system architecture of intermodal freight transportation is composed of three interconnected layers, namely logistics, institutional/organizational, and information.”Logistics layer refers to various approaches that are available to describe the complicated structures of logistics systems in terms of flow of freight, operations, intermodal facilities, flow of messages. and data required to operate the system.”(Abbasi,1996) Institutional/organizational layer is a framework to explain or illustrate how actors and stakeholders proceed in developing and improving information infrastructure and how these actions influence the design of information systems. , Information layer refers to intercomputer communications technology and procedures that facilitate dialogues between machines and enable them to cooperate. Recent advancements favor the transformation of highly hierarchzed information systems into more horizontal architectures of local networks, connected to each other by gateways or bridges and possessing client/server machines. The integrated logistics operation transportation components and modes are communicating among each other through an interactive communication link.

Intermodal transport is the basic principle to make a container loads. Then this loads are moved by road. It also carried by at least one transport mode after road mode. The critical point here is moving loads without handling. Intermodal freight transport has a lot of advantages.. This transport mode has many advantages. Some of these advantages are as follows.

*Easy and fast handling

*Easy loading and unloading

*Long distance transport facilities

*Possibility of delivery time

*Reduction in the number of calculations

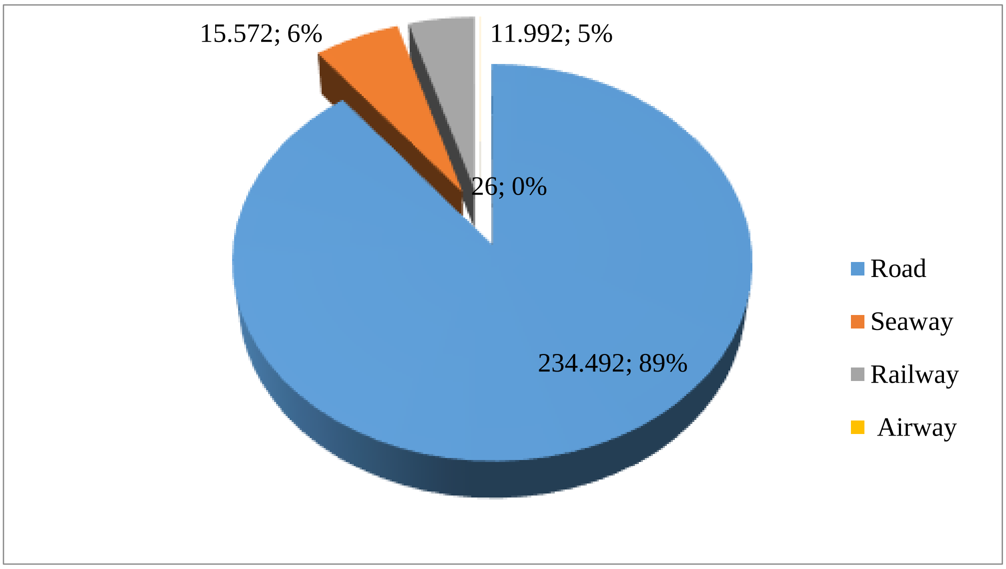
*Mitigation of the energy consumption

*Reduce to traffic congestion

Turkey is a very important place as to the location. Surrounded by sea on three sides, the intersection point of Asia and Europe demonstrates the importance to the world. Turkey attract to interest that young population, ready to develop sectors, among regions with a strong transfer connection.

Table 8.8. Domestic Freight Transport Rates in Turkey (2003-2014)

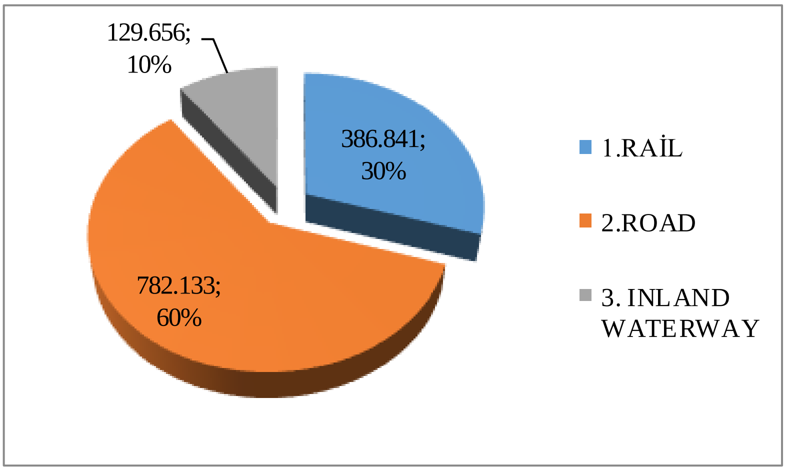
Million (Tons-Km)



Source: With Statistics Transport, Maritime and Communication, 2014

As we learn the from the table, road transport is the rate of 89.5 % within the total transport. This mode is the most important mode in the country. Despite maritime transport is important in the world, this mode 6% of the total transportation in Turkey. Rail transport which developed countries used extensively is a part of 5 % Air transport is very low percentage other modes. Therefore it is a very small part in the total transportation.

Table 8.9. Goods Transport Million in the European (2014) Million (Tons-km)



Source:www.internationaltransportforum.org Available on site 15.08.2015

As we understand from the table, Road transport is at level of %60. According to the situation in Turkey almost less than % 30.Railway transport is around 30%. This rate is almost 3 times of Turkey. This rate illustrates the importance of the railways. Inland waterways is shown %10.

PART 3. METHODOLOGY AND RESEARCH FINDINGS

CHAPTER 9. METHODOLOGY AND RESEARCH FINDINGS

9.1. Hypothesis

In this thesis, our desire target was able to identify the advantages of low cost in the change modes. Focus group interview was used in this thesis. It was interviewed with Samsun (Gelemen) Logistics Manager. It was taken the amount of railway transport and the amount of highway transport. It was compared per unit of analysis. With per unit cost of analysis calculated amount of shift. The benefits of resulting change were evaluated first region contributions then was evaluated country economy contributions.

In order to fulfill, for sampling 13 city, which far from 350 km and transport regularly from Samsun, was taken length average. "The reason of 350 km is railway effectiveness is to determine this length."(UBAK, 2010)

Our Questions are as follow:

-How many freight changes from highway to railway?

-What is the cost of per unit cost all of mode?

-After logistics center have established, how much cost has provided?

-What is the difference of the costs?

Consequently, these questions are our targets. In order to perform these aims, it will use below hypothesis:

Hypothesis 1. Railway per unit cost is less than highway

Hypothesis 2. The freight has shifted from Highway to railway

Hypothesis 3. Logistics Centers will provide benefits the country economy

In this chapter, When per unit costs calculates, it has been noted three costs, .These are maintenance cost, constructions cost, operation cost. These costs have every its properties.

9.2. Railway Cost Analysis

Railway per unit cost has a lot of information. So as to find correctly in this study is used below information.

In Turkey's transport infrastructure needs evaluation Technical Assistance Study Final Report is said " TEN-T project average constructions cost is in railway 10-11 million €/km ,roadway is 4 million €/km in European countries. It was stated 4 million €/km in our country." (TINA , 2007)

The following information will be used in calculations.

"*LMTC The Freight Train Line Maintenance Total Annual Cost = 107.000 TL/km

* FTP Freight Train Price = 26.750.000 TL

* FC Fuel Cost = 4.84 TL/km (21 kmh/km)

* M The Period Useful Life of Train =30

* OTT The Average Travel Time = 800 km/day

* TMC The Total Annual Maintenance Cost = 870.000 TL

* IOC The Infrastructure Operating Cost = 100.000 TL/km-year."(TINA , 2007)

Assumptions:

The following information will be used in railway per unit cost calculations.

The annual maintenance cost is updated as of 2009 to 2013.Lokomotive freight carried capacity (FCC) 2000 tons, it works 16 hours a day, the average transfer transfer/hour(ATH) 8 and occupancy rate (OR) 0,8 is accepted.

* RCC Railway construction cost = 6.650.000 TL

*PC Personnel Cost = 36.000 TL/year-person

*FTPN Freight Train Personnel Number = 3 personnel

*R Real interest rate (R) = %3

*1$ =1.9 TL

*1€ = 2TL

“Railway construction cost (RCC) is applied 3,5 $ million as updated. This calculates 6.650.000 TL as 2013 year values.”(TINA , 2007)

The Freight train line maintenance total annual cost(LMTC) is 107.000 TL/km. Freight Train price(FTP) 26.750.000 TL, fuel cost(FC) is 4.84 TL/km(21 kmh/km), the period useful life of train(M) is 30 years, the average travel time(OTT) is 800 km/day is accepted. The total annual maintenance cost(TMC) is accepted as 870.000 TL.

“The infrastructure operating cost(IOC) is assessed 100.000 TL/km-year.”(TINA , 2007)

“According to the figures we received from The State Planning Organization (2001) double line, signal and electrified railway construction cost is 2,96 million $/km.”(DPT , 2000).

“It was assumed that a personnel cost (PC) is 36.000 TL/year-person and freight train personnel number (FTPN) is 3 personnel. Real interest rate(R) %3 ,1$=1.9 TL 1€=2TL is used as 2013.” (Kabasakal and Solak , 2010)

Some information are taken from the specified source and other are assumed appropriately as updating 2013 year. So as to calculate per unit cost was used below formulations.

Railway Freight Carrying Capacity (RFCC) = FCC*ATH*OR*16

=2000*8*0,8*16

=204.800

Railway Construction Cost Per Unit (TL/Tons-Km)

$$\frac{RCC * R(1+R)^{M}}{[(1+R)^{K1}-1] * RFCC * 365}$$

$$\frac{6.650.000 * 0{,}03 * (1+0{,}03)^{30}}{[(1+0{,}03)^{30}-1] * 204800 * 365} = 0{,}00458$$

TL/Tons-Km

Railway Maintenance Cost Per Unit (TL/Tons-Km)

$$\frac{LMTC}{RFCC*365} = \frac{107000}{204800*365} = 0{,}01431 \text{ TL/Tons-Km}$$

Railway Operating Cost Per Unit (TL/Tons-Km)

Personnel Cost Per Unit (PCPU) (TL/Tons-Km)

$$\frac{PC*FTPN}{ATT*365} = \frac{36000*3}{800*365} = 0{,}3698 \text{ TL/Tons-Km}$$

Freight Train Operating Per Unit Cost (FTOC) (TL/Tons-Km)

$$\frac{FTP*R\,(1+R)^{M}}{[(1+R)^{M}-1]*ATT*365} + \frac{TMC+IOC}{ATT*365} + FC \quad +PCPU$$

$$\frac{26.750.000\ \ XR\ 0{,}03(1+0{,}03)^{30}}{[(1+0{,}03)^{30}-1]X\ 800X\ 365} + \frac{870000+100000}{800X\ 365} + 4{,}84+0398 = 13{,}2154 \text{ TL/Tons-Km}$$

Per Unit Of Train Operating Cost Per Unit (TL/Tons-Km)

$$\frac{FTOC}{FCC*OR} \quad \frac{13{,}2154}{2000*0{,}8} = 0{,}08259 \text{ TL/Tons-Km}$$

Table 9.1. Railway Freight Cost Per Unit (TL/Tons-Km)

Cost Type	Railway Freight Per Unit Cost (TL/Tons-Km)
Maintenance cost	0,001431
Construction cost	0,004548
Operating cost	0,008259
Total cost	0,014238

9.3. Highway Cost Analysis

“The Annual Routine Cost of State Road is 13.703 TL”(KGM , 2009) It is update to 2013 year. Road Annual Maintenance Cost (RAMC) is 45.000 TL. The period of useful life in highway (K) is accepted as 20 years.

“Divided Highway construction cost is approximately 2.600.000 TL/km. But This cost not include tax, expropriation and bridge construction costs.”(KGM , 2009b)

In this study, per km highway construction cost (PHCC) was update 2013 values. This value evaluated 3.502.000 TL.

Turkish Statistical Institute are showed vehicle distribution as follows. “Truck is %16.3 semi trailer (TIR) is % 4.4.”(Turkish Statistical Institute, 2013)

By proportioning light commercial vehicle is taken % 6.3. Values has proportioned again in this study. New values are as follows: truck (TR) %60, light commercial vehicle (LVR) %23, semi trailer (STR) %16. These vehicles freight capacity is accepted as follows: Light commercial vehicle capacity (LCC) is 3,5 tons, truck capacity (TC) is 20 tons, semi trailer capacity (STC) is 30 tons. The occupation rate is evaluated light commercial vehicle is 0,8(LVO), truck is 0,75(TO), semi trailer is 0,7 (SMO).

In order to calculate highway capacity, it is accepted daily average vehicle traffic(DAVT) is as 45.000 .This value are assessed by updating 2013 year.

Per km highway construction cost (PHCC) = 3.502.000 TL

Road Annual Maintenance Cost (RAMC) = 45.000 TL

The period of useful life in highway (K) = 20 years

The following information will be used in calculations.

Assumptions:

Truck (TR) = %60

Light commercial vehicle (LVR)= %23

Semi trailer (STR) = %16

Light Commercial Vehicle Capacity (LCC) = 3,5 tons

Truck Capacity (TC) = 20 tons

Semi trailer capacity (STC) = 30 tons

The occupation rate light commercial vehicle(LVO) = 0,8

The occupation rate truck (TO) = 0,75

The occupation rate semi trailer (SMO) = 0,7

Daily Average Vehicle Traffic(DAVT)=45.000

*R Real interest rate (R) = %3

*1$ =1.9 TL

*1€ = 2TL

Table 9.2. Vehicle Operating Cost (2008 year, not include tax)(TL/Vehicle-Km)

Coat Type	Type of Land	Truck	Semi Trailer
Concrete Asphalt(R=2)	Horizontal	1,05	1.28
	Wavy	1,13	1.6
	Mountainous	1,39	2.25
Old Concrete Asphalt (R=2,5)	Horizontal	1,06	1.29
	Wavy	1,13	1.61
	Mountainous	1,39	2,25

Source:KGM (2009) R=Surface Evenness With 2013 Inflation data has been updated.

In order to assess highway operating cost , as using Table 9.2 data, truck operating cost 1,9 TL/vehicle-km(TOC), semi trailer operating cost (SOC) is 1,7 TL/vehicle-km is determined. Light commercial vehicle cost (LCO) is accepted 0,4.TL/vehicle-km

Table 9.2. will use to evaluate highway operating cost.

If Highway used For Freight Transport, Capacity Situation

Highway Freight Carried Capacity (HFCC)

DAVT* [(LVR*LCC*LVO)+(TR*TC*TO)+(STR*STC*SMO]

HFCC= 45.000*[(0.23*3.5*0.8)+(0.6*20*0.75)+(0.16*30*0.85]= 617580

The Highway Construction Per Unit Cost (TL/Tons-Km)

$$\frac{PHCC*R(1+R)^{K}}{[(1+R)^{K}-1]*HFCC*365}=$$

3.502.000*0,03(1+0,03)20/[(1+0,03)20-1]*617580*365= 0,001044 TL/Tons-Km

Highway Maintenance Per Unit Cost (TL/Tons-Km)

$$\frac{RAMC}{HFCC*365}\frac{45000}{617580*365}=0{,}000199$$ TL/Tons-Km

Highway Operating Per Unit Cost

[(LCO*LVR)/(LCC*LVO)]+[(TOC*TR)/(TC*TO)]+[(SOC*STR)/(STC*SMO)]

[(0,4*0,23)/(3,5*0,8)]+[(1.9*0,6)/(20*0,75)]+[(1.7*0,16)/(30*0,7)]=0,0638 TL/Tons-Km

Table 9.3. Highway Freight Per Unit Cost Analysis (TL/Tons-Km)

Cost type	Highway Freight Per Unit Cost Analysis (TL/Tons-Km)
Maintenance cost	0,000199
Construction cost	0,001044
Operating cost	0,063800
Total cost	0,065043

Table 9.4. The Comparison of Highway And Railway Freight Per Unit Cost (TL/Tons-km)

Cost Type	Highway Freight Per Unit Cost (TL/Tons-Km)	Railway Freight Per Cost (TL/Tons-Km)
Maintenance Cost	0,000199	0,001431
Construction Cost	0,001044	0,004548
Operating Cost	0,063800	0,008259
Total Cost	0,065043	0,014238

According to table, the railway is approximately 4.5 times cheaper than highway. Operating cost is the highest cost among the highway costs. Another important point is highway constructions cost is quite.

In this thesis, once to assess per unit cost both railway and highway, we go to the Samsun (Gelemen) Logistics Center. Because This place is first establishment about this situation. In addition, as logistics center subject is new, data about transport is only be this facility.

9.4. Roles of Logistics Centers in Mode Shift

Logistics Centers will be the backbone of the transport sector in this country after all set up. Reduce traffic congestion and air pollution prevention is major objectives. We must reduce the road transport in order to provide it. In order to achieve this is to use the railway as it is in developed European countries.

In this study, I negotiated Samsun (Gelemen) Logistics Director about facilities freight situation. This study assesses from roadway to railway. This evaluation are taken total carrying freight both roadway and railway. This Studied aim to find per unit freight cost. In order to compare railway and roadway, we must find out per cost.

Table 9.5. Samsun (Gelemen) Logistics Center (Freight Distribution)

(Tons-Km) (1000)

Transportation mode	Years								
	2006	2007	2008	2009	2010	2011	2012	2013	2014
Logistics center (railway) total(1000)	202	210	384	339	332	312	361	324	326
Highway total(1000)	1089	684	800	644	812	955	1476	1524	1665
Total(1000)	1291	894	1184	983	1144	1267	1837	1848	1991

Source :Gelemen Logistics Directorate, 2016 .It was interviewed by telephone and was taken by e- mail. 15.02.2016

Table 9.6. Samsun (Gelemen) Logistics Center Freight Transfer (tons-km) (1000) and Total Transportation Change (%) Situation

	Before Establisment of Logistics Center the amount of Average (tons-km) (2006-2007)	%	After Establisment of Logistics Center the amount of Average (tons-km) (2008-2009)	%	Freight Change in Total Transportatio n (tons-km)	Freight Change in Total Transportatio n (%)
Logistics center (railway) total (tons-km)(1000)	206	19	362	33	156	+14
Highway total (tons-km)(1000)	887	81	722	67	-165	-14
Total (1000)	1093	100	1084	100	-9	

Source : Gelemen Logistics Directorate, 2016 It was interviewed by telephone and was taken by e- mail.15.02.2016

In order to perform, It is taken 13 city length average from Samsun This Cities are far from 350 km. Because so as to evaluate suitably, this study were interested in 13 cities. Because these cities were both transported with railway regularly from Samsun (Gelemen) and transported with highway.

Table 9.7. The Distance Length of Cities from Samsun (Table continues following table)

	Sivas	Erzurum	Erzincan	Malatya	Elazığ	Kars	Mardin
Highway(Km)	369	634	469	580	614	843	914
Railway(Km)	402	946	731	651	770	1162	1297

	Diyarbakir	Kurtalan	Nusaybin	Islahiye	Kahramanmaraş	Iskenderun	Average Length
Highway(Km)	818	945	1068	694	625	843	724
Railway(Km)	907	1064	1331	909	875	1019	928

Source :www.illerarasimesafe com. Available on site 15.02.2016

Table 9.8. Analysis of Cost Advantage in the Samsun (Gelemen) Logistics Center (TL/Tons-km)

	The Average Length (km)	Cost Per Unit (TL/tons-km)	Freight Change (tons)	Total cost (TL/tons-km)
Highway	724	0,064707	156000	7311373
Railway	928	0,014238	156000	2060694
Cost Advantage (TL/tons-km)				5250679

*To compare highway and railway in the Logistics Center, freight of roadway made assumption.

This table shows that as intermodal transport Samsun (Gelemen) shifted from highway 156.000 tons to railway. As we seen the table, railway per unit cost is lower 4.5 times than highway per unit cost. Highway length from Samsun is shorter than railway. Even if Length is short, because of per unit cost of railway has more advantages than highway.

PART 4. CONCLUSION

In terms of the development logistics activities, Logistics Centers have been established developed country in the world. These places are areas where the most efficient use of transport modes. These areas began to be established in Turkey since 2007. Because the reason we want use the railway is cheaper than other transport mode. Besides, with railway can be transported more longer distance and more amount of freight. The main contribution of railway arises from more than 350 km length. In this study, it was examined as specified.

Because railway for near distances are more expensive, It should not prefer to usage. Advanced Countries prefer the railway for long distances. Freight transportation is far cheaper in railway in long distances. This thesis has tried to determine from highway to railway freight change and the cost of situation. Samsun (Gelemen) Logistics Center was selected the main subject. It was examined that before the establishment of transportation situation and after the establishment of transportation situation. While it was investigating, it was assessed railway and highway transportation. Per unit cost was identified both of them. In order to assess correctly, it was calculated construction cost, maintenance cost and operating cost. It have been identified separately railway per unit cost and highway per unit cost.

As this study assesses the Samsun (Gelemen) Logistics Center, It was chosen before two years of establishment (2006-2007) and after years of establishment (2008-2009).Especially it was examined the first change in Logistics Center. As this thesis was determining the cost change, it was used the assumption. This assumption is to transport with highway in Logistics Center before the establishment of this place in Samsun Region.

According to Table 9.6, Samsun (Gelemen) Logistics Center after establishment provided to change 156.00 tons freight. As we seen the same table, From highway to railway changed to 14 percent. Railway freight transportation increased from 19 to 33 as percent. After Logistics Center was established, it showed that freight was changed from highway to railway. As seen from the table, railway per unit cost is quite low. Railway per unit cost is 4.5 times cheaper than highway per unit cost. These results show that after establishment provided 5.250.679 TL advantage of cost in Samsun Region. If these amount transport with highway, It would be expensive cost according to railway transportation. Though this place showed as intermodal terminal for now, It will be benefits of freight transfer facility. This place will contribute to establish in the future the Tekkeköy Logistics Center in Samsun region. Because Tekkeköy is near port and airport. If Logistics Centers planned and coordinated correctly , they will be useful our logistics sector and our economy targets.

Pay Back Period:

Approximately 40 million TL has been invested for the Samsun(Gelemen) Logistics Center.(Gelemen Logistics Directorate, 2016)

Table 9.9. Pay Back Period

Invest (million) (TL/tons-km)	Years And Cost Advantages(1000) (TL/tons-km)					
	2008(1)	2009(2)	2010(3)	2011(4)	2012(5)	2013(6)
-40000	5250	620	7250	8250	9250	10250
TOTAL	5250	11500	18750	27000	36250	4 month

* It is assumed that increased to 1 million every year with depreciation share.

This table shows that Logistics Center paid back 5 years 4 months according to investment. Such long term investment shows that the investment is appropriate for this time. We inferred from these data that investment of a logistics center is a promising investment.

Internal Rate of Return:

$$NPV = \sum_{t=1}^{T} \frac{C_t}{(1+r)^t} - C_o$$

Source: http://www.investopedia.com/terms/i/irr.asp Available on site 22.10.2016

This Formula is used to calculate Net Present Value. Our main objective is to calculate internal rate of return. We need to this value calculation until it is zero.

In order to calculate internal rate of return was used following formula.

$$\sum_{t=0}^{T} \frac{CF_t}{(1 + IRR)^t} = 0$$

Source: http://www.fizibilite.info/ic-karlilik-orani Available on site 22.10.2016

The IRR formula shows the rate of return when NPV=0

CF: Cost Advantage Value

IRR: Internal Rate of Ratio

t: The number of repetitions.

Inflation Rate is accepted % 3.(This value was used for all calculations.)

Table 9.10. Internal Rate of Return (1)

INVEST	A1	A2	A3	A4	A5	A6	TOTAL
-40000000	5250000	5891224	6634777	7330018	7979131	8584214	1669364,554

*It is assumed that increased to 1 million every year. (Depreciation share is included)

Table 9.11. Internal Rate of Return (2)

INVEST	A1	A2	A3	A4	A5	A6	TOTAL
-40000000	5250000	5756315	6408182	6998147	7530142	8007880	-49333,7573

* It is assumed that increased to 1 million every year. (Depreciation share is included)

IRR~0,042 or % 4,2

Our investment is 40.000.000 TL. This value has a negative value. Because our aim is to find internal rate of return according to initial investment. Then This value indicates that the interest rate would be harmful when it comes to this level of investment

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