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DOCTORAL THESIS
Doctor of Philosophy (PhD)

A QUANTITATIVE RESEARCH ON KEY PERFORMANCE INDICATORS
IN THE SCOPE OF HORIZONTAL COLLABORATIONS
AT LOGISTICS CENTRES

Didem ÇAVUŞOĞLU

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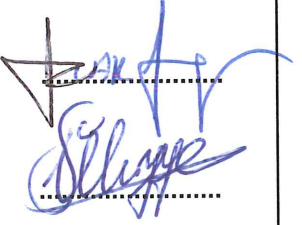
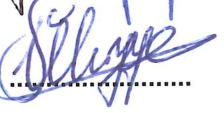
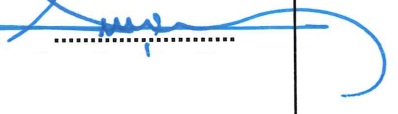
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DECLARATION

I hereby declare that this doctoral thesis titled as “A Quantitative Research On Key Performance Indicators In The Scope Of Horizontal Collaborations At Logistics Centres” has been written by myself in accordance with the academic rules and ethical conduct. I also declare that all materials benefited in this thesis consist of the mentioned resources in the reference list. I verify all these with my honour.

20/05/2019

Didem ÇAVUŞOĞLU

ABSTRACT
Doctoral Thesis
Doctor of Philosophy (PhD)
A Quantitative Research on Key Performance Indicators in the Scope of
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Dokuz Eylül University
Graduate School of Social Sciences
Department of Maritime Business Administration
Maritime Business Administration Program

Logistic centres are built in a specific area for the realization of all logistical activities by various actors and their impact on global freight traffic and their importance in terms of sustainability and multimodal transportation are increasing. Horizontal collaborations have been a well-known concept for different industries for a while, but they are not as common as in logistics industry except from the maritime transport. So it can be considered as an up-to-date method for the solution of many problems for the logistics sector as well. Logistics centres are already considered as an example of specialised industrial clusters resulting from collaboration between logistics service providers.

Logistics centre and Horizontal collaboration concepts and the relationship between them are the main interest of this thesis. In this regard, this research aims to determine and prioritize key performance indicators in the scope of horizontal collaborations for logistic centres. In order to achieve the aim of the research; both qualitative and quantitative data collection methods were employed. Secondary (content analysis) and primary data collection (semi-structured interview) techniques as qualitative research methods and Fuzzy AHP method as a quantitative research method were used.

Interviews were made with 7 logistics centre managers and 7 logistics company managers which are operate in logistics centre and fuzzy AHP survey

were carried with 18 professionals/experts from different groups of logistics centre's stakeholders.

The results were interpreted based on the findings of the analysis. Horizontal collaborations and logistics centres are drivers and facilitators of each other. As a result of the study, the perceptions of the logistics center stakeholders about their expectations from the logistics centers and the horizontal cooperation in the logistics sector were revealed. The results of the thesis will have importance for practitioners in the logistics industry. Logistics center managers and policy makers can take into account identified and prioritised key performance indicators by adopting a relationship marketing-oriented approach while planning, building and managing logistics centers. Finally, the research aims to contribute to the future studies of academicians aiming to study in this field.

Key Words: Relationship Marketing, Logistic Centres, Horizontal Collaborations, Horizontal Collaborations in Logistics, Key Performance Indicators of Logistics Centre

ÖZET

Doktora Tezi

Lojistik Merkezlerde Yatay İşbirlikleri Kapsamında Anahtar Performans Göstergelerinin Belirlenmesine Yönelik Nicel Bir Araştırma

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Denizcilik İşletmeleri Yönetimi Doktora Programı

Lojistik ile ilgili tüm faaliyetlerin çeşitli aktörler tarafından gerçekleştirilmesi amacıyla belirli bir alanda inşa edilen Lojistik merkezlerin, küresel yük trafiği ve sürdürülebilirliği üzerindeki etkileri ile çoklu taşımacılığın gelişimi açısından önemi artmaktadır. Özellikle stratejik işbirlikler şeklinde Denizyolu taşımacılığı sektöründe uzun süredir görülen yatay işbirlikleri, Lojistik sektörü için de birçok sorunun çözümü için güncel bir yöntem olarak değerlendirilmektedir. Lojistik merkezler de lojistik servis sağlayıcılar arasındaki işbirliğinden kaynaklanan ve işbirliğini arttıran lojistik kümelenmelere örnek olarak değerlendirilir.

Lojistik merkezi ve yatay işbirliği kavramları ve aralarındaki ilişki bu tezin ana ilgi alanıdır. Bu bağlamda, bu araştırma lojistik merkezleri için yatay işbirlikleri kapsamında temel performans göstergelerini belirlemeyi ve önceliklendirmeyi amaçlamaktadır. Araştırmanın amacına ulaşmak için; hem nitel hem de nicel veri toplama yöntemleri kullanılmıştır. Araştırmanın amacına, nitel araştırma yöntemleri olarak ikincil (içerik analizi) ve birincil veri toplama (yarı yapılandırılmış görüşme) teknikleri ve nicel araştırma yöntemi olarak bulanık AHP yöntemi kullanılmıştır.

Mülakatlar, 7 lojistik merkez yöneticisi ve Lojistik merkezde faaliyet gösteren 7 lojistik şirket yöneticisi ile yapılmış ve bulanık AHP anketi ise lojistik merkezlerin farklı paydaş gruplarından 18 profesyonel / uzmanla gerçekleştirilmiştir.

Sonuçlar, elde edilen analizlerin bulguları doğrultusunda yorumlanmıştır. Tezin sonuçları, hem uygulayıcılar hem de akademisyenler için çeşitli öneriler sunmaktadır. Yatay işbirlikleri ve lojistik merkezler birbirlerinin itici güçleri ve kolaylaştırıcılarıdır. Araştırmanın sonucunda Lojistik merkez paydaşlarının, lojistik merkezlerden beklentileri ve lojistik sektöründeki yatay işbirlikleri hakkındaki algıları ortaya konmuştur. Lojistik merkez yöneticileri ve politika yapıcılar lojistik merkezleri planlarken, inşa ederken ve yönetirken, ilişki pazarlaması odaklı yaklaşımı benimseyerek belirlenen ve önceliklendirilen kilit performans göstergelerini dikkate alabileceklerdir. Son olarak araştırma, bu alanda çalışmayı amaçlayan akademisyenler için gelecekteki çalışmalarına katkı yapmayı hedeflenmektedir.

Anahtar Kelimeler: İlişkisel Pazarlama, Lojistik Merkezler, Yatay İşbirlikleri, Lojistikte Yatay İşbirlikleri, Lojistik Merkezinin Temel Performans Göstergeleri

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ABBREVIATIONS

3PL	Third-party Logistics Service Providers
4PL	Fourth-party Logistics Service Providers
AHP	Analytical Hierarchy process
ASO	Ankara Chamber of Industry
AYGM	Infrastructure General Directorate of Investments
B2B	Business-to-Business
BALO	Büyük Anadolu Lojistik Projesi
CCTV	Closed-circuit television
CDC	Central Distribution Centre
CFZ	Customs-Free Zones
CKYHE	Alliance Comprise Cosco, “K” Line, Yang Ming, Hanjin and Evergreen
NVOCC	Co-loading among Non-vessel Operating Common Carriers
CEO	Chief Executive Officer
DKİB	Eastern Black Sea Exporters' Association
DLC	Dubai Logistics Centre
DSS	Decision Support Systems
ECR	Efficient Consumer Response
EDI	Electronic Data Interchange
EIB	European Investment Bank
ELC	European Logistics Centres
EMEA	Europe, the Middle East and Africa
ESCAP	Economic and Social Commission for Asia and the Pacific
EU	European Union
EUROPLATFORMS	European Association of Transport & Logistics Centres
FTL	Full Truck Load
FTZ	Free Trade Zone
GDP	The Gross Domestic Product

GM	General Motors
GOVT	Government
IBM	International Business Machines
ICD	Inland container depot
ICT	Information Communication Technology
IMO	International Maritime Organization
IT	Information Technology
JIT	Just in Time
KPI	Key Performance Indicators
LNG	Liquefied Natural Gas
LODER	Logistics Association in Turkey
LSP	Lojistik Service Providers
LPI	World Bank Logistics Performance Index Global Ranking
LTL	Less-Than-Truckload
MADM	Multiple Attribute Descision Making
MNC	Multi National Company
MCDM	Multiple Criteria Decision Making Methods
MODM	Multiple objective decision making
OIZ	Organized Industrial Zones
OECD	Organisation for Economic Co-operation and Development
PC	Personal Computer
PPP	Public Private Partnership
PSA	Port of Singapore Authority
PTP	The Port of Tanjung Pelepas
PwC	PricewaterhouseCoopers
R&D	Research and Development
RFID	Radio-Frequency Identification
SODM	Single Objective Decisionmaking Methods
SUTRANET	Sustainable Transport Research & Development Network in the North Sea Region

SWOT	Strengths, Weaknesses, Opportunities and Threats
QR	Quick-response
TCDD	General Directorate of Turkish State Railways
TDMC	Trade, Distribution and Marketing Centres
TEN-T	The Trans-European Transport Network
TEU	Twenty Foot Equivalent Unit
TLC	Transport and Logistics Centre
TOC	Terminal Operating Companies
TOPSİS	Technique for Order of Preference by Similarity to Ideal Solution
TRACECA	Transport Corridor Europe-Caucasus-Asia
TSE	Turkish Standardization Institute
UAE	United Arab Emirates
UN	United Nations
UNCTAD	United Nations Conference on Trade and Development
UND	Uuslararası Nakliyeciler Derneği
UNECE	United Nations Economic Commission for Europe
UNESCAP	United Nations Economic and Social Commission for Asia and the Pacific
UK	United Kingdom
USA	United States of America
UTIKAD	Uluslararası Taşımacılık ve Lojistik Hizmet Üretenleri Derneği
VAL	Value Added Logistics

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INTRODUCTION

Companies must build its relationships with all their stakeholders mutually satisfying. The main concern is how to coordinate activities with different stakeholders and control critical resources through relationships with them. Managing business networks and relationships is highly complex due to involving a large number of companies in different size and shape. In this kind of environment it can be said that “traditional markets are being replaced by networks” (Moller and Halinen, 1999: 418). Companies must considers its relationships with all these parties when developing a marketing plan and create a marketing network.

Companies form both vertical and horizontal relationships that form networks; vertical relationships containing relationships with suppliers, distributors and customers where horizontal relationships containing relationships with competitors and noncommercial actors. In addition companies are increasingly outsourcing their business activities that forming complex supply chain networks with several tiers of suppliers. Besides the management of vertical relations with suppliers, distributors and customers, several types of horizontal relationships are becoming important. The impact of relationships between competitors has been dealt with within the research areas of strategic alliances and business networks. Relationship marketing aims to build mutually satisfying strong long-term relationship with key stakeholders (customers, employees, channels, suppliers, distributors, dealers, agencies, shareholders, investors) by understanding their capabilities and resourced, needs, goals and desires. Network Based Relationship Marketing is one of the relationship marketing types and its main concern is how to co-ordinate activities with stakeholders and control resources through relationships with them (Moller, 2000: 45).

One of the most popular form of a network of enterprises are industrial clusters (Bylok et al., 2016: 173). Cluster concept is more than geographic proximity that emphasizes relationships and social ties between actors in the cluster population. Clusters facilitate networked collaborations and Logistics centres are a specific type of industrial clusters. Logistic centres are the clusters which are the most popular form of industrial networks and they are formed by the vertical and horizontal business relationships. Companies within the logistics centre should use the network-based

marketing tools with industrial market approach to facilitate the cooperation between the market actors.

Logistics centres acts as a node to link suppliers and customer in the supply chain and so Logistics centres concept have developed in paralel with the supply chain management, 3PL, intermodality and sustainable transport concepts. As complexity across the supply chain increases, it requires value-added, time-based logistics services continuous development to meet customer needs. Logistics centres are the main facilitators of intermodal transport by bringing together the logistics operators offering different type of transport modes and services to provide synergic solutions. Environmental concerns also play an important role in the development of logistics centres. An important purpose of the logistics centre development is switching the transport modes to more enviroment friendly ones i.e. railways and inland waterways instead of roads.

Logistics centres first appeared nearly 40 years ago in USA and spread around the world, along with the need efficient, sustainable logistics systems demand for logistics centres growing accordingly (Rimienė and Grundey, 2007: 87). Successfully developed Logistics Centres (Du Jun and Bergqvist, 2010: 3); improve the transport infrastructure and logistics market conditions, improve cost efficiency, improve quality of logistics systems, public authorities and private actors can better collaborate so they can attract and facilitate international trade and investments in the region, improve environmental performance of logistics systems in the region, with reduced number of lorries on the roads congestion, accidents, road maintenance costs and local pollution are reduced as well (Roso, 2008: 285, 286).

Logistics is a young industry in Turkey that has progressed in recent years. Turkey tends to become a bridge between East and West in context of international trade and logistics. Many authorities claim that Turkey will be regional logistics base. Growth rates in the logistics sector have already attracted many international companies (PwC, 2010: 44). Logistics centres in Turkey have been initiated by both public and private sector since 2000's. Since then 9 TCDD logistics centre has been completed out of 21 projects, at the same time 3 private sector logistics centre has started to operate.

Despite the common use of the term “Logistics Centre” both in the World and Turkey, the definition of the concept and the features of logistics centres vary in the literature and in practice, mainly because logistics centres continue to evolve and expand. At the same time development through collaboration and networking becomes increasingly important for sustainable competitiveness. European Union define the benefits of Horizontal collaborations as is below (EU, 2011: 4);

- sharing risk and costs
- raise investments,
- pool know-how,
- raise product diversity and quality,
- initiate innovation faster.

Despite all benefits, it is difficult to manage horizontal collaborations, most of them doesn't last long because it may lead to some competition problems. Horizontal collaboration practices are widespread in the maritime and aviation industries but it is not as much common in logistics and land transport industry. In the logistics industry, it is extensively accepted that economies of scale are necessary to decrease transport costs, congestion and transport emissions. Horizontal collaboration seems to be a current method for solution of the mentioned problems and physical proximity is considered one of the facilitators of horizontal collaboration in logistics.

When the literature analysed, although much has been written about the both concepts of logistics centre and horizontal collaboration, the relationship between them has not been researched specifically. Their benefits overlap such as cost efficiency, improve logistics systems quality e.g. but how do they effect each other has not been studied. Many studies regarding the logistics centres concentrated on the features, particularly location selection, and benefits of logistics centres but key performance indicators of the logistics centres particularly has not been studied. These two concepts and the relationship between them are the main interest of this thesis, in this regard research question of the thesis are

- What is Logistics Centre and what are the current Logistics Centre practices in Turkey and World?
- What is Horizontal collaboration concept in logistics? Why it is needed? What are horizontal collaboration types in logistics?

- How logistics centres affect horizontal collaboration level among logistics service providers?
- What are the key performance indicators in the scope of horizontal collaborations for logistic centres?
- What are the priority order of these KPI's for stakeholders?

In the light of the research of questions above, the main purpose of the research is to determine and prioritize key performance indicators in the scope of horizontal collaborations for logistic centres.

In order to achieve the aim of the research; firstly logistics centre concept itself and its practices in the world and Turkey has been analysed, after that horizontal relationship concept in general and its importance for logistics industry has been explained, then key performance indicators for logistics centre and impact of logistics centres on horizontal collaborations among logistics firms has been determined

- by literature analyse,
- by interviewing managers of logistics centres,
- by interviewing logistics companies already located in a logistics centre (already users).

Finally, determined key performance indicators for logistic centres have been prioritized by Fuzzy Analytical Hierarchy process (AHP) technique.

The results of the thesis will have importance for practitioners in the logistics industry as they will know what to expect from facilities called logistics centre and policy makers can take into account determined key performance indicators when planning, building and managing logistics centres and finally scholars that aim to work in this field.

SECTION I

RELATIONSHIP MARKETING, NETWORK AND CLUSTER THEORY FOR INDUSTRIAL MARKETS

Relationship marketing theory and Industrial Network approach are the two main theories lead the way towards the conceptualisation of logistics centres (Altuntaş, 2013: 23). Logistics centres concept has developed in parallel with the supply chain management concept. Logistics centres acts as a node to link suppliers and customer in the supply chain and the complexness across the supply chain and demand increases, it requires value-added, time-based logistics patterns for continuous development to meet customer needs (Du Jun and Bergqvist, 2010: 3). Millions of transactions take place between the members of supply chains and logistic centres are clusters that are established to unite these transactions in certain geographic points. “As these transactions take place between different organisations, the exchange market is said to be an industrial market and the subject of exchange is said to be industrial services” (Altuntaş, 2013: 23).

Companies cannot stand to be a “self-contained island”; increasing operations in global scale, increasing competition and the complexity of technology make learning through relationships important for the companies. They handle webs of various vertical and horizontal relationships that form networks involving, competitors, customers, suppliers and non-commercial organizations (Möller and Halinen, 1999: 416).

Logistics centre are example of industrial networks as it is composed of many enterprises that are vertically or horizontally linked to each other (Altuntaş, 2013: 36). According to Porter “A cluster is a form of network that occurs within a geographic location and constituted by interconnected companies and associated institutions linked vertically or horizontally”. Clusters appear in many different sectors both advanced and developing economies and strongly affect companies’, regions’ and countries’ competitiveness (Porter, 1998b: 213, 242).

1.1. RELATIONSHIP MARKETING

Organisations can choose five competing concepts to conduct their business: “the production concept, the product concept, the selling concept, the marketing concept and the holistic marketing concept”. Except “The Marketing Concept” and “Holistic Marketing Concept”, the first three concepts are of limited use today. “The Marketing Concept” was emerged in the mid-1950’s and focuses on finding the right products for the customers. Marketing concept aims to “be more effective than competitors in creating, delivering and communicating superior customer value to the target markets”. “The Holistic Marketing Concept is based on the development design and implementation of marketing programs, processes and activities that recognize their breadth and interdependencies”. In Holistic Marketing Concept it is crucial to have extensive and integrated perspective and everything matters in marketing. Holistic Marketing includes four components in (figure 1); Relationship Marketing, Integrated Marketing, Internal Marketing and Performance Marketing (Kotler and Keller, 2012: 39, 40, 41, 50).

Figure 1: Holistic Marketing Dimensions



Source: Kotler and Keller, 2012: 41

Relationship marketing is an emerging subfield of the marketing discipline and has been hailed as the New Paradigm of Marketing by several scholars (Moller, 2000; 29; Sheth and Parvatiyar, 1995). “The aspect of long-term relationships with customers

and other stakeholder groups has been neglected in mainstream marketing management literature” (Håkansson, 1982; Dwyer et al., 1987; Ford, 1990; Christopher et al., 1991; Grönroos, 1994b; Morgan and Hunt, 1994; Sheth and Parvatiyar, 1995a; Gummesson, 1997; Parvatiyar and Sheth, 1997; cited by Moller, 2000: 29). According to Moller’s content analysis study in 2013; “relationship marketing has become the dominant view in business marketing studies”. The study indicates that research on relationship marketing has increased consistently, where the researches on buying behavior, selling, and sales management and segmentation has decreased (Moller, 2013: 325).

It is discussed as a paradigm shift in marketing that adopts a relationship focus against the traditional focus on transactions (Webster, 1992; cited by Altuntaş, 2013: 26). Relationship marketing aims to build mutually satisfying strong long-term relationship with key stakeholders (customers, employees, channels, suppliers, distributors, dealers, agencies, shareholders, investors) by understanding their capabilities and resourced, needs, goals and desires (Kotler and Keller, 2012: 41). Companies must considers its relationships with all these parties when developing a marketing plan and create a marketing network in which the company works closely with in production and distributors chain (Kotler and Keller, 2012: 41). Altuntaş considered the study of Harker (1999) which is a content analysis of relationship marketing definition and extracted seven basic dimensions of the term; “creation, development, maintenance, interactive, long-term, emotional content and output dimensions” (Altuntaş, 2013: 26). Altuntaş states that none of the relationship marketing definition covers all the seven dimensions, only the definition made by Grönroos below covers six of them and so it is agreed as the best definition in terms of its coverage (Grönroos, 1994a: 9 cited by Altuntaş, 2013: 26);

“Relationship Marketing is to identify and establish, maintain and enhance and when necessary also to terminate relationships with customers and other stakeholders, at a profit, so that the objectives of the parties involved are met. This is achieved by a mutual exchange and fulfilment of promises.”Gummesson (1994) defined relationship marketing as “ marketing seen as relationships, networks and interaction” (Gummesson, 1994: 5). Möller (2000) analyzes the theoretical background of the relationship marketing and divided into two groups; market-based relationship

marketing (more consumer-oriented) and network-based marketing (more interorganisationally-oriented) (Moller, 2000: 29). Market-based Relationship Marketing can be defined as the management of the company's customer base by treating a large number of customers separately and profitably. The key managerial tasks include internal procedures of the company such as planning marketing activities for regular customers, mastering customer portfolio analysis, using information technologies to manage the customer interface and restructuring the marketing organization according to the relationship management thinking (Moller, 2000; 45). On the contrary, Network Based Relationship Marketing can be briefly explained as the management of interdependencies between business actors. Management's tasks and challenges include broader and deeper interaction with both customers and other stakeholders. The main concern is how to coordinate activities with different stakeholders and control critical resources through relationships with them (Moller, 2000: 45). Author states that Network-based Relationship Marketing involves more managerial 'levels' than Market-based Relationship Marketing, and it has also more open issues. In reality, companies are rarely confronted with only one type of business condition. They cannot just follow the ideas of either of each approach alone. Most companies have to follow few marketing modes together; traditional marketing management and market based and network based relational marketing. Companies need to have broad knowledge of different marketing modes and ability to use them in an integrated way (Moller, 2000: 49).

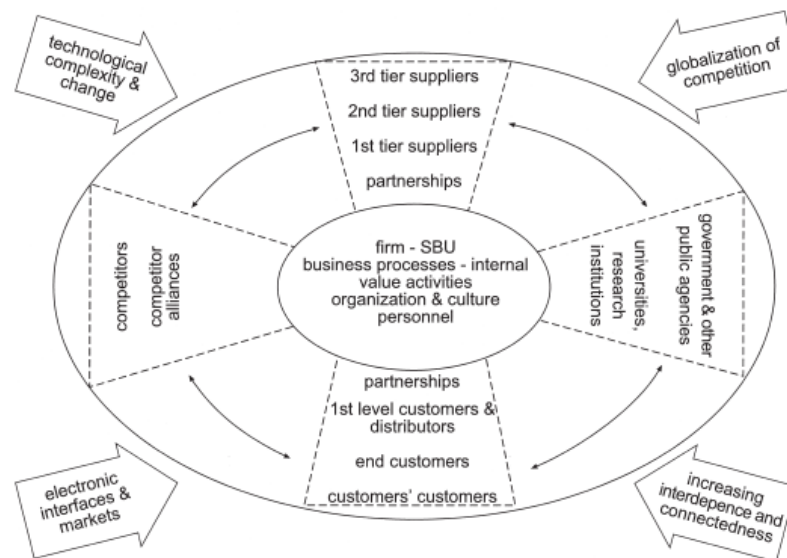
To improve effectiveness and efficiency, business suppliers and customers are exploring different ways to manage their relationships, closer relationships are driven by supply chain management and purchasing alliances (Kotler and Keller, 2012: 223). Gummesson states that there are three relationships in marketing that are the between the customer and supplier and between customer, supplier and its competitors and the network of the physical distribution. Managing business networks and relationships is highly complex due to involving a large number of companies in different size and shape. In this kind of environment, "traditional markets are being replaced by networks" (Moller and Halinen, 1999: 418) and "marketing becomes the creation, utilization and maintenance of this network" (Gummesson, 1994b; 33).

1.2. INDUSTRIAL NETWORK AND CLUSTER THEORY

Relationship Marketing and Business Networks are the two topics are highly integrated as relationships generally exist in networks (Lehtinen, 1996; cited by Altuntaş, 2013: 31). Hakansson and Ford (2002) defined network as “ a structure where a number of nodes are related to each other by specific threads” (Hakansson and Ford 2002: 133; cited by Altuntaş, 2013: 31). Network theory indicates industries through three key constructs: actors, resources and activities. Companies’ network positions and roles depend on their relationships with other companies (Möller, 1999: 423)

Möller and Halinen (1999) proposed a network management framework that is used for discussing the current managerial implications of the emerging industrial network theory (Möller and Halinen, 1999: 413). They states that it seem to be businesses “entering an new era where traditional markets are being replaced by networks of interrelated firms and other actors” (Möller and Halinen, 1999: 414). They described and represent the vertical and horizontal business relationships forming the network of organizations with the actors and major driving forces of the network those are positioned at the outer corners of the figure 2 below (Möller and Halinen, 1999: 415).

Figure 2: Business Relationships and Networks



Source: Möller and Halinen, 1999: 415

Companies form both vertical and horizontal relationships that create networks; vertical relationships including relationships with suppliers, distributors and customers where horizontal relationships containing relationships with competitors and noncommercial actors. Companies are increasingly outsourcing their business activities that creates strong supplier partnerships forming complex supply chain networks with several tiers of suppliers. In response to global competition, total quality management and customers' demand delivery times to be shorter and more flexible at very competitive prices, companies creates supplier networks where each member specializes in particular activities with the help of logistics. These networks offers cost-efficient better products and services and with shorter delivery terms. The globalization of competition has also increased the difficulty of getting access to end customers. To reach the end customers, companies strengthen their distributors partnership where the access and information about the end customers are shared. Besides the management of vertical relations with suppliers, distributors and customers, management of horizontal relationships started to be important (Möller and Halinen, 1999: 414). Despite the difficulties especially strategic alliances, a type of horizontal relationship, are increasing ; due to the increasing cost of operations, requiring very high investments in marketing and distribution, technological complexity, needing to be more knowledge intensive have led companies to seek strategic alliances. Competitors with whom they have joint interests in some markets and/or product fields e.g. the alliance between GM and Toyota, coalitions establishing industry standards or to compete against such major players as Microsoft or coalitions against other coalitions e.g. One World by British Airways, American Airlines, and Quantas as anchors versus Star Airlines by United Airlines, Lufthansa, and Singapore Airlines as anchors) are few examples of alliances (Möller and Halinen, 1999: 415, 416).

Smith in his presentation pointed the ten big claims for networks as listed below (Smith, 07.11.2017);

- “Networks create social capital for individuals and communities”
- “Networks create status and category differences in markets”.
- “Network forms of organization are an alternative to markets and hierarchies”

- “Networks are an identifier feature of “innovative regions” like Silicon Valley”
- “Networks are the locus of innovation in high-technology industries”
- “Networks create trust and increase forbearance”
- “Networks inspire conformity in thought and action”
- “Networks shape the diffusion of Technologies” and “organizational practices”
- “Networks create individual tastes and preferences”
- “Networks ‘embed’ transactions in a social matrix, creating markets”

One of the most popular form of cooperation is that of a network of enterprises are clusters (Bylok et al., 2016: 173). Porter determines that a cluster is a form of network (Porter, 1998b: 242). A Cluster can be described “as the geographical concentration of enterprises connected by economic ties” (Bylok et al., 2016: 173). Porter describes clusters in his various articles, according to him clusters are;

“A business cluster is a geographic concentration of interconnected businesses, specialized suppliers, service providers, firms in related industries and associated institutions (for example, universities, regulatory agencies and trade associations) in particular fields that compete but also cooperate” (Porter, 1998b: 213) and

“Concentrations of highly specialized skills and knowledge, institutions, rivals, related businesses, and sophisticated customers in a particular nation or region” (Porter, 2000: 27).

Some authors describe the cluster with agglomeration approach as “the concentration of mutually tied enterprises on a specific territory that are capable of synergetic processes where an important role is played by administration and local and regional authorities” (Crouch and Farrell, 2001; Maillat, 1991; Marschall, 1930 cited by Bylok et al., 2016: 173). The other approach defines cluster as an industrial complex; “the concentration of co-dependent enterprises on a specific area that operate in the same or related industrial sectors or services by which the mutual ties strive towards the improvement of competitiveness” (Drejer, Kristensen and Laursen, 1997; Porter, 1998a, Rosenfeld, 1997 cited by Bylok et al., 2016: 173). Another definition perceive a cluster as “a hub of knowledge in which cooperation take place between research units and the enterprises with the aim of creating new knowledge and innovative solutions” (Gordon and McCann, 2000; Maskell and Lorenzen, 2004 cited

by Bylok et al., 2016: 173). On the other hand OECD defines clusters as following; “A cluster as a social network based on social relations, trust and social relations, trust and social ties, sharing resources that facilitate cooperation and the creation of innovations” (OECD, 1996 cited by Bylok et al., 2016: 173). Another definition of a cluster by Knop is as “a group of entities consciously operating in a specific ecosystem concentrated on a specific territory and around a defined specialization” (Knop, 2013 cited by Bylok et al., 2016: 174).

There are two fundamental elements in the definition of cluster (Manzini and Di Serio, 2017: 366-367)

1. Companies must be linked in some way in a cluster, these links can be vertical (buyer and seller chains) or horizontal (complimentary products or services) and both of these links involve relationships and networks that provide benefits for the companies involved in a cluster.
2. Geographic concentration, co-location of companies expands the value creation that emerge from networks.

Most of cluster studies subject of geographical concentrations of employment and/or co-locations of firms several studies discuss the agglomeration advantages of clusters while missing to measure linkages including the analysis inter-firm relations. Logistics companies act as intermediaries that connect all the stages of supply chains while logistics companies have heterogeneity among themselves ranging from dealing with material flows to those managing all the logistics services (Beckers et al., 2018: 179).

Clusters concept is more than geographic proximity that emphasizes relationships and social ties between actors in the cluster population. Clusters facilitate networked collaborations; “The personal interaction, frequent communication and a sense of common identity that can arise out of a cluster’s diverse networks, from project cooperation to cluster organisations and networking arrangements”. While some of the relationships in clusters are formal, most of them are being founded upon trust over a long time that fosters the cluster dynamics (Hansen and Clasen, 2010: 9).

Manzini and Di Serio (2017) offered an approach for main dimensions of the cluster concept in three fields; strategic management and operations management, economic and geography. They proved each of these areas are unique in conceptual

bases and they are complementary and have few topics in common. They confirmed that Porter's definition of the cluster in his study of "Cluster Growth Theory" became the standard because authors in the three areas referring to his definition of cluster. According to them concepts correlated to the concept of cluster are agglomeration, agglomeration of firms, industrial agglomeration, agglomeration theory, industrial districts. They state that concepts like e.g. strategic group, supply chain are the translation of the cluster concept for each of the areas. Eventually, a strategic group is an agglomeration competitors but they share some beliefs and values in common, also the supply chain can be seen as an agglomeration of suppliers and customers (Manzini and Di Serio, 2017; 385).

Newlands (2003) sought to separate processes of cooperation and competition in clusters by comparing different industrial clusters theoretical approaches. Newlands reviewed the different theoretical approaches of clusters and identified five traditions and noted that some arguments overlap. **Standard Agglomeration Theory;** Marshall's (1890, 1920) studies of industrial organization helped to develop what was to become standard agglomeration theory. Following to his studies number of writers contributed to the theory; Scitovsky (1954) identified a further category of 'pecuniary external economies', Perroux (1955) is famous for growth poles theory and Chinitz (1961) applied the notion of agglomeration economies to the economic development of New York and Pittsburgh. More recently Porter (1990) makes up many of the key relationships within his famous 'diamond', finally Krugman (1991, 1995) has emphasized the development of external economies. In the writings of the '**Californian school**', changes in market and technological conditions lead to increase in firms' transaction costs and these costs varies systematically especially with the distance. Thus, agglomeration is the result of the minimization of these types of transactions costs in a situation (Scott & Storper, 1986; Scott, 1988; Storper, 1989). **Flexible Specialization, Trust and Untraded Interdependencies;** "modern industrial district theory emphasizes the interdependence of firms, flexible firm boundaries, and the importance of trust in creating and sustaining collaboration between economic actors within the districts" (Brusco, 1982, Piore & Sabel, 1984). "The collaborative networks of (mostly) small firms and supporting institutions permitted the establishment of trust between actors and trust is more likely to be

sustained in geographically concentrated networks than more dispersed ones” (Belussi, 1996). “it is probably not a coincidence that the most successful districts have tended to be the most racially and culturally homogeneous” (Harrison, 1992: 479). According to Granovetter (1985), trust which actors can be relied upon arises from the experience that is formed repeating interactions between companies and other actors likely to depend on proximity. **Innovative Milieux: The GREMI Group**, A large literature on the schools of thought on the relationship between innovation, high technology industry and regional development has been spawned (Saxenian, 1985; Castells & Hall, 1994; Storper, 1993). The most discussed is the relationship between research universities and regional development; Stanford in the case of Silicon Valley and MIT in the case of Route 128. **Innovative milieu; the GREMI group** (Groupement Europe’ en des Milieux Innovateurs), the key theoretical concept of the GREMI group is that “clustering enables firms to benefit from a collective learning process”, operating “through skilled labour mobility within the local labour market, customer–supplier technical and organisational interchange, imitation processes and informal ‘cafeteria’ effects” (Camagni, 1991: 130). This process draws upon “an intricate network of mainly informal contacts among local actors ... made up of personal face-to-face encounters, casual information flows, customer–supplier cooperation and the like” (Camagni, 1991, p. 131). **Institutional and Evolutionary Economics** is another approach derives from institutional and evolutionary economics (Nelson and Winter, 1982; Amin and Thrift, 1992; Amin, 1999). “Standard economic theory conceptualizes competition as the location on a production possibility frontier that maximizes a firm’s comparative advantage given an existing set of factor prices”. This approach views competition as a process of economic change extended by constant technological change. Thus, if innovation is the driver of competition, a firm (or locality) may possess technologies which are superior to those of others regardless of the level of factor prices (Newlands 2003; 522-525). Newlands compare the different theories as a schematic summary in Table 1 below.

Table 1: A Schematic Representation of The Principal Theories of Industrial Clusters

	Sources of Advantage	Degree of 'localness'	Competition and Cooperation	Policy Implications
Standard agglomeration theory, from Marshall onwards	Firms share a 'commons' of labour supply, infrastructure, and business services	External economies most likely where common services are concentrated locally—but not confined to these circumstances	Advantages to firms in clusters derive from cooperation but firms continue to compete	No obvious policy implications unless markets fail to provide the 'commons'
Transaction costs: the 'Californian school'	Transaction costs are lower for firms in clusters, a cost advantage which is to outweigh any assumed increase in production costs	Certain transaction costs reflect the maintenance of personal contact; these will usually vary with distance	Some transaction costs can be reduced by cooperation but, in general, this is not important	Markets may typically be assumed to coordinate transactions successfully within clusters
Flexible, specialization trust and untraded interdependencies	Firms within networks of trust benefit from the reciprocal exchange of information	Trust is more likely to be sustained in geographically concentrated networks	Firms within clusters compete with each other, often on quality rather than price, but there are strong cooperative relationships	Social and familial networks are key to the development of trust but national economic, legal and policy norms are relevant
Innovative milieu: the GREMI group	Milieux provide the frameworks and necessary coordination for successful innovation	Institutions and practices conducive to innovation depend partly on personal contact; thus more common within localities	Balance between competitive and cooperative firm relationships not well specified but presumption that the latter are important	Policy-makers have a role in forming and supporting networks of firms, research institutes and so on
Institutional and evolutionary economics	Clusters reflect the impact of past choices and the subsequent development of reinforcing institutions	Particular trajectories can develop at a number of spatial scales	Technological change, along particular paths, is a driver of competitive processes	Policy interventions are only one—and frequently a minor—determinant of how innovative trajectories develop

Source: Newlands 2003; 526.

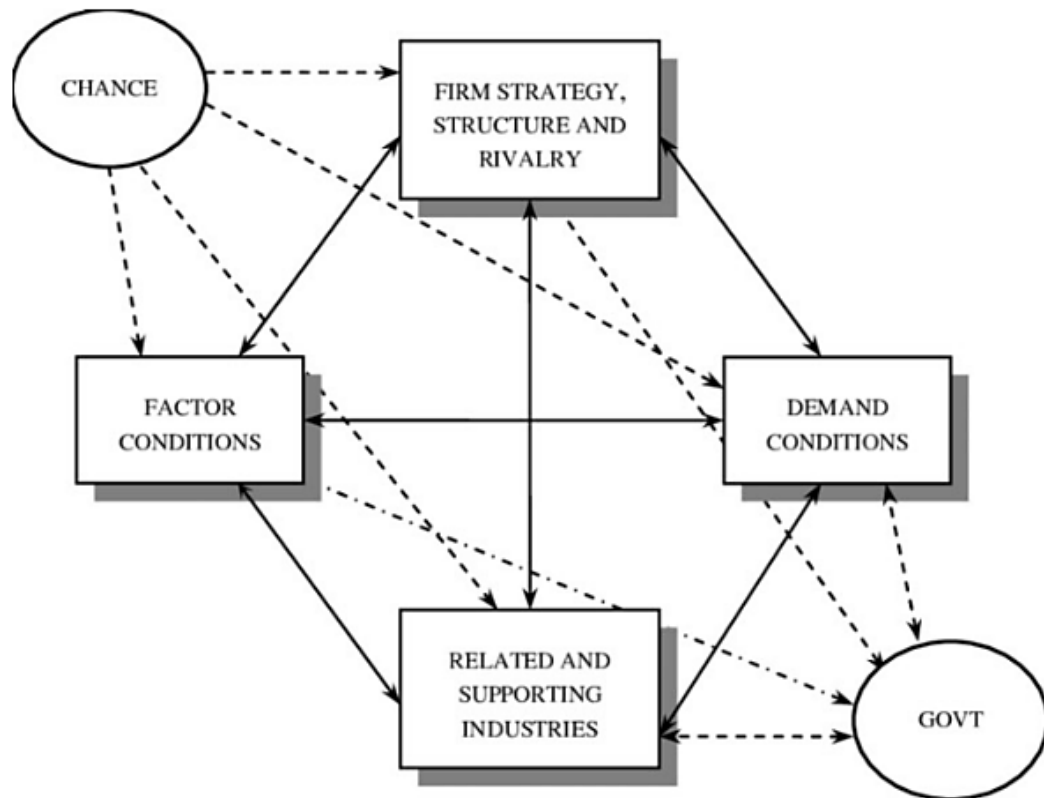
Clusters provide several benefits to companies; they help companies to access to the knowledge that is important for developing new products, markets and partners and a wider client base. Clusters generate and maintain a competitive advantage for the enterprises that participate in them (Meyer-Stamer, 1999; Porter, 1990 cited by Bylok et al., 2016; 173-174;). According to the various definitions of a cluster, the

most important features and advantages of clusters (Bylok et al., 2016: 174; Hansen and Clasen, 2010: 8; Porter, 2000: 15):

- Chosen specialization at a geographically separated location
- Companies cooperate for the chain of common values
- Synergy of cooperation
- Horizontal and mutual ties and interactions based on trust
- Creation and management of knowledge and innovations and new competences
- Clusters are a driving force for increasing exports
- Clusters are facilitator for attracting foreign investment
- Clusters play a crucial role for driving competitiveness and job creation, thus a large role in economic activity regionally.
- A generator of employment and stimulus for growth in other sectors

Porter's Diamond describes the dimensions defining the level of dynamism in a cluster (figure 3). Clusters can improve the factor conditions that are the companies' inputs (capital, specialised labour, infrastructure, technologies, research and education) needed for their operations. Intense competition, simultaneous investments, innovation and the collaboration opportunities increase pressures on companies to innovate so such conditions influences firm strategy, structure and rivalry conditions. Clusters enable companies to lower the costs and the ability to outsource non-core activities by the presence of advanced, specialized suppliers and others in the related industries. Thus, the intense demand conditions in clusters increases the competitiveness of the companies enable them to growth and facilitate innovations (Hansen and Clasen, 2010: 8).

Figure 3: Porter's Diamond



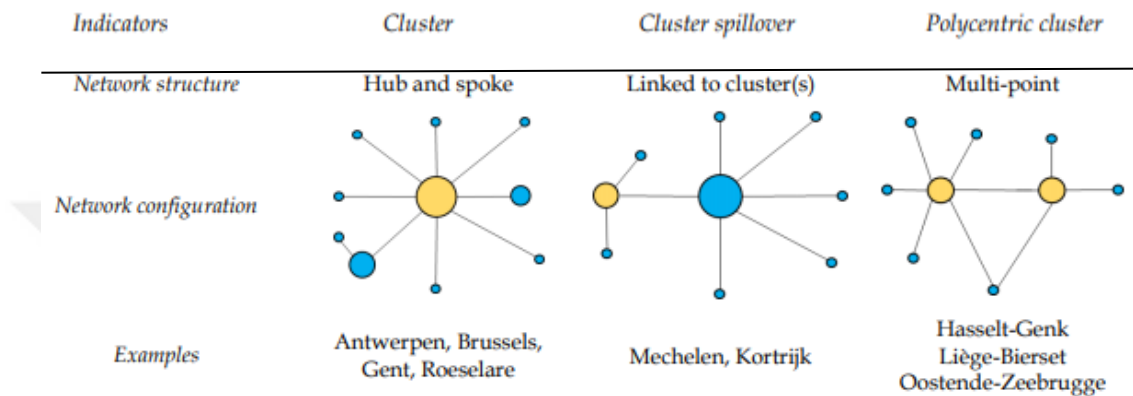
Source: Porter, 1990; Hansen and Clasen, 2010: 8

Clusters play an important role in economic activities than usually its is acknowledged. More than 3000 clusters have been identified in Europe which is 23% of the overall European Union economy and so it is predicted that %46 of European employees work in clusters, it is even reaches %60 in some regions. The most known clusters are City of London financial services, luxurious fashion goods in Italy, the biopharmaceuticals in Denmark, automotive production concentrations in Germany (Ketels and Protsiv 2016: 1).

Markusen (1996) determined three kinds of industrial districts based on roles of the companies within the districts; hub and spoke districts, stellite platforms and state anchored districts (Beckers et al., 2018: 180). Beckers and others (2018) identified three different types of logistics concentrations; cluster, spillover cluster and polycentric cluster (figure 4). They defined logistics cluster as concentration of logistics employment that serve as the centre of a large region, in addition to large clusters -characterized by employment intensity and many internal and external relations- spilled and multi-centred clusters have been identified. Spillover clusters

appear in the nearby hinterland and mostly directed to a big cluster nearby, polycentric clusters have less prominent co-location than the first two types but they play a crucial role in tying the companies in the region and to the overall network (Beckers et al., 2018: 190).

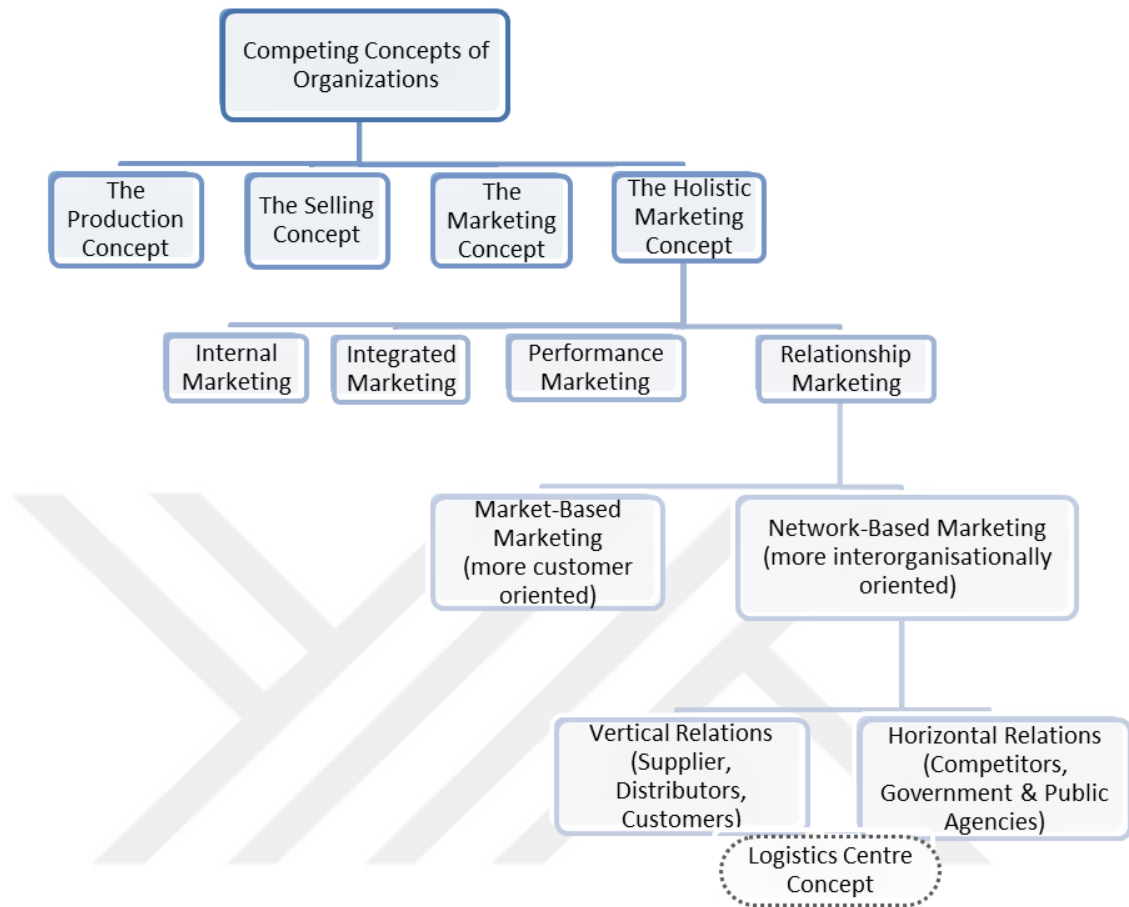
Figure 4: Typology Of Logistics Concentration



Source: Beckers and et al, 2018: 189.

Taking all the discussions above theoretical background of logistics centres can be evaluated as follows; logistic centres are the clusters that are the most popular form of industrial networks and they are formed by the vertical and horizontal business relationships. Companies within logistics centre should use the network-based marketing tools with industrial market approach to facilitate the cooperation between the market actors. As a summary; the conceptual scheme for logistics centres is represented in the figure 5 below.

Figure 5: Conceptual Scheme of Logistic Centres



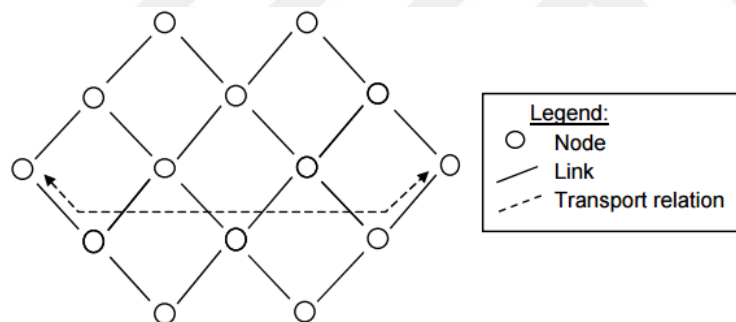
Source: Developed by author from Altuntaş, 2013: 36; Kotler and Keller, 2013: 39, 40, 41; Möller, 2000: 29, 45; Möller and Halinen, 1999: 415, 416; Notteboom and Rodrigue, 2009b:12; Porter, 1998b: 213, 242; Porter, 2000: 27).

1.2.1. Logistics Centres And Freight Transport Network, Hub And Spoke System

To over time there have been changes for producing, storing and moving the goods which have been important for the development of logistics centres. Before the definition of logistic centre, an overview of freight transport network and hub and spoke sytem will be given briefly as logistics centres act as nodes and when interconnected through transportation it links suppliers and consumers (Du, Bergqvist, 2010: 3).

Freight transport systems are seen as moves of products between points of origin and destinations, generally defined as nodes. Transshipment between vehicles and traffic modes and value added logistics activities, such as consolidation, sorting, packaging, storage are carried out in nodes. The globalisation of supply chains made attractive for shippers to outsource value adding services to logistics service providers at nodes. A transport network contain nodes and links as shown in Figure 6; the nodes can be defined as “a source, a sink or a transshipment node, depending on the transport assignment, the links represent transport and transfer activities connecting nodes”. The transshipment nodes with a central role in the network are specifically called airports, seaport, station, hub, dock, gateway and links are served by vehicles and vessels by using the infrastructure. By connecting all sources and sinks with a sufficient number of transshipment nodes, a transport network can be defined as shown in Figure 6 (Roso et al., 2009: 339, 341).

Figure 6: A Transport Network Model and a Transport Relation



Although Logistics centres can be considered as nodes in the logistics chain, the node is actually equivalent to a “stop” in the chain but the idea behind the logistics centre/dry port concept is to make the flow smooth, not to stop. Logistics centre’ mission is not to stop the flow in the node instead make the node seamless, and ensure to make the intermodal transport chain seamless (Roso and Lumsden 2009: 97).

“A hub is strategically located at an airport utilized as a collection-distribution centre for passengers and serviced generally by a single carrier” defined by Cavinato in 1989. Cavinato also stated that, the hub concept became primary logistics model used by the leading international logistics service providers in the 1990s, such as DHL, UPS and FedEx. Hubs are major terminals where loads come from various origins are consolidated and these consolidated shipments are redirected to their respective

destinations through radial links (spoke) (Cavinato, 1989 cited by Song and Panayides, 2015: 276).

Song and Panayides (2015: 276) stated that:

“Hub concept is often introduced under various terms mainly in accordance with its storage and transportation functionality: eg logistics centre, logistics zone, freight terminal, distribution centre, warehouse, intermodal terminal, international transport terminal, intermodal terminal and so on”.

Europlatforms (2004: 3) describes the logistics centre as:

“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”.

Lugt and others in SUTRANET (Sustainable Transport Research & Development Network in the North Sea Region) project in 2007 defined logistics centres as below;

“A defined area within which all activities relating to transport, logistics and the distribution of goods – both for national and international transit, are carried out by various operators on a commercial basis”. They point out that integrated intermodal logistics centres have two functions (Sutranet, 2007: 1);

- A node in the transport chain
- A location for (value added) logistics activities

1.2.2. Logistics Centre Evolution and Cluster Formation

Logistics clusters are a specific type of industrial clusters. Sheffi (2012) defined logistics clusters “as the geographical concentration of firms offering logistics services, the logistics functions of manufacturers and retailers and firms with logistics intensive operations” (Sheffi, 2012: 55). Logistic clusters may include one or more logistics parks that are owned and managed by either private or public authorities e.g. port authorities, airport authorities etc. Logistics parks facilitate benefits of clustering as companies close to each other that facilitates interfirm activities (Rivera et al., 2016: 285).

In the late 1950's physical distribution management began to be considered as an important business activity and 1960's logistics was a synonym for physical distribution. In 1980s global firms have started reducing their number of national warehouses and consolidated them into regional distribution centres that are located near airport or seaport, so that raising demand can be met with agility, reliability and flexibility. In 1985 Jones and Riley present the term of Supply Chain Management as a tool for managing inventory to gain competitive advantage. After all companies started to outsource inventory management and logistics centre concept rised with logistics outsourcing concept (3rd Party Logistics) (Rimienė and Grundey, 2007: 88).

Since the end of 1980s international firms' logistics strategies based on two ways: the use of centralized inventories and/or postponement of final assembly. They have been consolidating their number of national warehouses them into regional distribution centres that serve a much wider geographical area to reduce total inventory requirements and so enhance their competitiveness (United Nations, 2002:6).

By the 1990's in Europe, the dynamics of logistics networks have created logistics zones development and they are now well developed in Europe. The first such zones were built in France, near Paris. In the late 1960s and 1970s, logistics centres appeared in Italy and Germany and in the 1980s and 1990s, the number of such centres multiplied in France, Germany, Italy, the Netherlands, Belgium and the United Kingdom (Notteboom and Rodrigue, 2009b: 12).

Emergence of logistics centres and containerization process throughout the world starts at the same period of time. The increasing demand for maritime transport in the intermodal transport chain required to increase the capacity of the ships to reduce unit costs and in order to take advantage of economies of scale. In this case, to develop the performance of sea ports some logistics facility structures were established behind the ports (Roso et al., 2009: 340). Dry ports are become gates of sea ports extending to the land and shippers consider the dry ports as an interface of the sea ports. Dry ports can be established very close, close, medium or further away to the sea ports. Dry ports increases the capacity of sea ports and reduces density of traffic on roads connecting dry ports to the sea ports (Violeta, 2007: 523, 524).

Logistics cluster, that means that all facilities in relation to the logistics gathered in the same area, is one of the most important strategies in regions' economic

development plannings. For the purposes such as using the land efficiently, the reduction of city traffic, regional development and providing employment because it is desirable for businesses to gather in logistics centres. According to Notteboom and Rodrigue (2009b) inland terminals have evolved from simple intermodal locations to logistical zones -cluster formation of logistics activities- with the range of functions varies from simple cargo consolidation to advanced logistics services (Notteboom and Rodrigue, 2009b: 11). They stated that the evolution of inland freight distribution can be seen as a cycle in the ongoing development of containerization and intermodal transport (Notteboom and Rodrigue, 2009b: 2).

Logistics Centre evolution process can be expressed with “a three-dimensional structure in scope, scale and time. Between each stage there are some requirements to fulfil in order to reach the next stage”. Figure 7 below summarized these requirements of the evolution process. “Scale” indicates the degree of specialization of the logistics centre, while the “scope” express the scopes of the services has been provided. However, logistic centres developed in three stages that can be specified as functionality, value adding and comprehensiveness (Du, Bergqvist, 2010: 18,19);

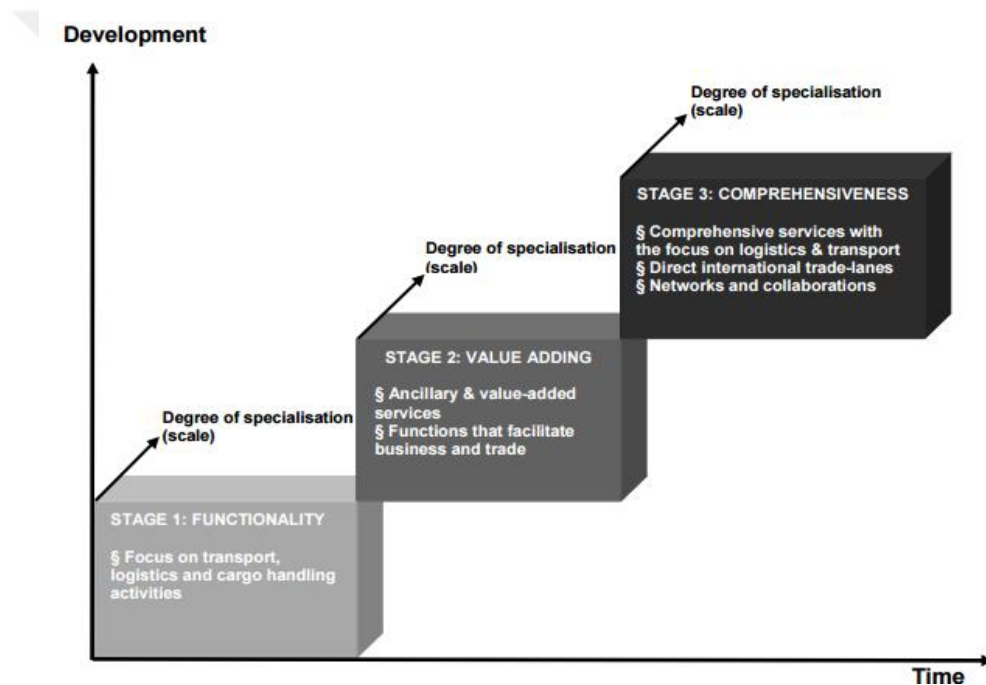
In the first stage, logistic centres focuses on functional processes, such as cargo handling, consolidation, and distribution. They are built near to airports or sea ports and usually focused on transshipments. Administrative and operational functions are important in terms of improving functionality of the logistics centre. Port of Singapore, the world biggest transshipment hub, can be an example for this stage.

In the second stage, the main aim of logistics centres in the phase of adding value is to promote economic growth by implementing policies that help to facilitate regional trade and reduce bureaucracy. Operations such as product processing, purchasing, supplier management and customer service functions are the value-adding activities in these centres. For example, the Shangdong Gaijiagou Logistics Park is developing at this stage.

In the third stage, besides having all the characteristics of the previous two stages logistic centres has achieved an important position in international trade by developing its position. A wide range of services offered for large international transport volumes, at this stage, the priority target is facilitating the flow on the supply chain with the help of the supportive and complementary service companies.

“Integration with customers’ supply chain and intermodality development to improve the environmental performance is also one of the features at this stage”. The services that are offered is not limited with only the transportation and logistics sector, at the same time logistics centres include sectors such as financial institutions, research institutions e.g.. The Hong-kong and Shenzhen regions are developing at this stage. With the port regionalization progress and hinterland connection development new trends are developing; some of the hubs evolve to ‘knowledge based global supply chain centre’ and others ‘international goods movement centre’.

Figure 7: The Evolution Process of Interational Logistics Centre



Source: Du, Bergqvist, 2010:19

In summary, table 2 compares the stage of logistics centre evaluation characteristics below.

Table 2: Logistic Centre Evaluation Characteristics

Stages	Aim	Main operations	Example
1. Functionality	• to improve functionality	• cargo handling, • consolidation	• Port of Singapore
2. Value Adding	• to facilitate regional trade	• product processing, • supplier management, • customer services	• Shangdong Gaijiagou Logistics park
3. Comprehensiveness	• to facilitate the flow of the supply chain	• integration with supply chain • development of intermodality • improving environmental performance	• Hongkong and Shenzhen Regions

Source: Author adapted from Du, Bergqvist, 2010: 18,19.

UN report indicates three different generations of Logistics centres evaluation. It is based on the scope and extension of logistics activities as in Table 3. Logistics firm in logistics centre behind a port area are able to perform basic value-added service and carry out other value-added logistics services at the same time. That is, logistics centres provide not only traditional activities such as storage, but also value-added logistics services such as labeling, assembly, semi-manufacturing and customizing. Logistics centres combine logistics and industrial activities effectively in major port areas to create country specific and/or customer specific variations or generic products (United Nations, 2002: 25, 26).

Table 3: Generations of Logistics Centres Evaluation

1960s-1970s	1980s-early 1990s	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	Order processing	Order processing
Picking	EDI Reporting	EDI Reporting
	Picking	Picking
Order assembly (Re)packaging	Order assembly (Re)packaging	(Product)subassembly
	Stretch-shrink-wrapping	Order assembly (Re)packaging
		Stretch-shrink-wrapping
Palletizing/unitizing	Palletizing/unitizing	Palletizing/unitizing
Label/mark/stencil	Label/mark/stencil	Label/mark/stencil
Shipping Documentation	Shipping Documentation	Shipping Documentation
	Outbound transportation	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 Custom invoicing

Source: Bolten, 1997: 19.

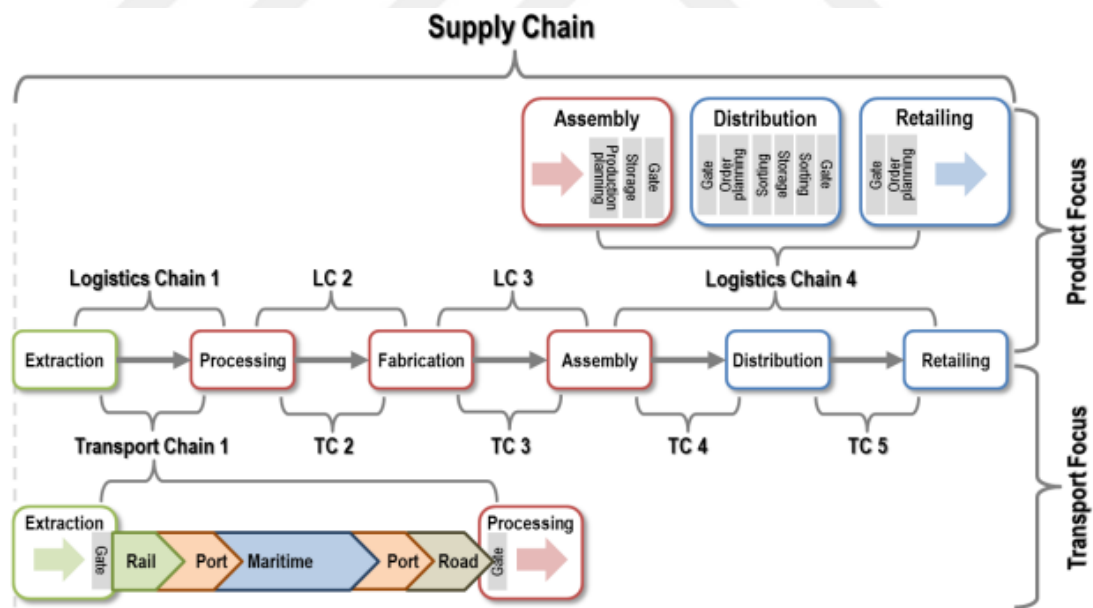
SECTION 2

AN OVERVIEW OF LOGISTICS CENTRE CONCEPT

In this section of the research, existing literature regarding logistics centre concept by focusing on its definition and development phases, its types and bottlenecks of logistics centres establishment and practices in the World and Turkey have been reviewed by conducting literature review.

“Logistics is a procedure to optimize all activities to ensure the delivery of cargo through a transport chain from one end to the other. Logistics chain consists of activities that facilitate the movement of goods from supply to demand” (United Nations, 2002: 21, 22). A logistics chain (figure 8) could include a product that has been assembled into a final good, brought to a distribution centre to be sorted and temporarily stored and delivered to a retail store (Rodrigue, 2012: 5).

Figure 8: The Scope of a Supply Chain, Logistics Chains and Transport Chains

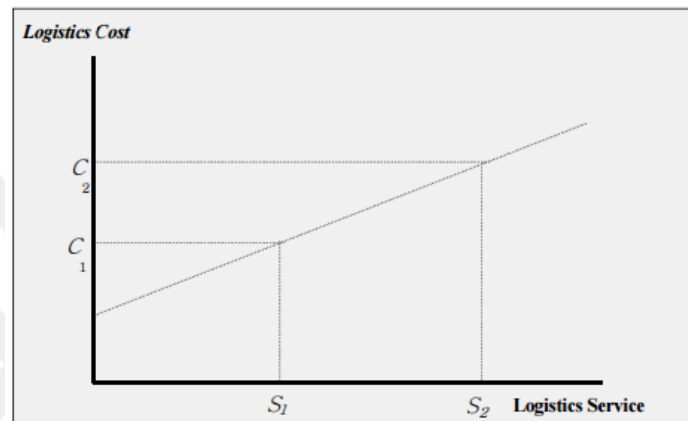


Source: Rodrigue, 2012: 5.

Logistics chains involve transport chain requires the use of ports and logistics centres for transferring the goods between different transport modes and for added value services. The logistics costs, mostly influenced by public policy, cover about 10-

30 percent of countries' GDPs. The percentages may differ from country to country, usually lower in developed countries and much higher in less developed countries. In general, logistics systems improve not by lowering logistics costs, but rather by achieving better service level (c^* , s^*), at a lower cost level, by shifting the costs-service curve itself (A->B) as shown figure 9 below (United Nations, 2002: 22).

Figure 9: The Relationship between Logistics Costs and Logistics Service



Source: United Nations, 2002: 22

Logistics is rather young industry that has progressed in recent years in Turkey. Turkey tends to become and already is a bridge between East and West in context of international trade and logistics. Many authorities claim that Turkey will be regional logistics base. Growth rates in the logistics sector have already attracted many international companies (PwC, 2010: 44).

Sustainable, efficient and safe modern logistics system is necessary for all countries that meets customers' demands. Some policy recommendations based on the analysis of best practices in different countries are;

- (a) upgrade existing infrastructure to achieve an interconnected network with properly planned and designed interchange facilities, multimodal transport hubs, and logistics centres;
- (b) speed up modernization of transport and logistics systems and equipment;
- (c) formulate new logistics policies that improve the transport regulatory framework (Asian Development Bank, 2012: 68).

Logistics centres first appeared nearly 40 years ago in USA and spread around the world, along with the need efficient, sustainable logistics systems demand for logistics centres growing accordingly (Rimienė and Grundey, 2007: 87). Countries and regions develop specific policies to increase commercial potential and acceleration of the movement of goods. Among the most prominent ones of such policies is the establishment of a logistics centre (Meidute, 2005: 107). Successfully developed Logistics Centres have benefits for both the logistics sector the region it is located (Du Jun and Bergqvist, 2010: 3).

- benefits for the actors in logistics and transport system;
 - improvement of the transport infrastructure
 - improvement of logistics market conditions
 - improvement of cost efficiency
 - improve logistics systems quality
- the region benefits
 - better collaboration among public authorities and private sector so they can attract and facilitate international trade and investments in the region,
 - improve environmental performance of logistics systems in the region
 - congestion in roads, accidents, pollution and road maintenance costs decrease by reduced number of trucks on the roads (Roso, 2008: 285, 286).

2.1. FACTORS SHAPING LOGISTICS CENTRE CONCEPT

When the related literature is searched, it is revealed that main concepts that shape develop in parallel with the logistics centre concept is supply chain management, intermodality, sustainability and development of ports and 3PL services (outsourcing the logistics activities).

2.1.1. Supply Chain Management and Logistics Centres

Logistics centres acts as a node to link suppliers and customer in the supply chain. Logistics centres concept develop in paralel with the supply chain management concept, as the demand and complexity across the supply chain increases, it requires value-added, time-based logistics patterns continuous development to meet customer needs (Du Jun and Bergqvist, 2010: 3). Supply chains will always seek to flow through the most cost effective, efficient and reliable channels. Making the supply chain more efficient is an opportunity to add value, reduce costs and maximise sustainability (DPWorld, 2016: 2).

The establishment of global supply chains has made the actors in the freight transport industry (shipping companies, terminal operators and logistics service providers) to examine supply chains as a whole (Notteboom and Rodrigue, 2009b:1,2).

The trend of Just-In-Time type production and Supply Chain Management approach in the manufacturing sector has been widely accepted worldwide. They require more time-based production, better inventory management, shorter lead time in the distribution channel. Therefore ports and logistics centres are needed to create value through VAL services and improved customer service (UN, 2002: 61).

Logistics centres are important nodes which can increase the value added services in the logistics value chain, thereby supply chains' competitiveness increases. Logistics centres can have different roles; they can be specialized in particular products, certain markets or focus on certain markets in a global logistics network (Eckhardt and Rantala, 2012: 613).

Responsiveness and agility in the supply chain management has raised its significance due to the trend of many markets. However, cost, inventory minimisation and rapid flow of the goods through the supply chain are major keys to achieve the objectives. Logistics centres in a distribution network creates opportunities to increase both the cost-efficiency and customer responsiveness of supply chain. The activities like packaging and labelling, procurement and inventory control, repair, assembly held in Logistic centres directly impact on both the supply chain cost and the lead time. Therefore logistic centres increasingly becoming important within the supply chain (Eckhardta and Rantalab, 2012: 613).

In order to optimize the trade off between cost efficiency and responsiveness of the supply chain, the elements of the supply chain is needed to be integrated. Logistics hubs are enabler for such integration as they gather the “key actors, manufacturers, shipping lines, air cargo companies, 3PLs and a host of logistics related service companies in a single location” (Fernandes and Rodrigues, 2009: 78).

2.1.2. Ports and Logistics Centres

Notteboom (2000) defines a seaport as: “A seaport is an area with maritime and hinterland access that has developed into a logistics and industrial centre, playing an important role in global industrial and logistics networks”. As understood from the above description; ports are not only transition points for freight, they are also connection point between the maritime network on the seaside and the hinterland network on the landside. Some logistics activities and value added activities can take place in ports. Therefore 3PL companies and manufacturing firms’ logistics departments increasingly tend to locate in clusters usually linked or close to the ports (Sutranet, 2007: 1).

According to UNESCAP, “there is a positive correlation between cargo flows at the logistics centre and the number of ships calling at the port” (Du Jun and Bergqvist, 2010: 4). Logistics centre’s history can be traced back to the ports where goods are handled and stored just like logistics centres. Today port and logistics centre have been developing together, some ports even develop logistic centres themselves to support port functions and attract customers. They both also considered to be enhancer of regions’ competitiveness. Therefore today there are also discussions if ports can be regarded as logistics centres. Some ports can be regarded as logistic centres depending upon what facilities they perform. Main purpose of ports are mainly loading and discharging of ships but if they perform logistic activities like i.e. warehousing and handling services within the port, these ports can be regarded as logistics centres as well. Therefore the Logistics Centres evolution process is facilitated by the development of port-hinterland linkages (Du Jun and Bergqvist, 2010: 3, 4).

Growing international trade results in growth in transportation namely in container traffic and port facilities consequently. Increases in container shipping expose the necessity of the logistics centres in ports and encourages the use of logistics centres (UN, 2002: 60).

Seaports are important nodes in the intermodal transport; their focus on cargo handling has been replaced with a range of logistic activities that makes them more active in the logistics chain. At the same time, there has been a trend towards offering door-to-door transport solutions rather than port-to-port that changed port's organizational and technological structures (Robinson, 2002; Paixão and Marlow, 2003 cited by Roso and Lumsden, 2009: 90). To be able to offer door-to-door transport solutions ports need to improve their links with the hinterland, improvements in seaport inland linkages will become a crucial for the seaports' competitive advantage (Roso and Lumsden, 2009: 88). Therefore many seaports and shipping lines integrate vertically to improve hinterland links (Notteboom and Winkelmanns, 2001: 87).

European Logistics Centres (ELCs) located in the Netherlands can be considered as the examples of logistics activities that are linked to a port in the world. It is a major trend for both multinationals and for medium-sized companies in European logistics. Many of them centralize their Europe-wide distribution by setting up their logistics centres to reduce logistics costs, increase sales, better product availability, quick response, improve competitive position, savings on labor force and infrastructure investment. Distriparks where the logistics centres have clustered in are the "Port of Rotterdam's response to the growing demands on shippers and transport service providers for just-in-time distribution at lower cost" (United Nations, 2002: 41).

These days, shippers and other port customers are becoming increasingly demanding and ports are evolving from providing traditional cargo-handling to providing value-added logistics services as an integral part of their customers' supply chain. All in all, providing value-added services build a sustainable competitive advantage for ports and they need to achieve value differentiation to achieve competitive advantage (United Nations, 2002:20,21).

Ports and logistics centres can achieve synergistic benefits as logistics centres can attract more cargo, it is advantageous if a port connected to a logistics centre. Ports

can therefore benefit both from the integrated range of services that logistics centres provide and increased cargo flow through the logistics centre. (United Nations, 2002: 22).

2.1.3. 3PL Services and Logistics Centres

The term third parties refers to outside parties can be defined as performing non-core activities which are not performed by the firm (Ellram and Cooper 2002:1). There has been a growing importance for outsourcing of logistics activities to third party logistics service providers because there is an increasing recognition that competitive advantage doesn't just come from the product but also comes from the delivery process (Razzaque and Sheng, 1998: 89).

The trend towards outsourcing of logistics services increasingly extends to response for lean production and distribution systems. Using 3PL in almost every aspect of logistics functions has been increasing as the demand for stability, consistency and flexibility continues. Table 4 below shows the activities/services that 3PL companies provide. 3PL companies provide global businesses many advantages, such as (UN, 2002: 74) ;

- reducing the need for capital investment,
- reducing working capital needs,
- enabling penetration into new markets more quickly and with less capital,
- responding to the demand for stability, consistency, and flexibility.

Table 4: Range of Services Offered by 3PL Providers

Classical	Advanced Services	Full Services
Warehouse management	Pick and Pack	Order Processing
Transportation	Assembly/Packaging	Order Planning
Dispatch	Returns	System/IT
Delivery Documentation	Labeling: price and barcode	Invoicing
Customs Documentation	Stock Account	Payment Collection
		Logistics Consulting
		Shipment tracking
		Materials Planning

Source: OECD, Logistics Integration in the Asia-Pacific Region, 2000.

Logistics centre concept developed in parallel to 3PL services as companies' demand and requirement in integrated services is increased (Du Jun and Bergqvist, 2010: 4). According to UN report the quality of 3PL's services is considered to be a significant factor for attracting new logistics centres in the countries. Ports must attract and develop customized logistics service providers in order to attract global firms to set up their logistics centres in the region. Existence of competitive 3PL service providers lead and shapes the building of efficient logistics centres in ports. The value of 3PL cannot be overestimated in the development of logistics centres and the future success of the logistics centres is essentially dependent on the 3PL efficiency (UN, 2002: 61, 74).

2.1.4. Intermodality and Logistics Centres

Logistics centres have a key role in consolidating transport modes as they include intermodal terminals that combine different transport modes and units (Eckhardt and Rantalab, 2012: 613).

Road freight transport is still the most widespread transport mode in Europe and the demand for road transport has been constantly growing over the last 20 years where a stable decrease in rail freight transport. According to the White Paper (2001), to decrease the rate of road transport among other modes, intermodal transport options are offered. Logistics centres are the main facilitators of intermodal transport by

bringing together the logistics operators offering different type of transport modes and services to provide synergic solutions (rail/road/short-sea-shipping) (Europlatforms, 2004:5)

Logistics centres which has direct rail link to the port is defined as the Dry ports. The dry port concept itself actually is based on moving of intermodal terminals from the port areas to hinterland further. Moving intermodal terminals helps to avoid traffic congestions in the region, as well as it can help to develop the hinterland areas. In addition to moving intermodal terminal, some other activities and services must also be offered in the dry ports instead of the ports such as consolidation, storage and container maintenance services. (Jaržemskis and Vasiliauskas, 2007: 207, 208; Roso, 2007: 523, 524).

All in all logistic centre/dry port/inland terminal concept strengthens intermodal/multi-modal solutions.

2.1.5. Sustainability and Logistics Centres

Sustainable transport systems aims to develop a framework for integration of different transport modes in the logistics centres. These logistics centres enable “efficient and cost-effective use of the transport system through seamless, customer-oriented door-to-door services, favouring competition among transport operators” (Babcock and German, 1989). European Union (EU) transport policies formed many logistics centres in order to develop intermodality, decrease traffic congestion and transportation cost, increase freight transport efficiency, encourage innovation (Kayıkcı, 2010: 6298).

Environmental concerns also play an important role in logistics centres development. An important aim of the logistics centre development is switching road freight transport to more environment friendly ones i.e. rail transport and inland waterways. Development of logistics centres have significant positive impact on sustainability by reducing congestions, gas emissions, energy use, noise, number of accidents and external cost on the society. Additionally Logistics centres provides the necessities for dangerous goods as handling, storing and distributing them requires appropriate procedures and special locations (Kondratowicz. 2003: 57).

European Union Road Federation states that road transport dominates the inland freight transport market in Europe with a 76 % market share, furthermore while road freight transport share increased for 5 %, rail freight transport decreased for 4 % (European Union Road Federation, 2010: 13). The main reasons for increased utilization of road transport are (European Environmental Agency, 2003: 14);

- removing trade barriers and market liberalizations
- a change trade routes from east to west and the new markets' rail links are not suitable
- road transport provide more flexible connections.

Transport policies advocate rail and inland waterway transport are more sustainable traffic modes than road transport and therefore offer a shift from road freight transport to more energy-efficient modes. Establishing inland terminals connecting seaports would be a major strategic decision for implementation of more sustainable traffic modes. (Slack et al., 2002 cited by Roso and Lumsden, 2009: 88).

Slack in his study emphasizes the role of inland terminals in reducing environmental effects, also these terminals are seen as an alternative to seaport expansions and generates environmental and land use conflicts (Slack 1999 cited by Roso and Lumsden, 2009: 90).

2.2. LOGISTICS CENTRE DEFINITION AND CHARACTERISTICS

Logistics centre concept is an emerging research field that attracts researchers in recent years. Although there is a common background, the concept of logistics centres varies from country to country and there is no consensus on a single definition of logistics centre (Meidute, 2005: 110). Reasons for no consensus on the terminology are stated by various authors;

- Ongoing evolution of freight and logistics concept and new types have been continuously developed (Kondratowicz, 2003: 134),
- Short history of supply chain management approach (Rimienne and Grundey, 2007: 87),
- These facilities have multiple shapes, functions and network positions (Notteboom and Rodrigue, 2009a: 9),

- “Logistics researchers have made little effort to build a unified logistics conception” (Rimienne and Grundey 2007: 92),
- “They vary according to local, regional, and national characteristics” (Higgins, Ferguson, Kanaroglou, 2012: 9).

Although logistics centres first appeared nearly 40 years ago in USD and followed by the EU countries, there are many different terms used for logistics centre. During this period functional and conceptual significance of Logistics centre has changed and commonly accepted definition and a term are still not exist. The name of these sites with same meaning may vary in practice in each country (Meidute, 2005: 107, Rimienė and Grundey, 2007: 87, Sutranet, 2007: 9, Roso, Woxenius and Lumsden, 2009: 343, UNESCAP, 2013a: 1) for instance;

- Great Britain; “Freight Village”
- America; “Logistics Centre”
- France; “Logistics Platform” or “Multimodal Platform”
- Germany; “Logistics Village” (Güterverkehrszentrum),
- Netherland; Distripark
- Italy; “Logistics Village” (Interporto),
- South Korea; Multimodal Industrial Park (Multimodal Industrial Park),
- Denmark; “Transport Centre” (Transport Centre) such as partially used expressions with the same meaning.
- China; “Dry port”, “Inland Port”, “Logistics Park”
- Singapore; “Logistics Centre”
- India “ Inland Container Depot”

These terms generally define a logistics centre as a facility that “usually created within the framework of regional development policies as joint initiatives by companies, intermodal operators, regional and local authorities, the central government and/or the chambers of commerce” (Notteboom and Rodrigue, 2009b: 5). There are many similar logistics centre definitions;

- Rimienne defined logistics centre as “a special intermodal hub (nodal point) in the transportation system including different logistics facilities, where separate operators are providing a number of services, connected to transportation,

logistics and distribution in established geographical coverage” (Rimienne and Grundey, 2007: 93).

- Europlatforms defined logistics centre as “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” (Europlatforms, 2004: 3).

But the term “logistics centre” itself is subject to confusion.

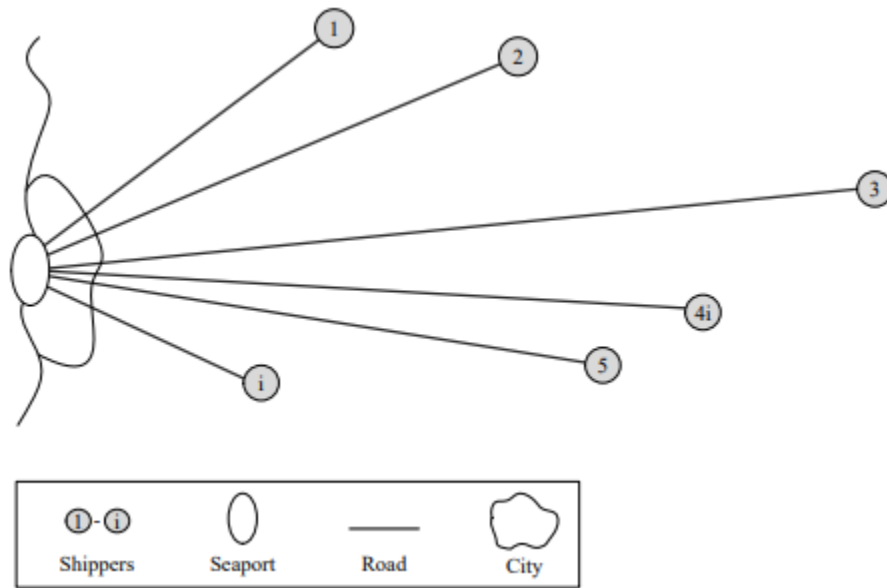
Rimienne and Grundey (2007) analysed logistics centre definitions’ scope and concluded that logistics centre can be considered as “freight village, transport node or distribution centre” (Rimienne and Grundey, 2007: 93).

Notteboom and Rodrigue (2009b: 3) called the inland facilities in the hinterland networks of ports as “**inland nodes**”. These nodes have been referred to as “dry ports, inland terminals, inland ports, inland hubs, inland logistics centres, inland freight villages, etc.” In the same study they also indicate the “**driver factors for inland nodes**” ;

- Modern freight distribution complexity,
- Growing focus on intermodal transport solutions,
- Capacity problem seem to be the most important concern,
- Increasing demand for seamless hinterland links to the inland terminals with the increasing container volumes in the ports,
- Establishment of global supply chains; it has forced actors in the transport sector for better integration,
- The larger volumes of flows in networks through a limited set of ports of call (Notteboom and Rodrigue, 2009b: 1, 2).

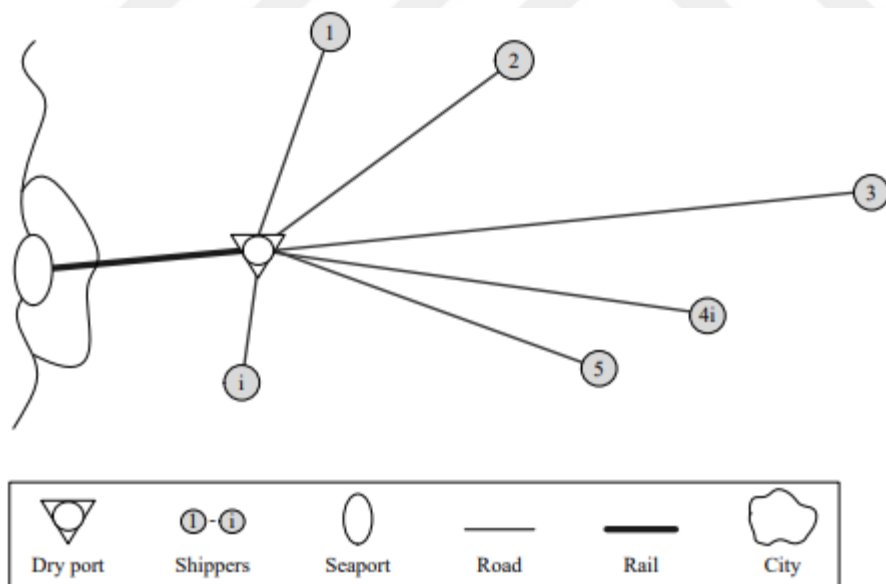
Roso explains the basic idea behind the dry port concept (figure 10 and 11) that dry ports are directly connected to the ports by rail basically to increase the capacity and productivity of the port. Also shifting of flows to/from the seaport from road to railway results reduction of road accidents, maintenance costs and local pollution (Roso, 2008: 285, 286).

Figure 10: Seaport's inland access without a dry port



Source: Roso, 2008: 285, 286

Figure 11: Seaport's inland access with a dry port



Source: Roso, 2008: 285, 286

Many researchers (Pegrum, 1963; Bowersox, Smykay, LaLonde, 1968; Reynaud, Gouvernal, 1987; Cavinato, 1989; Holtgen, 1996; Johnson, Wood, 1996; Wiegmans, Masurel, Nijkamp, 1998; Breitzmann, Wenske, 1999; Ballis, Golias, 2002;

Židonis, 2002; Waters, 2003; Kondratowicz, 2003; Kia, Shayan, Ghotb, 2003; Ballou, 2004; Urbonas, 2004; Meidutė, Vasiliauskas, 2005; Rushton, Croucher, Baker, 2006; Lu, Yang, 2006; etc) analysed logistics and supply chain management theory about logistics centre functionality concept determination and its (Rimienė and Grundey, 2007: 87).

Logistics centres are special type of transport nodes. Based on the Logistics centre definitions; Logistics centre can be considered as “Freight village, Logistics node or Distribution centre” as well (Rimienė and Grundey, 2007: 91,93).

Some authors refers to logistics centre as a broadest concept covering the activities related to transportation and logistics service providers participating in (Meidute, 2005: 106). Some of companies are also call their warehouses and distribution centres as their logistics centres. (Jaržemskis, 2006: 50). Some others authors referring it to it as functional equivalents of freight villages (Higgins, Ferguson, Kanaroglou, 2012: 10).

The studies showed above that not only the terms, also the concepts vary as well. Most commonly logistics centre concept is consolidated with understanding of facilities such as container yard, distribution centre, distripark, dry port, freight village, inland container depot, inland terminal, intermodal terminal, freight/transport terminal, transport node, warehouse (Rimienė and Grundey, 2007: 87).

Terms and their definitions that are associated with Logistics centres concept has been listed in Table 5 as follows. When the definitions of inland logistics facilities associated with logistics centre concept are analysed, we understand that from simple logistics services to the most advanced logistics services can be provided at these facilities. In respect of regional aspect these facilities are ranged into local, regional, national or international; some of these centres serve to international shipping, while others serve to urban logistics operations (local distribution).

Many warehouses or terminals are also called logistics centres by their owners (Jaržemskis, 2007: 50). These facilities also range for geographical coverage, volume, capacity and the services they provided (Higgins et al., 2012: 13, 14; Rimienė and Grunde 2007: 90, 91).

Therefore, although there are many variety of useful definitions of logistics centres, establishing a general definition is difficult. For this reason, instead of using a

common definition, it is more common the use of different definitions which emphasizes the functional characteristics (Meidute, 2005: 107). To differentiate varieties of facilities and define the functional characteristics of the terms associated with Logistics centres concept and their key points has been seen in the literature summarized in table 6 below.

The terms Logistics Centre and Logistics Villages are mainly used in Turkey and these facilities are mainly possess the same characteristics as the facilities in the world. In this research, the term “Logistic Centre” is preferred, considering the features of existing formations in Turkey and because of its common use.



Table 5: Terms and Definitions Associated with Logistics Centres Concept

Terms for Inland nodes/ Logistics facilities	Author	Definition
Container yard	UNESCAP (2009)	“A facility dedicated to the temporary storage, cleaning and repair of empty containers in readiness for their re-use. Sometimes they are located near to a seaport so that import containers, once emptied of their cargo, can be used to deliver export cargo at short notice to the ship.”(Unescap 2009 cited by Higgins et al., 2012: 11).
Container yard	Higgins, Ferguson, Kanaroglou, 2012	“A container yard is a facility dedicated to performing the basic functions of storage, cleaning, and repair of empty containers. Like warehouses, these facilities act as a buffer in the transport chain by ensuring a smooth supply of containers to facilitate the movement of goods. These facilities can be located near a mainport terminal or other logistics centres as a way to improve service and handling turnaround times” (Higgins et al., 2012: 16).
Distribution centre	Bowersox (1968)	“Physical facility used to complete the process of product line adjustment in the exchange channel. Primary emphasis is placed upon product flow in contrast to storage” (Bowersox 1968 cited by Rimiené and Grundey, 2007: 90).
Distribution centre	Rimiene and Grundey (2007)	“In distribution channels, warehouses are intermediate storage points between suppliers and the manufacturer, and the manufacturer and industrial customers. A distribution centre is a warehouse that emphasizes the rapid movement of goods” (Lu and Yang, 2006 cited by Rimiene and Grundey, 2007: 90).
Distribution centre	Notteboom and Rodrigue (2009b)	Distribution centre “represent a distinct category of intermodal terminals performing an array of value-added functions to freight, with operations mainly supported by trucking”. These functions include; transfers, Cross docking, Warehousing (Notteboom and Rodrigue, 2009b: 6)
Distribution centre	Higgins, Ferguson, Kanaroglou, 2012	“Distribution centres are a single large warehouse or cluster of warehouses dedicated to the rapid movement of goods. Basic functions include warehousing, shipping, receiving, transloading, and cross docking” (Higgins et al., 2012: 15).
Distripark	United Nations, 2002	“When logistics centres are grouped together in a dedicated area, it is sometimes called a Distripark. Therefore, Distripark is a large-scale, value-added logistics complex with comprehensive facilities for distribution operations at a single location, which is connected directly to container terminals and multimodal transport facilities for transit shipment, employing the latest information and telecommunication technology.” (UN, 2002: 25,26)

Dry port	UNCTAD (1991)	“Customs clearance depot located inland away from seaport(s) giving maritime access to it” (UNCTAD, 1991;7)
Dry port	Woxenius et al. (2004)	“The dry port concept is based on a seaport directly connected by rail with inland intermodal terminals where shippers can leave and/or collect their goods in intermodal loading units as if directly at the seaport” (Woxenius et al., 2004:1).
Dry port	UNESCAP, 2013	“Refers to an inland location as a logistics centre connected to one or more modes of transport for the handling, storage and regulatory inspection of goods moving in international trade and the execution of applicable customs control and formalities” (UNESCAP, 2013b:4).
Dry port	Roso, V., Woxenius, J. and K. Lumsden (2009).	“A dry port is an inland intermodal terminal directly connected to seaport(s) with high capacity transport mean(s), where customers can leave/pick up their standardised units as if directly to a seaport. Apart from the basic service, transshipment, that a conventional inland terminal provides; services like storage, consolidation, depot-storage of empty containers, maintenance and repair for containers, custom clearance, etc. Should be available at full-service dry ports”. (Roso, V et al., 2009:345).
Dry port	European Commission 2001	“An inland terminal which is directly linked to a maritime port” (European Commission, 2001/b;59)
Freight village	Rimienne and Grundey 2007	“Seen as synonymous with logistics centres, differing only in scale. Usually only large-scale intermodal logistic centre is called freight village” (Rimienne and Grundey, 2007: 91)
Freight village	UNESCAP, 2009	“A freight village is a defined area within which all activities relating to transport, logistics and the distribution of goods, both for national and international transit, are carried out by various operators. These operators can either be owners or tenants of buildings and facilities (warehouses, break-bulk centres, storage areas, offices, car parks, etc.) and it is run by a single body, either public or private” (Notteboom and Rodrigue, 2009b: 13).
Freight village	Higgins, Ferguson, Kanaroglou, 2012	“A freight village is a site or area hosting a cluster of industrial, intermodal, distribution, and logistics infrastructure and supporting services dedicated to facilitating the flow of goods. A central feature of a freight village is high-quality connections to intermodal and other transportation infrastructure (road, rail, air, barge) that enable the fast and flexible transportation of freight. Some freight villages add urban consolidation and distribution functions to improve the efficiency of urban goods movement” (Higgin et al., 2012:16)
Inland clearance depot	UNCTAD (1991)	“A terminal located in the hinterland of a gateway port serving as a dry port for customs examination and clearance of cargoes, thereby eliminating customs formalities at the sea port”. Alternatively also known as an “Inland Customs Depot”” (UNCTAD, 1991;7)

Inland container depot	UNESCAP (2013)	“An inland container depot is a container terminal located inland from seaports, which offers services for the handling, temporary storage and customs clearance of containers and general cargo that enters or leaves the ICD in containers.” “A container terminal located inland from seaport(s), which offers services for the handling, temporary storage and customs clearance of containers and general cargo that enters or leaves the ICD in containers. In essence an ICD has the same functions as a port container terminal except ship to shore transfers”. (UNESCAP, 2013b: 9).
Inland container Depot	Higgins, Ferguson, Kanaroglou, 2012	“Inland container depots offer a location for the handling and temporary storage of containerized trade. Similar to the focus of distribution centres, the focus of an inland container depot is on the movement of containers rather than storage. Unlike a container yard, an inland container depot performs some of the functions of a traditional seaport container terminal other than ship-to-shore transfer. This can include container handling and storage, break bulk cargo handling and storage, and additional value-added services, such as basic customs clearance and inspection” (Higgins et al., 2012: 16).
Inland port	Higgins, Ferguson, Kanaroglou, 2012	“An inland port can be understood as an inland extension of a traditional seaport, connected to the mainport terminal by a high-capacity rail shuttle or barge link for short sea shipping. The scope of activities at an inland port can range from intermodal satellite terminals dedicated to extending the gate of mainport terminals by consolidating freight flows for further transport by barge or train or preparing incoming freight for local distribution” (Higgins et al., 2012:16).
Inland terminal	UNCTAD (1982)	“An inland terminal to which shipping lines issue their own bills of lading for import cargoes, assuming full responsibility of costs and conditions, and from which shipping companies issue their own bills of lading for export cargoes” (Notteboom and Rodrigue, 2009b: 3)
Intermodal terminal	UNECE (2017)	“Intermodal terminal is location which provides the space, equipment and operational environment under which the loading units’ (freight containers, swap bodies, semi-trailers or trailers) transfer takes place “ (UNECE, 2017:1).
Intermodal terminal	Higgins, Ferguson, Kanaroglou, 2012	“An intermodal terminal is a facility dedicated to the transshipment and consolidation of intermodal freight into bigger flows for regional and continental trade. Intermodal terminals handle large freight flows and feature intermodal infrastructure for the transshipment of goods between rail, road, and other modes, such as barge, for further transportation to their final destinations” (Higgins et al., 2012: 16).
International distribution centre	International Maritime Organization 1991	“A place that integrates the operations of manufacturing with land, sea, air transportation, storage, port, and customs operations in order to achieve the efficient distribution of commodities” (Lu, 2003: 51).

International Logistics centre	Du; Bergqvist, 2010: 21	“An international logistics centre is a functional logistics centre offering its customers a full range of logistics value adding services together with facilitating transactional services and having direct access to global transport networks.” (Du and Bergqvist, 2010: 21).
Logistics centre	Europlatforms (2004)	“A Logistics Centre 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 centres, storage areas, offices, truck services, etc.)” (Europlatforms 2004: 3).
Logistics centre	Rimienne and Grundey	“Logistics centre (Freight village / Logistics node / Distribution centre) 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” (Rimienne and Grundey, 2007: 93).
Logistics platforms	Abrahamsson, Aldin, Stahre (2003)	“We define a logistics platform as a homogenous part of the logistics system, which a logistics organisation centrally manages and controls, and has the power to design in a way that it is a resource base for new market positions. The logistics platform includes concepts for logistics operations, a physical structure, processes and its activities as well as the information systems needed for design, operations and reporting” (Abrahamsson et al., 2003: 104)
Mainport Terminal	Higgins, Ferguson, Kanaroglou, 2012	“Mainport terminals act as nodal centres for logistics that produce large amounts of activity both inside the facility and within its periphery. Mainport terminals include major seaports that transfer large volumes of freight from maritime to inland transportation systems and other large-scale terminals, such as airports with worldwide connections and high trade and passenger flows. Large volumes of freight arrive at the terminal and are split into smaller shipments for further transport, although these flows have enough volume to fill an entire train, barge, or ship” (Higgins et al., 2012;16).
Transport Nodes	InLoc, 2006	“Transport nodes are points which gather and connect different transport modes and give an opportunity to serve cargoes which flow from different directions”(Rimienne and Grundey, 2007: 93).
Transport Terminals	Pegrum (1963)	“Transport terminals are regarded as the points of concentration at which traffic on the intercity carrier ends its journey, or is interchanged for further movement when transferred for continuance to ultimate destination in another centre.”(Rimienne and Grundey, 2007: 90).

Warehouse	Higgins, Ferguson, Kanaroglou, 2012	“Warehouses are typically a place for inventory and storage, and they perform the basic function of acting as a buffer between suppliers, manufacturers, and customers to smooth time and demand constraints in the supply chain. Some warehouses are more complex, performing distribution, maintenance, and valueadded activities, and can approach the functional scale of distribution centres” (Higgins et al., 2012: 15).
Warehouse	Minalga, 2001	“Warehouse is understood as a place for inventory that has no direct impact on production” (Rimienè and Grundey, 2007: 89).
Warehouse	Rimienè and Grundey, 2007	“Warehouses are intermediate storage points between suppliers and the manufacturer, and the manufacturer and industrial customers. The complex-type warehouse is virtually synonymous with a distribution centre” (Rimienè and Grundey, 2007: 90).

Table 6: Comparing the characteristics of the terms associated with Logistics centres concept

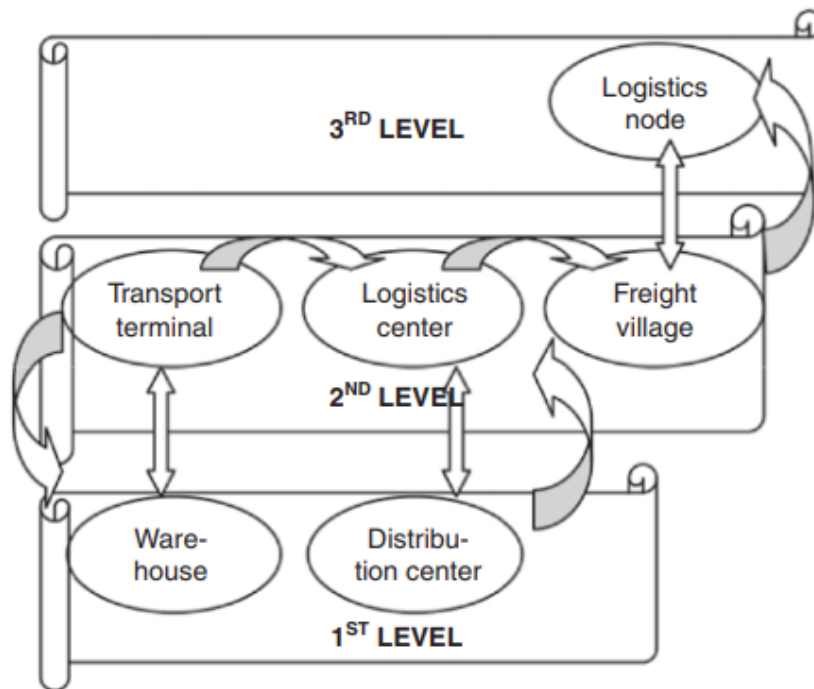
Size	Term	Key Activities and points
XS	Warehouse	• Storage of goods • Usually belongs to only a single company
S	Distribution Centre	• Warehousing • Shipping and receiving • Cross-docking • Production flow rather than storage • Large warehouses or cluster of warehouses
	Container Yard	• Temporary storage of containers • Cleaning and repairing of containers
M	Inland Container Depot	• Located in the hinterland of a gateway port • Handling and temporary storage of containers • Container flow rather than storage • Basic customs clearance • Inspections
	Intermodal Terminal	• Transshipment of goods between rail, road, and other • Consolidation of intermodal freight
L	Inlan Port/Dry Port	• Located in the hinterland of a gateway port and directly connected to seaport by rail • Provides all the services that seaports do except loading/unloading the ships • The aim is the meitigate the congestion at mainport terminal • It deals all type of cargo • Full customs-related services
	Logistics centre	• All the activities related logistics carried by various operators • It deals ith all type of cargo • Includes warehouses, distribution centres, storage areas, offices, truck services etc.
XL	Freight Villages	• Synonymous with logistics centre, differing in scale • Offering broader range of services than logistics centres such as banks, restaurants, repairing, cleaning areas, education facilities etc. • A centralized management and ownership structure
XXL	Mainport terminals	• Produce large amounts of activity both inside the facility and within its periphery. • Large volumes of freight • Include major seaports and airports with worldwide connections • High trade and passenger flows.

Source: Author adopted Higgins et al 2012:13; Rimiene and Grundey, 2007: 87

2.3. LOGISTICS CENTRE CLASSIFICATION AND OBJECTIVES

Some authors presented logistics centres hierarchy forms according to each their geographic coverage, size, function and services they provide etc. Rimienne and Grundey (2007: 89) proposed a three-level hierarchy of logistics facilities according to their role in the supply chain; according to their classification first level points the smallest scope of activities and third level indicates the highest scope (figure 12).

Figure 12: Logistics Facilities Hierarchy

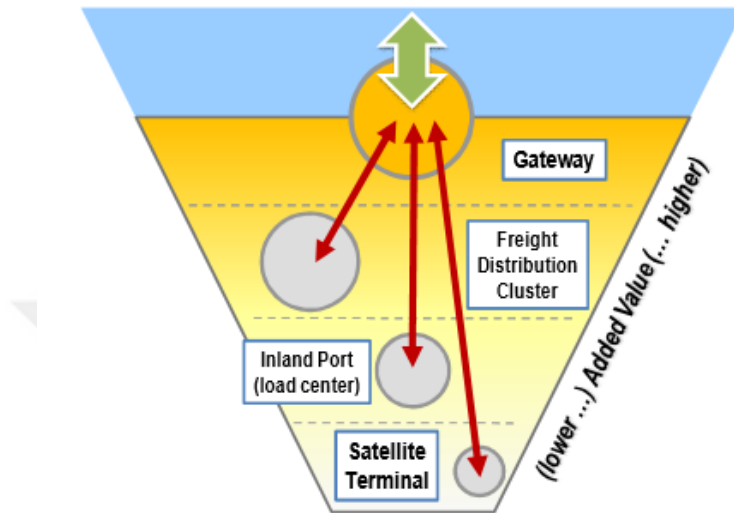


Source: Rimienne and Grundey, 2007: 89.

Notteboom and Rodrigue (2009b:12) categorized logistics centres to three levels, ranging from satellite terminal to gateways by using a functional and value-added hierarchy (Figure 13). They grouped categories starting with the first level 1: Gateway; a world class gateway should include the all value added activities related to transportation, from financing to intermodal infrastructures. Freight Distribution cluster (level 2) is a complex of large inland terminals and distribution centres that governing the distribution of a large region. Inland port (level 3) is usually a single intermodal terminal is combined with a series of distribution activities. Satellite

terminal 1 (level 4) is usually perform a very special function, such as transloading, often near a gateway. They presented the logistics centre hierarchy as in figure 13.

Figure 13: Freight Terminal Hierarchy and Added Value

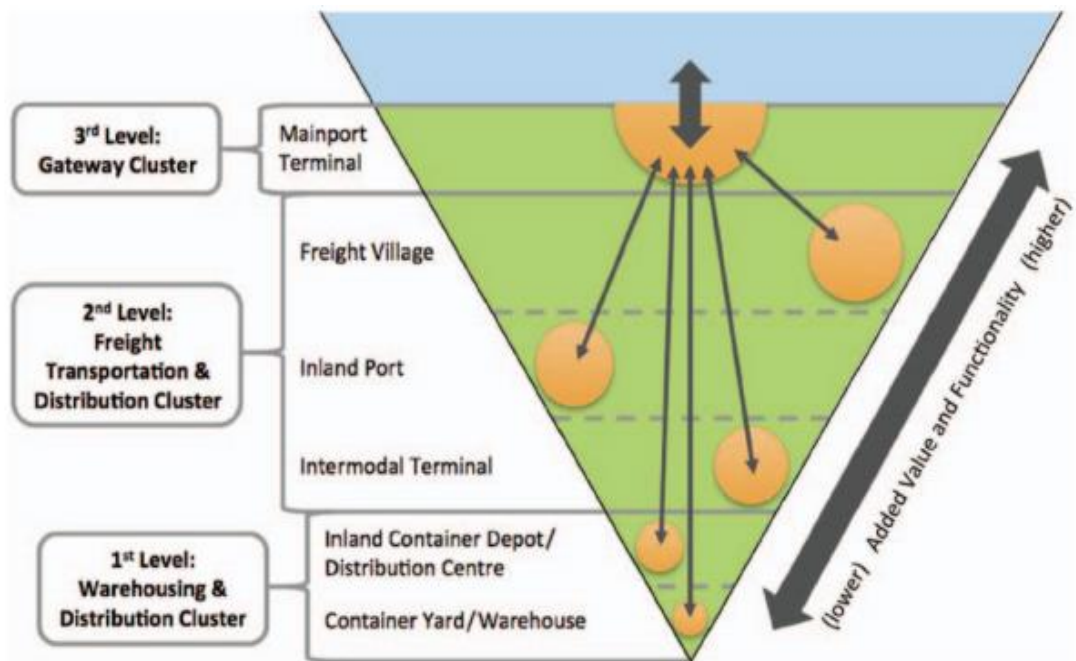


Source: Notteboom and Rodrigue, 2009b: 12.

Du and Bergqvist (2010: 17,18) categorized logistics centres at different geographic dimensions into local, regional, and international. Local logistics centres concentrate on domestic market within national borders, a regional logistics centres covers a wider network of national or continental scope and finally the international logistics centre deal with international goods by both sea and air.

Higgins, Ferguson and Kanaroglou (2012: 15) produced a three broad levels logistics centre hierarchy based on the works by Rimiene and Grundey (2007) for scope of activities) by Wiegman et al. (1999) and by Notteboom and Rodrigue (2009). The facilities in the classification move up the scale in functionality and value-added services. The first level represent the smallest scope of activities such as warehousing, shipping, receiving, transloading, and cross docking etc. The second level activities range from the simple transfer of goods to the broad range of multimodal transportation activities with broad geographic coverage and value-added logistics service. The 3rd level represents the largest scope of logistics activities within large international terminals such as major seaports, airports with worldwide connections.

Figure 14: Standardized Logistics Centre Hierarchy



Source: Higgins et al., 2012:13

Their classifications produce typology and hierarchy that serve to simplify and differentiate between the varieties of inland logistics facilities. In general, the researchers highlighted the intermodal function of the centres that are established to combine different transport modes and have intermodal facilities to promote intermodal transport. (Higgins et al. 2012: 4).

Unlike the definition there seem to be mostly consensus on the objectives and purposes of the logistic centres. According to different authors Logistics centres objectives;

- They should contribute to implement and development of intermodal transport, encourage regional economic activity and improve land use and efficiency of local goods distribution (Roso and Lumsden, 2009: 91),
- They serve several purposes including cargo transloading, facilitating production synchronization and trade (Song and Panayides, 2015: 276),
- They aim to strengthen the logistics capability of the country and transform it into a more attractive competitive market (Song and Panayides, 2015: 276),

- Support seamless integrated transport network (Du Jun and Bergqvist, 2010: 2),
- Enhance the market attractiveness and logistics companies' competitiveness (Du Jun and Bergqvist, 2010: 2),
- Achieve sustainable competitive advantage for transport and logistics companies (Jensen, 2008),
- Generate synergies and collaboration among transport and logistics companies (Europlatforms, 2004: 15),
- Improve transport and logistics companies economical and productive performance (Europlatforms, 2004: 15),

2.4. BOTTLENECKS OF LOGISTICS CENTRES ESTABLISHMENT

Jaržemskis (2007: 52, 53), the UN report (2002: 61, 62) and the Project of Mongolia Regional Logistics Development (2010: 15) dealt with the encountered difficulties during establishing logistics centre. They pointed out the followings:

1. Constraints in infrastructure; poor transport and port infrastructure and other facilities for logistics activities; old technology and inadequate intermodal carrying capacity
2. The problems caused by legislation; lack of urban master plan, missing of transport policy heavy bureaucracy, customs transition issues long procedure etc.
3. Lack of capital and budget for infrastructure and facilities and ill-prepared contracts with investors.
4. Different expectations of the public and private sectors regarding the creation of logistics centres.
5. The lack of governmental support and other institutional programmes.
6. Inefficient administrative procedures; inability to implement international agreements and national laws and procedures.
7. Expensive land costs
8. Long duration of planning process and lack of understanding the need for the leadership of the public sector in the initial phase.

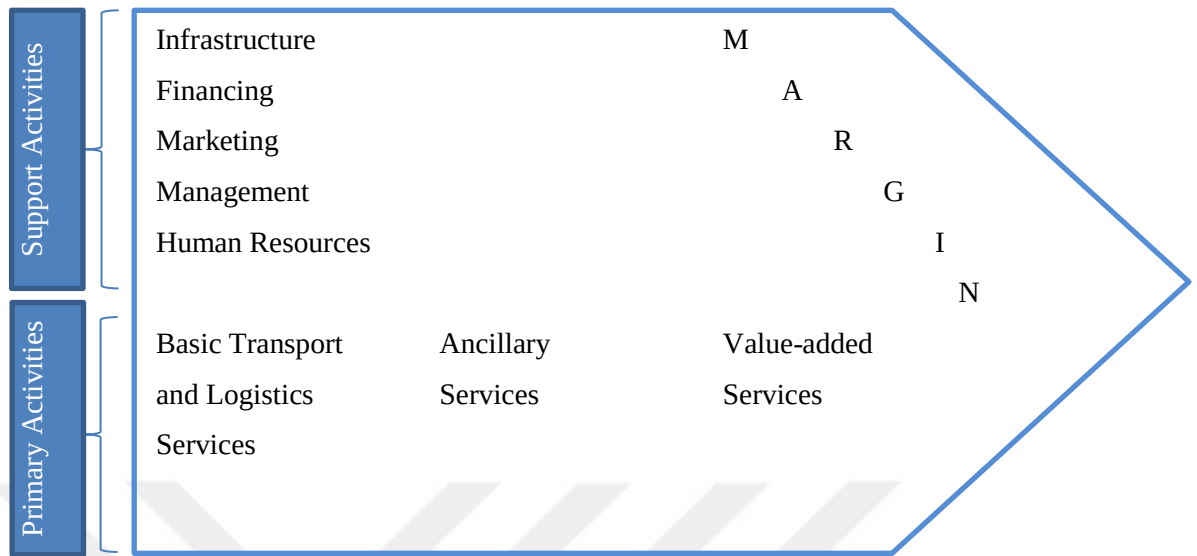
9. Lack of the knowledge of roles and tasks and collaboration between the institutions of the public sector and state-owned companies.
10. Some errors during the preparation phase like publicity for the idea before preparation of conditions.
11. Inadequate human resources development; lack of professional logisticians and skilled workforce
12. Lack of third-party logistics providers' professionalism.
13. Lack of promotion of logistics centres.

2.5. LOGISTICS CENTRE VALUE CHAIN ANALYSIS

Every firm performs a collection of activities and all these activities should create “value” that buyers are willing to pay for a product or a service. All these activities can be divided into two broad types, primary activities and support activities, represented by using a value chain. Value chain may differ for every firm as a firm's value chain is a reflexion of its activities, history and strategy (Porter, 1985: 150; Porter 2001: 52, 53). For logistics centres the infrastructure and pooling of other resources are referred to create value to logistics service providers. To identify support and primary activities creating value in Logistics centres Porter's Value-chain analysis is used as seen figure 15 below.

Notteboom & Rodrigue (2005) identified primary functions for logistics centres (figure 15); transport modes served (unimodal and/or multimodal), transport and cargo handling functions, customs clearance services, warehousing, container repair and value added services (Notteboom and Rodrigue 2005:9).

Figure 15: Primary and Support Activities of Logistic Centres



Source: Author adaptod from Porter, 2001: 52 and Notteboom and Rodrigue, 2005:9

Each supporting activities (Infrastructure, Financing, Marketing, Information Communication Technology, Research&Development, Human Reseources) have been explained below but as primary activities have been explained under the following heading of “Logistics Centre Features” in detail.

Infrastructure is one of the supporting activities for a logistics centre includes hardware (e.g. facilities and equipments) and software aspects (e.g. information and communication technologies) (Du Jun and Bergqvist, 2010:6). The most important infrastructures are the warehouses and the intermodal terminals. Because Logistics companies mostly perform their businesses in the warehouses and many locations have multimodal access are become the fields that Logistics centres can be established (Europlatforms 2004:10, 11, Rodrigue and Notteboom, 2009: 171). Insfrastructure is also a very important feature for logistics centres, this feature is also analyzed in logistics centre features section.

Financing is another supporting activity for logistics centre’s value chain. The establishment and structuring of logistics centres require great investment. Purchase of the land, implementation of infrastructure, establishment of intermodal facilities, warehouses, buildings and other logistics and non-logistics facilities require high

financial resources that make it difficult for logistics centres to become private sector investments. When considering the benefits of logistics centres for both logistics service providers, logistics service buyers and society making public authorities more important in projects that require such high investment. The financing of the logistics centres is evaluated within the scope of project financing. In the table 7 below, project financing models are given in terms of financing, risk and revenues. The European Transportation Policy directive states that the Public - Private Sector Partnership Model are in practice for the construction of the logistics centres and also provides opportunity for the private sector to access the projects. It is also possible to come across a number of successful logistics centre projects in Europe through the Public Private Partnership (PPP) (Ünal, 2013: 49, 50).

Table 7: Project Financing Models

Public Finance	Public - Private Sector Partnership Models	Privatization
1. The project is financed and operated by the state. 2. Risk and revenue are state-owned.	1. Build-Transfer 2. Build-Rent-Operate-Transfer 3. Build-Transfer-Operate 4. Build-Operate-Transfer 5. Build-Own-Operate	1. Public service is owned and operated by the private sector. 2. Risk and return belong to private sector.

Source: Ünal, 2013: 50

Primarily three funding sources can be considered for a logistics centre; private investors (equity), bank loans and public institution. So four funding combination can be mentioned (Meidute, 2007: 114, 115):

- “combination of private investments, bank loans and public institution or public limited company’s funds”,
- “combination of private investments and bank loans”,
- “combination of private investments and public institution or public limited company’s funds”,
- “fully private investments”.

In terms of costs, they can be divided as fixed costs and variable costs. Fixed costs include costs associated with the land acquisition, construction and the equipment acquisition costs, variable costs include salaries, repair and maintenance, costs of electricity, water and telecommunications, insurance of the buildings, equipments, etc., as well as miscellaneous expenses.

A logistics centre can obtain its revenue from renting warehouses, storage spaces, offices and of open storage areas for cargo placing, hotel concession and restaurant business, gas station revenues, intermodal transportation terminal processing fees (Meidute, 2007: 116).

Marketing as a supporting activity is critical to attract new businesses and continuous development of logistics centre. Logistics centres should do followings as marketing activity (Bergqvist, R. 2007: 111).

- thoroughly understand the targeted markets and promote the logistics centre,
- identify potential customers, categorize by profitability, revenue size and strategic values,
- offer activities and services that delivers high value to targeted customers,
- develop a pricing structure to maximize long term profit.

According to Sulgan (2006: 198), context of logistics centre marketing activities can be briefly listed as follows;

- Region-area focused situation analysis for logistics centre
- Marketing efforts of logistics services: Positive image, competitive advantage of the region, attractiveness of regional business power, development of new transportation projects for new industrial areas, increase of transportation types and quality of transportation, creation of logistic chains.
- Selection of Segments for Logistics Solutions: Population of the region, corporate units, industrial structures, export markets, tourism potential of the region
- Establishment of marketing plan "Marketing mix of the logistics centre".

Small transport companies, in particular, should be the target group for Logistic Centres as they are most potential companies involved in the logistics centre activity.

Logistics centres are also an important opportunity for small and medium logistics companies to survive against international competition (Jaržemskis, 2007: 52).

Customers of logistics centres are the companies closely related to logistics business, e.g. Dubai Logistics Centre define its customers as below; (Dubai Logistic City web site)

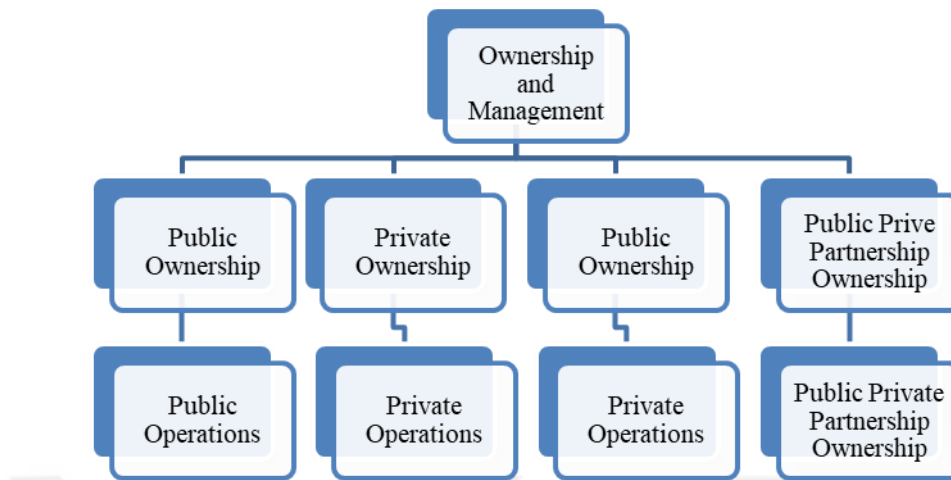
- Freight forwarders engaged in intermodal transport
- Logistics companies offering warehousing and value added services
- Contract logistics service
- Manufacturers and trading companies that operate their own distribution centres
- Companies supporting logistics community
- Companies providing light assembly

Management, as another supporting activity, the management model of logistics centres is based on two main elements: ownership and management of operations (see figure 16). Ownership is the ownership of the terminal area and vehicles and can be owned by the public or private sector. Public ownership is a more common form due to economic reasons. In this management style, infrastructure investments, future plans are publicly owned and private sector leasing opportunities exist. Private ownership is less common than the public sector. Ownership models appear in three forms currently;

- Businesses use infrastructures as tenants
- Businesses have proprietary infrastructures
- Build Operate Transfer Model

The operations management models are generally three types; public, private, public-private partnership. Merger of companies to form a joint management and partnership of the chamber of industry and commerce and the local management are other management practices also common in Europe countries (Sezen and Gürsev, 2014: 114).

Figure 16: Logistics Centre Management Models



Source: Sezen and Gürsev, 2014:114.

Management activities should include to ensure synergy and commercial cooperation, develop strategic alliance with key supply chain players (e.g. with railroads, shipping companies, ports), invest in information systems, develop effective performance metrics (including service quality, productivity, safety, sustainability measures), define logistics centre functions and focus on core competency areas, determine land, building, road, rail track and equipment needs, forecasting and ensure continuous improvement. Logistics Centres should be “managed by a single and neutral legal body, preferably by a Public-Private-Partnership” to develop win-win solutions that benefit diverse stakeholder groups (CAREC, 2013; Europlatforms, 2004: 3).

Human Resources is the last supporting activity within the logistics centre’s value chain. A large number of employees are needed to work in the various units and facilities within the logistics centres. Employees with different characteristics are employed for facilities such as container terminal, intermodal terminal, storage areas, repair and maintenance services, door entry/exit control unit, logistics centre information technology unit, logistics centre management company units. The function of human resources in logistics centres can vary depending on the size of the centre and the facilities it has. Logistics applications such as contract logistics and supply chain management which go beyond transportation, storage, transfer and information

technology (IT) increase the need for qualified personnel. For this reason, there are personnel demands for both operational and management levels. Three approaches can be mentioned for improving human (Bentzen, Hoffmann 2004: 44.;

- Organizing training activities related to transport and logistics,
- Establishing training facilities in the centre,
- Creating personnel pools.

Logistics centres also have important points in terms of human resources management. The most important point is that people who have been trained in logistics should be employed in logistics centres. Accordingly, it is necessary to establish "continuous education" infrastructure in logistics centres and the training programs should be application oriented. But also educational institutions e.g. vocational schools and logistics centres should be integrated. Furthermore, all necessary work safety precautions should be taken for employees, relevant trainings should be given and the works done should be carried out within a standard framework (Sezen and Gürsev, 2014: 111).

2.6. LOGISTICS CENTRES FEATURES

Despite the common use of the concept “Logistics Centre”, in addition to the definition of the concept, the features of logistics centres also vary in the literature. There are sites with the same meaning but with different characteristics from each other all over the World.

Logistics centre functions may vary according to the type, scale, service concept, goals of the establishment and development goals in the region. Logistics centres provide national and international transportation and basic logistics services as well as value-added services, customs services, and social services. The logistics centres established with the aim of improving the local distribution facilities and the Logistics centres established in a particular field of aggregation in order to provide international transport and logistics activities differ in terms of features. While the logistics centres that enables intermodal transport have intermodal facilities, there are logistics centres serves only for road transport have no intermodalite function.

According to Song and Panayides, the primary requirements for a logistics centre are being on a nodal point, having common infrastructures, intermodality and logistics and transport services (Song and Panayides, 2015: 276).

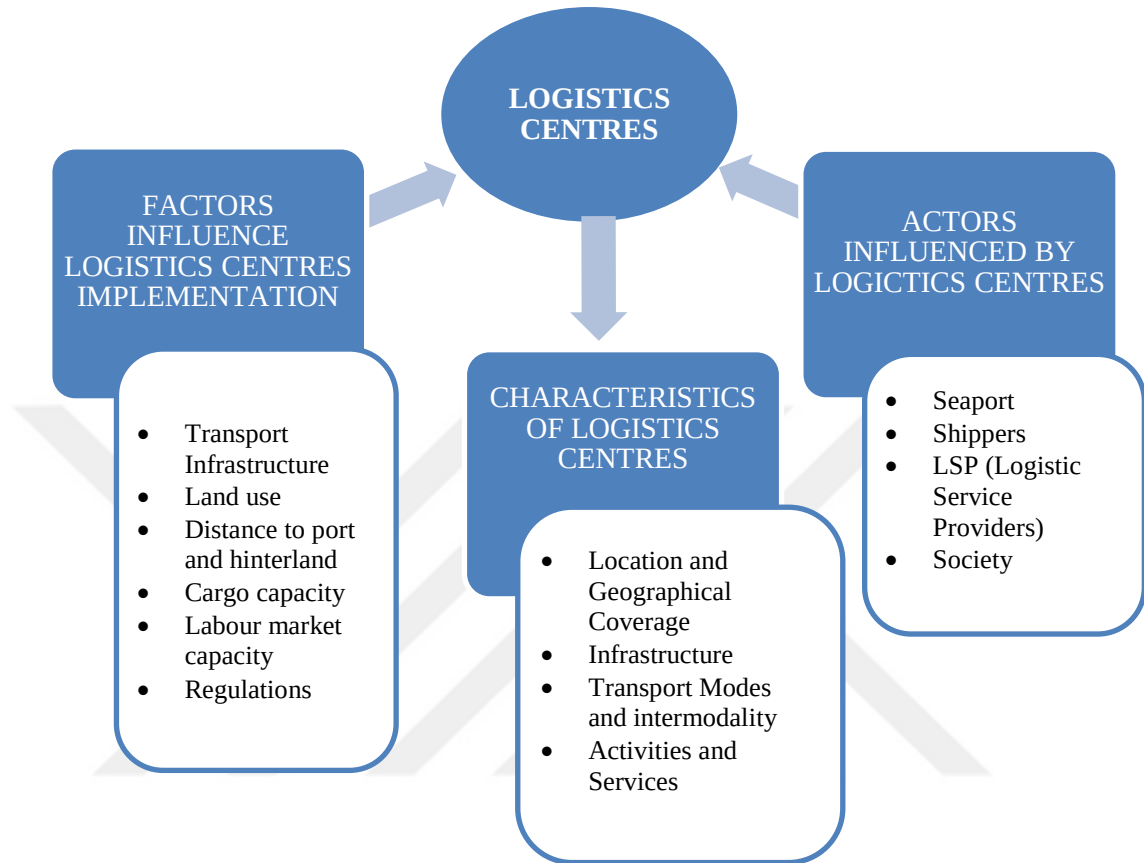
Rimie and Grundey explains the conventional and modern logistics services. Conventional logistics functions were “shipping, receiving, storage, order picking, break-bulk, freight consolidation and containerization”. Nowadays, many logistics operations are computerized and automated by using information systems with the development of the technology. Therefore number of newvalue-added services have been added such as “total logistics management, inventory control and tracking, packaging, labeling and bar coding, procurement and vendor management, and customer service functions, such as returns, repair, rework and assortment promotional assembly” (Rimienè and Grundey, 2007: 87).

Roso and Lumsden stated the features of a dry port in their study in 2009 as aligned below (Roso and Lumsden, 2009: 98):

- “Seamless transport and trans-shipment points”
- “Scheduled and reliable rail connection between a seaport and a dry port”
- “Dry port equipped for the handling of standardized units”
- “Services at a dry port: trans-shipment between road and rail, customs clearance, maintenance of containers and long and short time storage”

All in all factors influence logistics centre implementation, actors influenced by logistics centres and the features of logistics centres can be summarised in figure 17 below and the most important key features for Logistics centres development also has been described below individually.

Figure 17: Factors Influence Logistics Centre Implementation, Actors Influenced By Logistics Centres and Characteristics of Logistics Centres



Source: Author adopted from Kondratowicz, 2003: 50-52, Roso, 2008: 787, and United Nations, 2002: 31, 32.

2.6.1. Location & Geographical Coverage

Logistics centre locates in a defined area, often at a nodal point of a transport system (Jensen 2008). Its location strongly influences the effectiveness of the logistics centre. Therefore it is necessary to locate logistics centres where the logistics centres' services will be provided in an optimum way. Factors influencing the choice of Logistics centre's location can be listed as follows (Kondratowicz, 2003: 50-52);

- Transport infrastructure
- Available and planned intermodal connections
- Available area (size of land, extensions of possibility)

- Area topography and configuration
- Local transport connections and transport networks
- Labour market
- Telecommunication infrastructure
- Business activity in the region
- Existing and expected cargo extremes

The majority of countries in Europe have geographical potential to establish and develop competitive logistics centres (Rimienè and Grundey, 2007: 87). Most of European Logistics Centres already located in hub points for being near the main motorway, railway, and seaway connections. Being located as hub point helps to coordinate all the transport modes (Europlatforms 2004: 7).

As a geographical coverage -areas served by the centre- some logistics centres focus more on regional and national distribution while others serve larger geographic areas to provide an international coverage (Du and Bergqvist, 2010: 9). According to United Nations Commercial Development of Regional Ports as Logistics Centres report in 2002, the factors and policy issues influencing the selection of sites for logistics centres listed as in table 8 (United Nations, 2002: 32).

In the same report they have interviewed 67 global businesses, in order to find the major factors that influence global companies when choosing the location. For the companies operating logistics centres, the factors and policy issues influencing the selection of sites for logistics centres listed as below (United Nations, 2002: 32, 33).

- Central and strategic location for the European market,
- Highly skilled and productive workforce with work ethic,
- Advanced logistics infrastructure and excellent links to the foreign market,
- Language skills in different languages
- Keen professionalism of the logistics industry
- Friendly international business environment
- Supportive central and local authorities

Table 8: Factors Influencing the Site Selection

Factors	Main Features
Port infrastructure	Adequacy of port facilities Spaciousness of port area Availability of feeder vessels
Land/Land prices	Availability of land Affordability of land prices Low rental fees for land
Labour	Availability of English speaking port workers Availability of specialized technicians Availability of trained or non-trained technical labours Labour costs in distribution centre
Technology/Information	Level of port information service Supply of information infrastructure
Market factors	Distance between port and hinterlands Distance between port and major cities
Related industries	Ease of access to parts and raw materials Distance between port and industrial complex
Back-up city	Existence of large consumer city behind port areas Quality of workers
Institutional factors	Incentive programmes offered by host country Simplicity, ease and efficiency of administrative procedures Financial assistance in constructing distribution centres Free trade system and related law provided by the host countries
Connecting transport system	Airport access to provide speedy linkage between the distribution centre and major markets Effective land transport system Establishment of feeder service (hub and spoke system)

Source: Korea Maritime Institute cited by United Nations, 2002:32

2.6.2. Infrastructure

The infrastructure development aimed to optimize area utilization, protect the environment (moving the heavy traffic from residential areas to the Logistics Centre), meet operator necessities, enables tenants to access to common facilities (Europlatforms 2004: 4). The Logistics centre infrastructure includes both hard infrastructure (e.g. facilities and equipments) and soft infrastructure (e.g. ICT) (Du Jun and Bergqvist, 2010:6, Asian Development Bank, 2012: 31).

Hard Infrastructure of a logistics centre consists of

- Rail, road, inland waterway and air connections
- Ports (sea, river, air)
- Multimodal hubs
- Transport and material handling equipments

Soft Infrastructure of a logistics centre consists of

- Information and communication technology,
- Knowledge and skills,
- Standards, specifications and conventions
- Government policies, logistics strategy, laws and regulations
- Institutional framework

The most important infrastructures inside a Logistics Centre are the warehouses and the intermodal terminal because Logistics companies mostly perform their businesses in the warehouses. There are different types of warehouses, depend on the type of the cargo and the transport operator activity (Europlatforms 2004:10, 11).

- General warehouses for storage
- Large warehouses (for logistics activities)
- Warehouses with rail-road interchange
- Warehouses with raised docking bays
- Air-conditioned warehouses

Intermodal terminals are another essential infrastructure feature for the logistics centres. Many locations have multimodal access are become the fields that Logistics centres can be established. Transportation, distribution and storage

companies etc. have been grouped for providing support services to businesses in these areas. For reasons such as high land prices around sea ports, constraints in industrial areas and environmental constraints, inland terminals which can be called the logistics centre, can be established at the points more remote from the sea ports. Fast, efficient and reliable intermodal connections, is a prerequisite of the mentioned internal terminals (Rodrigue and Notteboom, 2009: 171).

Logistics centres shall have the following infrastructure, equipment and facilities features that appropriate to existing and expected freight in accordance with their national laws, regulations and practices (UNESCAP, 2013b: 15,16);

- A safe area with a gate for private entrance and exit,
- Indoor and outdoor storage areas reserved for import, export and transshipment and for dangerous cargoes and hazardous materials,
- Warehouse facilities that may include bonded warehouse facilities,
- Customs inspection,
- Quality control and storage facilities,
- Cargo and container handling equipments,
- Internal service routes and pavements for use in operation and stacking
- Vehicle retention areas with sufficient parking space for cargo vehicles;
- Administrative building for offices of customs, transport companies, shippers, customs brokers, insurance companies, banks and other related institutions;
- Information and communication systems including electronic data exchange systems, scanners and vehicle weighing equipment;
- Maintenance and repair site for containers, vehicles and equipments.

2.6.3. Activities & Services

Logistics Centre is simply planned and built to manage all the activities and services involved in freight movement (Europlatforms 2004: 8). Du Jun and Bergqvist stated that the logistics centres services can be categorized as basic logistics services, ancillary services, and value-added services. They classified services into 3 groups and give examples of these services as below (Du and Bergqvist, 2010: 7, 10);

- **The basic services;** storage, cargo transfer, consolidation, distribution, cargo handling, sorting and packing, intermodal transportation.
- **The ancillary services;** vehicle auxiliary services, public and commercial services (restaurant, hotel, retail store, financial institution and post offices, banks, parking area, truck stops, rest areas etc.) as well as custom services, for example, submission of vehicles/semitrailers/containers, reverse-logistics services, customs mediators, maintenance and repair of transport facilities function of custom clearance.
- **The value added services;** inventory management, goods processing, inspection, labeling, packaging, bar-coding, order picking, adding parts, final assembly and adjustments, semi-manufacturing, maintenance and repair, reverse logistics, quality control, testing, installing, adding instruction manuals, as well as product customization.

According to Europlatforms report the activities that the Logistics Centre management is responsible can be classified into three categories (Europlatforms 2004: 8, 9);

a. Activities defining and creating the general infrastructures

- Road connections
- Rail connections
- Connections with ports
- Warehouses
- Integrated services

b. Activities defining and creating the Logistics Centre plan

- Customs infrastructures
- Postal/bank/insurance services
- Offices
- Intermodal terminals
- Warehouses
- Other general services

c. Activities related to planning and management of the Logistics Centre

- Investment and development planning regarding its layout.

- Leasing or selling activities; land leasing to transport operators, sale or leasing of warehouses and offices.
- Commercial/marketing and legal procedures.

Along with the infrastructures there are also activities and services that are necessary relating to transport, logistics and goods distribution (Europlatforms, 2004: 11). According to Europlatforms report the services normally found with a Logistics Centre are (Europlatforms, 2004: 11);

- Customs control services
- Post office and bus services
- Parking areas
- Loading/unloading operations
- Restaurants/café
- Filling stations with vehicle washing facilities

The level of services provided and the size of logistics centres are differ from each other. For example table 9 below compares major logistics activities at logistics centres in selected economies of the ESCAP region.

Table 9: Comparison of the Activities at Logistics Centres in the ESCAP Region

Economies		Major Functions	
Singapore		Storage, processing, assembly, classification, transshipment, consolidation, labelling, packaging, inspection, manufacturing is partially allowed	
China	China	Storage, processing, assembly, consolidation, labelling, packaging, manufacturing, exhibition, sampling, export and import, intermediate trade, finance and logistics	
	Hong Kong, China	As a free port, all functions are allowed including storage, processing, assembly, classification, transshipment manufacturing,, exhibition, sampling	
	Taiwan Provience of China	Export Processing Area	Manufacturing, processing, assembly, packaging and labeling
		Science Industrial Area	Research and Development, manufacturing support and education for high-tech products
		Special Area	Trade, warehousing, and transport for building international logistics centre in Asia-Pacific region
Japan		Foreign Access Zone	Storage, processing, assembly, labeling, packaging, classification, inspection, testing and exhibition of imported goods.
		Free Trade Zone	Storage, processing, assembly, manufacturing, , inspection, testing, transformation, packaging, labeling, export, and exhibition.
Korea		Storage, processing, material handling, exhibition, distribution, repair, and other international logistics activities.	

Source: United Nations, 2002: 30.

2.6.4. Advantages/Benefits

Nowadays, the high service quality standard and specialization are the key words for competitiveness and surviving from the effects of globalisation. Growing competition is forcing companies for more efficient logistics solutions (Europlatforms,

2004:3). Logistics centres are an essential tool for more efficient, customer oriented logistics. Because Logistics Centres can offer;

1. Logistics chain optimization
 2. Lorry utilisation optimization
 3. Warehouse utilisation optimization
 4. Manpower organisation optimization
- as well as
5. Total transport costs reduction
 6. Total industrial costs reduction
 7. Personnel costs reduction
 8. Transport operators total turnover raise (Europlatforms, 2004: 4).

Europlatforms report in 2004 stated that transport and logistics operators benefiting from many advantages from operating inside a specialized area equipped with all the related services and dealing solely with logistics services (Europlatforms, 2004: 12);

- Connection with the main road/rail/port networks
- Transshipment availability
- Using integrated logistics services
- Using public services

The benefits and the advantages may be divided into several sub-groups as several reports and authors have considered them previously.

Benefits for the ports; the benefits of distant dry ports implementation mainly derive from the modal shift from road to rail; dry ports that implemented a seaport's immediate hinterland and have train connection to the seaport provides the advantages below (Roso and Lumsden 2009:91)

- increases the seaport's terminal capacity
- has potential to increase seaport's productivity
- congestion in seaport's caused by numerous trucks is avoided (one train can substitute for some 35 trucks on average in Europe).
- dry ports also serve as a depot for storing empty containers.
- new logistics solutions are created by the establishment of dry ports

Benefits for shippers; Logistics centres provide shorter delivery times, lower distribution costs, wider service integration, better information service, material flow control, savings on administrative revenues, improved sea port access, green marketing and more competitive prices in the long term. (Roso and Lumsden 2009:92, Sezen and Gürsev, 2014: 109).

Benefits for the region&country; Especially with a train connection from ports to logistic centres, congestion in roads, accidents, road maintenance costs and local pollution are reduced. Also they make the rural areas more attractive for the establishing new businesses, providing new job opportunities and resulting development of the rural area. In addition they are good solutions where long trailers are not allowed to pass through cities for safety reasons in some countries. (Roso and Lumsden 2009: 91). Establishing logistics centre will help to attract foreign investments into the country (Rodrigues, 2009: 77).

Intermodality benefit; Logistics centres should offer more multimodality solutions (rail/road/short-sea-shipping) that single transport and logistics companies cannot reach themselves. This will also increase the volume of goods transported and reduces costs in such cases as using shuttle trains for trailers and containers. Intermodality also should increase frequency of the transportation which is important from the customer perspective (Jaržemskis, 2007: 51, Europlatforms, 2004: 5).

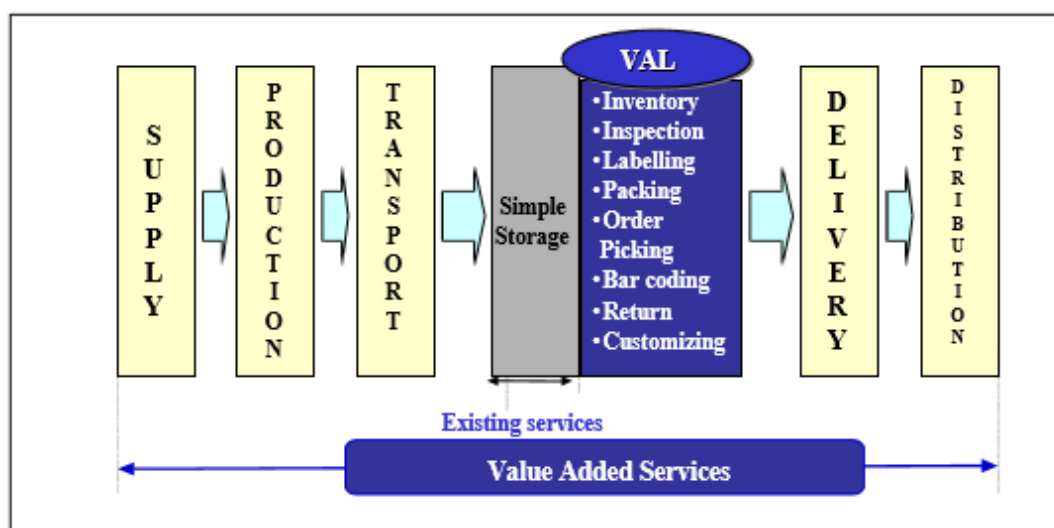
Benefits for Logistics Service Providers; Logistics centres have perfect conditions for logistics service providers. Jaržemskis explained each benefit as summarised below.

- **IT Solutions;** IT solutions play an important role in planning, executing and control of logistics processes. But small transport and logistics companies are not able to use special IT softwares for their operation management. Their turnovers are too small for IT solutions. Logistics centres could play the consolidation of turnovers role and due to economies of scale the companies can get possibility for more efficient operation planning and control (Jaržemskis, 2007: 51).
- **New transport flows;** The services such as warehousing and modern equipments that logistics centres provide should attract new goods/customers for the logistics companies. Cargo volumes will also

increase due to synergy into logistics centres. Turnover for forwarders, carriers, insurance companies, freight operators and loading companies will grow-up for “new goods” (Jaržemskis, 2007: 51).

- **Additional services;** Additional services such as customs infrastructure, postal/bank/insurance services, rent of offices, filling stations, washing facilities, packaging, customs clearance, research activities, centralised electric supply and electric appliances, telecommunication services should reduce costs and increase goods volume of separate companies within logistics centres (Jaržemskis, 2007: 51).
- **Value Added Services;** United Nations report proposed that the main VAL activities in a logistics centre are (United Nations, 2002: 27, 28):
 - Receiving goods and preparing for shipments, packaging
 - Storage, order picking, distribution
 - Customizing, quality control, testing of products
 - Assembly, adding parts and manuals, installing and instruction, repair
 - Reverse logistics; returning empty packaging
 - Product training on customer’s premises

Figure 18: VAL Service of Logistics Centres in Port Area



Source: United Nations, 2002: 27.

- **Cost sharing;** Sharing cost of both basic services and additional services such as storage facilities, IT-systems, service development and knowledge give advantages for logistics companies (Jaržemskis, 2007: 51).
- **Quality;** Quality standard for companies involved in logistics centre activity should be one of active marketing elements. For customers' decisions working of the company within logistics centre should be "quality mark" (Jaržemskis, 2007: 51).
- **Know-how;** Know-how performance and control can be distributed between the logistics service providers (Jaržemskis, 2007:51).

Joint marketing. The companies which work within logistics centre could provide joint marketing. It is especially an advantage for small companies, which have no financial possibility for their own marketing (Jaržemskis, 2007:51).

Horizontal Collaboration; The other important reflection of logistics centres is horizontal collaboration. Logistics centre supports free competition on site, and intends to attract a wide range of freight and logistics companies. They aim to generate synergies among companies with the potential benefit of economies of scale. They also facilitate companies sharing of know-how and resources to improve their economical and productive performance and also strengthen the competitiveness of companies on a national and international level through collaboration (Du and Bergqvist, 2010: 6, 8; Cereno, 2008: 4).

2.6.5. Ownership and Shareholders

Du and Bergqvist stated that three main types ownership model for logistics centres (Du and Bergqvist, 2010: 7);

- owned by private companies mainly serves their interests rather than for the pupose of regional development,
- owned by a a public authority that allows open access for all interested parties;
- based on private-public participation (PPP-model).

According to the UNESCAP the ownership of dry ports can be public, private or public-private partnerships (UNESCAP, 2013b: 15). Europlatforms stated that The

Private Public Partnership (PPP) model is the most common and competitive ownership model for Logistics Centres because of financial, infrastructure and planning reasons. Considering that the Logistics Centre is a long-term enterprise and it may reach millions of square meters, building a Logistics Centre requires huge investment therefore at least in the start-up phase, financial support from Public Authorities becomes important (Europlatforms, 2004: 12).

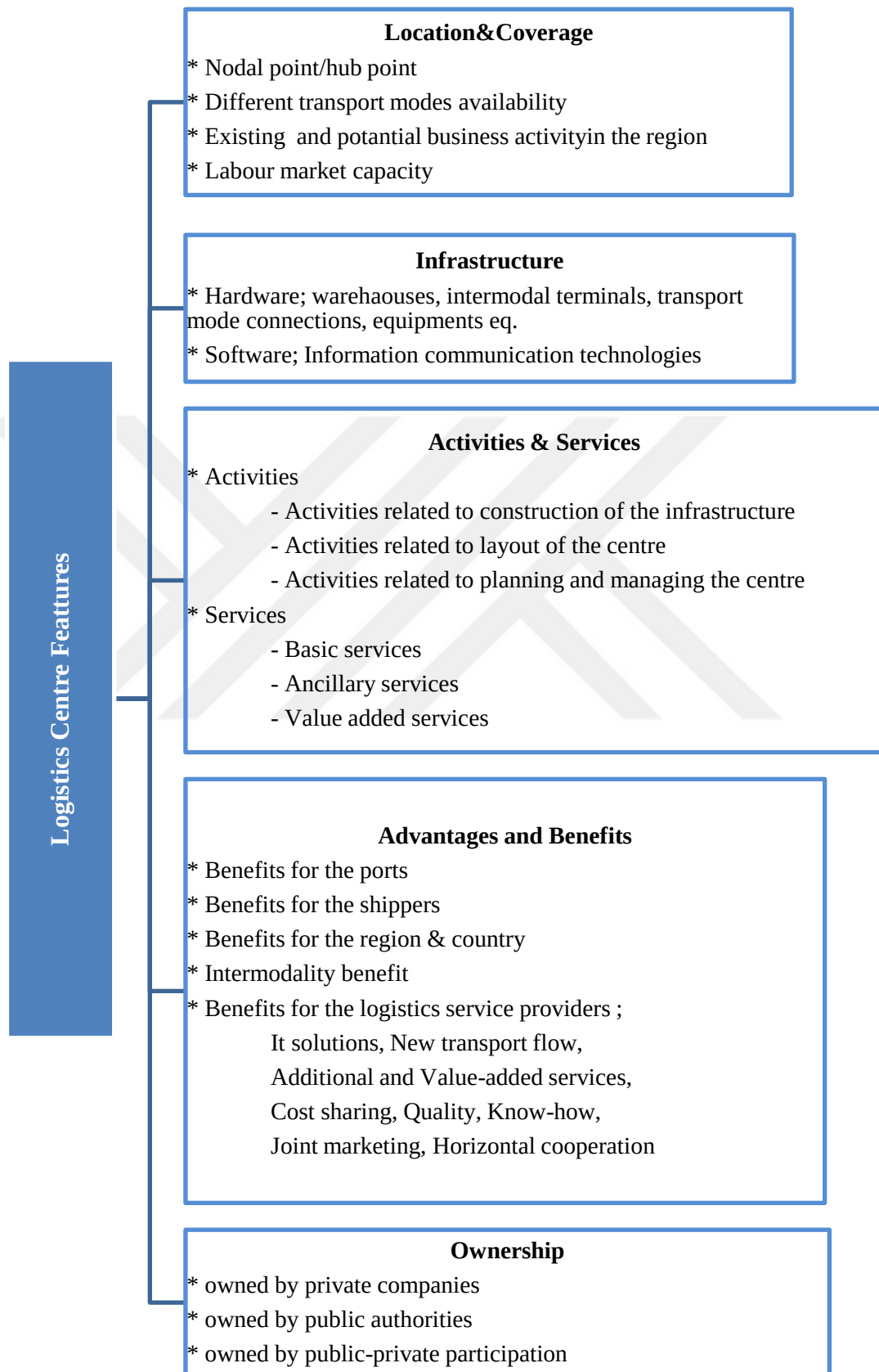
Meidute suggested that any private investment into a logistics centre project has some risk implications; therefore, to compensate such risks public funds are necessary. However, if the project succeeds, it will result with gains for the private investor (Meidute, 2007: 114).

Europlatform defined shareholders on the basis of the share capital of most companies is subscribed between (Europlatforms, 2004: 13);

- National and local territory planning Public Authorities
- National and local railway companies
- Local transport associations
- Chamber of Commerce
- Banks
- Insurance companies
- Industrial associations

In reviewing the literature, main findings regarding to the most important features for efficient Logistics centres development has been summarised in figure 19 below.

Figure 19: Logistics Centres Features



2.7. FUTURE TRENDS

The scope of logistics companies are expanding geographically and by offered services. Many researchers refer that networking and collaborating between the logistics centres will be one of the most important trend in the future. For example, Rodrigue and Notteboom (2008) introduced the term “logistics pole”. Logistics poles form a regional load centre network consisting of several logistics zones and seaports and inland locations. Heaver (1993) suggests that network dynamism between ports and inland locations and among logistics centres. The paper stresses that the networks also will help to develop service standards between logistics centres. Rimienne, K et al. (2007) states that as logistics centres evolve and expand, development through collaboration and networking will become increasingly important for sustainable competitiveness (Du and Bergqvist, 2010: 20).

Bergqvist also determines the logistics trends below in his another research (Bergqvist, 2011: 20, 21);

Increased containerization. While global trade continue to grow, the use of load units will be increasing as well and overall, economics of scale in container shipping improve the container shipping cost efficiency. **Deregulation and harmonization of rail markets.** In Europe, deregulation and harmonization of the rail markets maintain competition, cost efficiency, more innovation and creativity in the marketplace. **International collaborations.** More international alliances and cooperations are established aiming to improve the international shipping efficiency. **Mergers and Acquisitions.** According to statistics, the number of merger and acquisitions within the global transportation and logistics sector increased. **Development of dry ports.** As ports have realized effective and efficient hinterland system's importance, dry ports are being developed at rapid pace throughout Europe. **Rail-shuttles and semi-trailers.** Transporting containers and semi-railers to and from the Port increase the volumes in the rail shuttle systems. Currently, almost all logistics centres in Europe rail shuttles. In the future, differentiation and specialization on the freight type and load unit such as semi-trailers, swap-bodies, bulk, reefers, express goods, specific sectors would take place (e.g., furniture, groceries), etc. **Multipurpose.** As the terminal operation's market enlarge, more and more terminals interested in

intermodality and develop multipurpose terminals. **Marketing.** Increased awareness of the environmental benefits of intermodality, more and more shippers use intermodal transport as a tool for marketing.

According to Leading global commercial real estate services firm Colliers International Group Inc. e-commerce and evolving delivery methods will shape the future of logistics. Their global logistics report “From First Mile to Last Mile” states “critical need for more extensive logistics and warehousing networks in towns and cities worldwide to support urban”. The report also examines the primary factors that will impact warehousing and logistics over the next years, include (Colliers, 2015: 3, 4, 6, 16, 18).

Digital Trends: In global market either a home PC activity or mobile users – especially in developing markets- are leading the e-commerce. The consumer pool will increasingly consist Generation X, Y and the Millennials which is ‘technologically savvy’. Most of CEOs see mobile technologies more important for customer engagement than any other digital tool and global Transportation and Logistics CEOs giving priority adopting digital technologies to create value.

Population & Consumption Trends: Increases in urbanization and majority of the population increasingly comprising Generations X, Y and the new Millennials will create more concentrated consumer markets and complete change in consumer behavior and logistics/warehousing needs. In other words; much larger population will be living in towns and cities in the world, using their digital tools for their purchases and this will lead a far bigger and more robust logistics and warehousing network across the world to support online demand.

Containerised Growth: The Increasing Importance of Port-centric Logistics: Container shipping around the world has been growing dramatically since 2000, because of this increasing demand. Also major ports have required to improve their infrastructure in order to meet the needs of larger vessel size, with deep water ports and handling equipments etc becoming a necessity. These developments also resulted change in trade routes both the in North American and European markets. In accordance, Port-centric logistics becoming increasingly important in global logistics and shipping industries.

Key Clusters & Physical Infrastructure Expanding: To meet increasing demand, new logistics frameworks and warehouse infrastructure investments have been made worldwide.

First Mile Facilities Expand: As a result to the growth of e-retailing, installing more sophisticated 'first mile' larger distribution facilities that total floor area with automated picking and sortation systems are required.

Last Mile Space Contracts: E-commerce retailers have started to install smaller urban warehouses within urban community catchment areas to shorten delivery routes and provide quick delivery services to online customers.

According to the Colliers International report in 2015 strategic alliances between the retailers, freight and logistics providers is going to be one of the most interesting trends that will foster further market evolution. The most important reason for that is expanding volume of e-commerce; it increases the demand for more sophisticated warehousing and distribution facilities. There are four stages of logistics market evolution (Figure 20) (Colliers, 2015: 29).

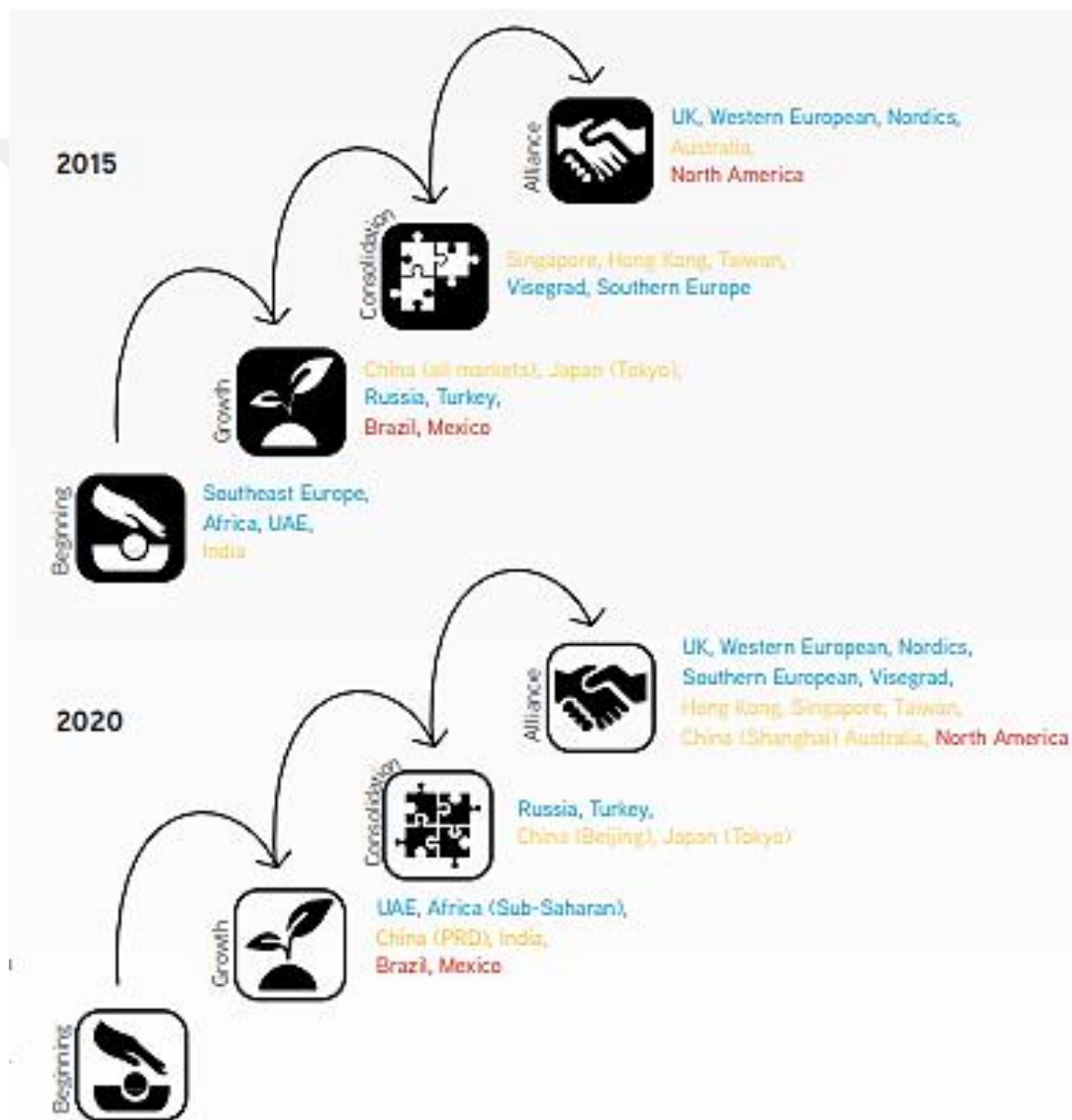
Stage 1 – Beginnig. In this early stage, there is a limited competition in the logistics market, it has grown but in a fragmented way, often smaller units are built at low specifications owned by many small operators. Southeast Europe, Africa, UAE and India markets can be classified in this stage by 2015 but by 2020 they will move to the second stage of Growth.

Stage 2 – Growth. In this stage there is more more competition arised from local and international markets. As the market continues to develop, logistics services become more complex including service differentiation and deepening segmentation. China (all markets), Japan (Tokyo), Russia, Turkey, Brazil and Mexico markets can be classified in this stage by 2015 but by 2020 they will move to the third stage of Consolidation.

Stage 3 – Consolidation. In this stage degree of competition is intensive, logistics companies go for more service differentiation in order to secure their market share. Logistics operators and retailers move in to major cluster cities in this phase. Singapore, Hong Kong, Taiwan, Visegrad and Southern Europe are regarded to be in this stage by the 2015 and they will move to the last stage, stage 4 – strategic alliances, by 2020.

Stage 4 – Strategic Alliance. In this stage, market actors emerge adopting different business models like new strategic alliances between logistics service providers start. UK, Australia, Western European and North America markets are already in this stage and by 2020 countries like Hong Kong, Southern European, Taiwan, Singapore, China will also move to this stage.

Figure 20: Stages of Logistics Market Evolution



Source: Collier International, 2015: 29.

2.8. LOGISTICS CENTRES IN THE WORLD

The logistics centres have launched to operate with the increase of trade flows in the world are especially attracted by their size. These areas, which have at least 100 hectares, are generally located far away from urban areas. Different types of logistics centres have been constructed across the world, the level of services provided and the size of logistics centres differ from each other. Logistic centre formations with some examples in different continents of the world are examined below.

2.8.1. Logistics Centres in Europe

The White Paper published in Brussels on 28 March 2011 by the European Commission determines the European Union (EU) transportation strategies. Globalization, international collaboration, integration and economic growth are seen as major issues in transportation. The topics highlighted in the 2011 book are productivity and environmental awareness in resource utilization under the heading of sustainability. For the competitive and resource efficient transport system 10 targets are set in the white book 2011 as follows (Tanyaş et al., 2012; 21, 24, 25):

- To develop and expand new and sustainable fuel and drive systems. Reducing vehicles using conventional fuel by half in 2030. Achieving a 40% reduction in aviation's sustainable low-carbon fuel use by 2050, reducing the fuel emissions of tanker ships by 40% by maritime.
- To use of more efficient energy-based transport methods, optimizing the performance of hybrid transport chains.
- In 2030, to create efficient and green freight corridors, 30% of the land transportation which is over 300 km will be transformed into railway and waterway transportation. In 2050, this ratio will be increased to over 50%. To realize this doing new infrastructure investments.
- To complete the European high-speed railway network in 2050, to triple the existing network length in 2030 and ensure that the majority of medium-distance passengers are transported by rail.

- To make it fully functional the expanded EU TEN-T multi-modal transport network in 2030, increase the information based quality and capacity of the network.
- Connecting all the airports to the high-speed railway network and the ports and inland waterways to the railway cargo network in 2050.
- Increase the efficiency of transportation infrastructure through the use of information systems and market economy based enterprises.
- To provide the contemporary air traffic management infrastructure in 2020 and to complete the European Common Airspace. To ensure the spread of the road and inland road transport management system and the European Global Navigation Satellite System (Galileo).
- Establish the framework of European mixed transport information, management and payment system in 2020.
- Realize the principle “users and pollutants pay”. Cooperate with the private sector to prevent mistakes and wrong subsidies, to finance future transportation investments by creating growth.

As can be seen from the above targets; more efficient and sustainable European Transport System depends on three issues: Vehicle efficiency, use of cleaner energy, more efficient and safer use of transportation networks with information and communication systems. Logistics centres can be considered as a tool for the European Union to implement its transport strategies and objectives.

Today more than 80 logistics centres are operated on national or international scale and numbers of new logistics centres are in the planning and construction phase in Europe (Sezen and Gürsev, 2014: 105). The new deep water ports has faced some challenges in global logistics market Europe; traditional ports have witnessed a decline in activity or have remained stable where Northern German and Baltic, Greek, Turkish and Spanish ports witnessed the biggest growth rate in volumes since 2010 as shown in table 10 below (Colliers, 2015: 9).

Figure 21: EMEA Key Logistics Clusters**Table 10: TEU Growth Rate of EMEA Port**

Port	TEU Growth Rate (2010-2014)
Athens (Piraeus)	322%
Sines	221%
Gdansk (Tricity)	138%
Algeciras	64%
Baltic Ports Mersin	57%
Istanbul(Ambarli)	48%
NAPA (Rijeka)	46%
London	40%
Genoa	29%
St Petersburg	25%
Hamburg	25%
Duisburg	23%
(Dusseldorf)*	25% (2014-2015 H1)

Source: Colliers, 2015:9

The Municipal Port Management of Rotterdam encouraged the Distriparks formation which is more or less examples of integrated (intermodal) logistics centres in order to consolidate cargo flows to the port and create port-related employment. The Port of Rotterdam encompasses three distriparks; The Eemhaven, The Maasvlakte, The Botlek. Rotterdam Distriparks are fairly close to the Rotterdam port container terminal because cargos in the distriparks mainly come by container. The main aim of the Rotterdam Distriparks is just-in-time delivery at lower cost. (Sutranet, 2007: 9; United Nations, 2002: 42);

Table 11: Highlights of Distriparks in Rotterdam

<i>Trade, distribution and marketing centres (TDMCs) Distriparks in Rotterdam</i>			
Distriparks	Starting date of Operations	Size (1,000 m ²)	Remarks
Eemhaven Distripark	1989	237	Close to the home terminal of ECT
Botlek Distripark	1990	165	Close to the Botlek Port area Handles many chemical products
Maasvlakte Distripark	1 st phase: 1998 2 nd phase: construction	848 1 017	Close to the ECT Delta terminal Most companies constructing their warehouses
Total		2 267	

Source: UN, 2002: 42.

The Port of Rotterdam operates as a landlord port. Therefore, Rotterdam Municipal Port Management (RMPM) provides the infrastructure for the port and distriparks and leased out the infrastructure to private. The private companies have to invest in all superstructures; pavement, rail tracks, cranes, sheds, equipment, etc in terminals and buildings, equipments etc in distrparks. In addition, all employees are under private companies' responsibility. Though the disripaks are not free zones, they have some similar features; each company within the distriparks is be considered as a free zone, because if a company fulfils certain conditions and establishes required online computer connection and meeting certain standards with Customs, they can obtain a license from Customs that permits carrying out certain basic Customs formalities on itself. This system makes the custom clearence procedure faster and there are approx. 1,500 such free points in the Netherlands (UN, 2002: 45).

Figure 22: Map of the distriparks in the Rotterdam Port



Source: Sutranet, 2007:10

London Gateway Logistics Park is one of Europe's largest logistics centre with the UK's most advanced deep-sea port. It provides many benefits and advantages for supply chains across the UK in a highly sustainable way. Its leading features can be summarised as below.

- 859,000 sqm of total area,
- An international hub with tri-modal infrastructure via sea, rail and road including channel tunnel connection,
- Logistics park located next to the UK's most advanced deep-sea port,
- Linked to the UK's strategic rail network (W10),

- Has a single management team for both port and logistics park,
- Situated close to the consumer and workforce market which helps to reduce supply chain costs, saving on lorry miles and CO2 emissions,
- Advanced 24/7 port automation with state-of-the-art handling equipment and
- Reduced stock holdings.

Figure 23: London Gateway Logistics Park and its Masterplan



Source: DPWorld London Gateway Logistics Park Brochure, 2016:15.

The logistics centres in Europe, especially in Western Europe, are located close to trade, production and consumption centres, logistics terminals such as ports and airports, and at points of intersection of roads such as highways, inland waterways and railways. There is an association in Europe called Europlatforms representing national associations and more than 100 individual European Logistic Platforms, Europlatforms (European Association of Transport & Logistics Centres) was established December 18th 1991 and approximately 80 logistic villages where 2400 companies operate, in 10 countries across Europe (Italy, Spain, France, Portugal, Germany, Denmark, Greece, Hungary, Ukraine and Luxembourg) are member of the Europlatforms. The aim of the association is “to support the strategic importance of logistics villages and the development and logistics activities of intermodal terminals in terms of development”. Logistic villages in Europe are seen in Figure 24 (<http://www.europlatforms.eu/#>, 26.09.2016).

Figure 24: Map of Logistic Villages in Europe

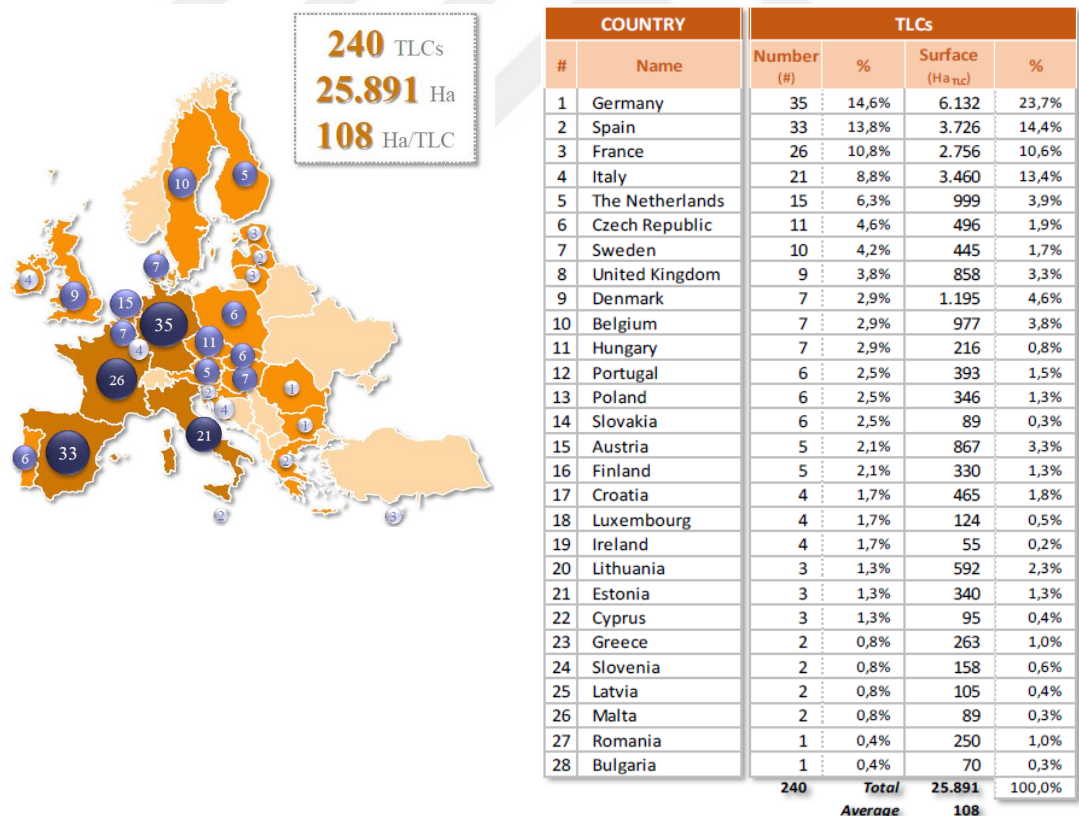


Source: Europlatforms (<http://www.europlatforms.eu/#>, 26.09.2016).

Europlatform has 240 TLCs (Transport and Logistics Centre) members across Europe, they are average size of 108 Ha/TLC. Four countries, Germany, Spain, France

and Italy, represent 47,9% of the total number of TLCs and 62,1% of their gross surface. These centres' hard key elements are usually; access control, service area, business centre, transport & logistics warehouses, intermodal warehouses, intermodal terminal. There are 35 TLCs in Germany, most of TLCs are developed by Public-Private Partnerships and all of them TLCs provide rail connectivity. There are 33 TLCs in Spain facilitating intermodality and 21 TLCs in Italy, facilitating road-rail intermodality in most of them. Compared to other countries maritime and airport connectivity is very weak in Italian TLCs When we checked the features of TLC's in the rest of the European countries; especially road-rail intermodality the most representative, they are mostly financed by Public-Private Partnerships (only in UK most of them private), connectivity with sea, air and inland waterways are limited (Europlatform, 2015: 3, 4, 5, 15, 16).

Figure 25: General Overview of Logistics Centres in Europe



2.8.2. Logistics Centres in Asia

United Nations report for logistic centre development in the ESCAP (Economic and Social Commission for Asia and the Pacific) region classifies the ports into two groups (United Nations, 2002: 29).

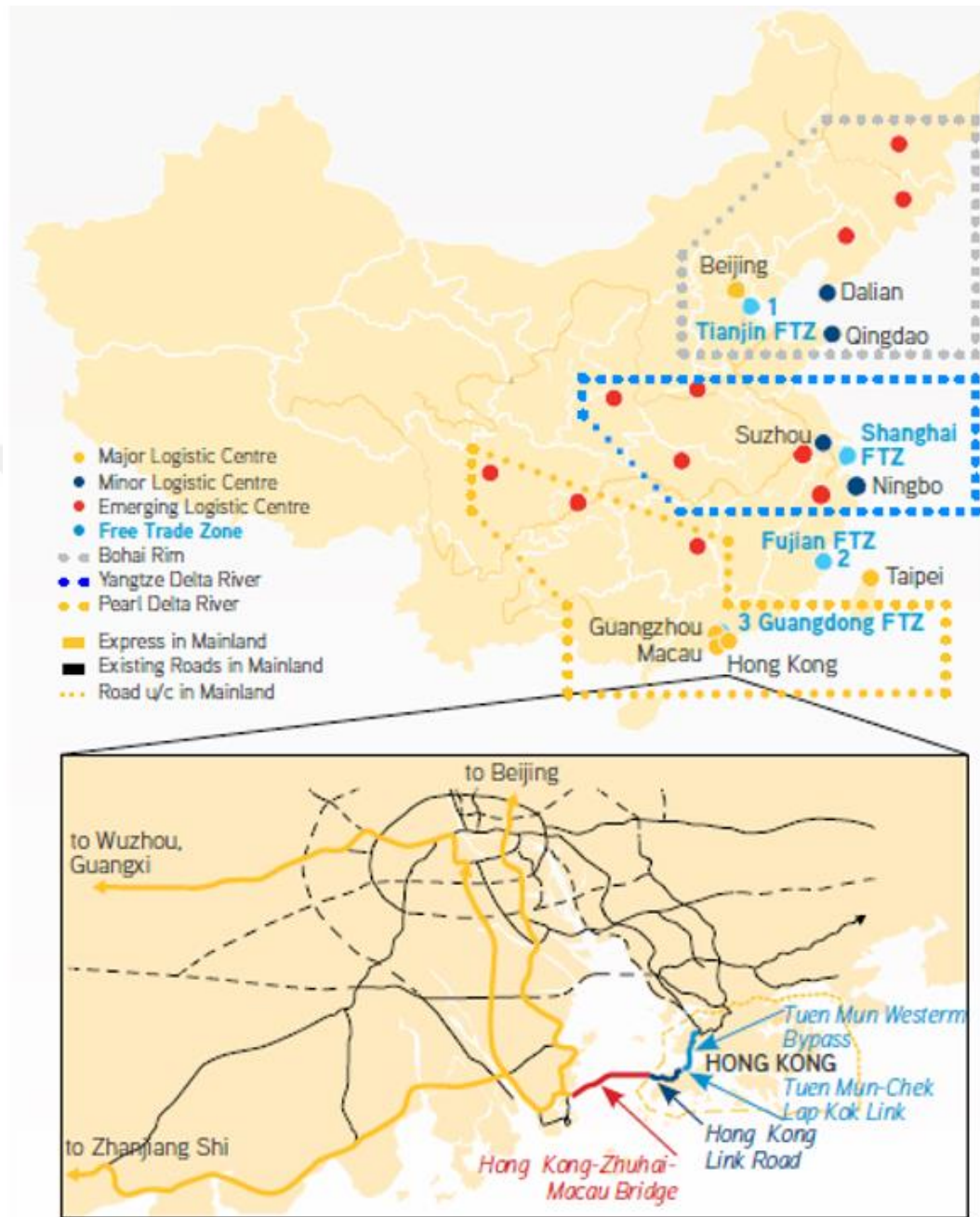
- Logistics centre oriented ports
- Production oriented ports

When the Port Island 1 was built in the Port of Kobe in Japan in the late 1970's, logistics centres' development began in the ESCAP region. China has been constructing logistics centres behind the ports due to the increasing demands for international freight since the 1980s. The Port of Singapore is considered as a role model for a large-scale logistics centres within the ESCAP region. (United Nations, 2002: 29).

In China, apart from major logistics hubs in the Yangtze River Delta (YRD), the Pearl River Delta (PRD) and the Bohai Rim, new logistics centres are planned in the north and west part of China that are away from the coastal areas. At the same time High-Speed Railway (HSR) network are being built comprising over 25,000 km. In tandem, the China Railway Corporation is rolling out a network of 18 intermodal terminals across China (Colliers, 2015: 12).

The Singapore Government started to work to turn a city-state into a transshipment hub for the Southeast Asia region in the 1980s. Singapore have become a hub of international trade and a base for many multinational and regional companies by its well-established sea connectivity with more than 600 ports in more than 120 countries in the world. Singapore has all the necessary factors to become a regional hub such as excellent infrastructure support, "having advanced seaports and airports, an efficient telecommunication network, a pro-business environment, intensive use of information technology, wide-ranging logistics capabilities, as well as a skilled and professional workforce". Over 5,000 MNCs have chosen Singapore as their Southeast Asian logistics/distribution hub and over 6,000 logistics companies in Singapore, most of them are located in distriparks, provide comprehensive services to the MNCs.

Figure 26: Future Logistics Clusters in China



Source: Colliers, 2015: 12

GLP Park Lingang (Shanghai) is a modern logistics park provides 830,000 m² of high-quality logistics facilities 32 km away from Yangshan deepwater port, it is ideal for both domestic and international retailers, manufacturers and 3PLs.

Figure 27: GLP Park Lingang (Shanghai)

It has an immediate transportation network;

- Intermodal Train Yard nearby
- 32 km from Yanstan Deep Water Port
- 4.2 km from Shanghai Nangang Roll-Roll Terminal
- 37 km from the Pudong International Airport
- 75 km from the Shanghai City Centre
- 80 km the Hongqiao Airport.



Affiliated Facilities;

- Intermodal train yard
- 4 railways
- 8 loading&unloading lines
- 680,000 sqm yards
- Connected to 18 railway stations all over China
- 100 teus per vagon
- River terminal centre
- Yangshan bonded zone

Source: <http://www.gplingang.com/english/Overview.html> (16.02.2017).

Currently, Port of Singapore has five container terminals but they are reaching their limits as a global maritime and logistics hub. Therefore, there are new infrastructure developments in Singapore port to further strengthen its position as a key global hub. Singapore Port Expansion will be completed by 2017 and this will increase the total container terminals' capacity by more than 40% to 50 million TEUs per annum (UN, 2002: 45, Colliers, 2015: 11).

Keppel Distripark Singapore, In 1993, PSA built the 23 hectare Keppel Distripark (KD) within the Free Trade Zone to serve as a premier cargo consolidation hub and provides extensive warehousing facilities. It is located in south of Singapore and it has direct link to 3 container terminals; allows containers to be transported within 5 minutes. It is also close to major roadways, highways, airport and major industrial hubs. Located within the Free Trade Zone allows cargos brought into it are tax exempt. The following facilities are available in KD (<https://www.singaporepsa.com/our-business/shippers-services/keppel-distripark-kd>):

- 45 warehouse modules ranging from 1,000 m² to 5,100 m², including four blocks of storage space, warehouse areas, and a height of up to 14,6 m to support high rack automated storage and retrieval systems.
- Container stacking yard with 560 TEU capacity,
- Lorry parking lots.
- Mechanical workshop to attend to equipment maintenance needs.
- Diesel kiosk to supply fuel for cargo handling equipment.
- Network of CCTV systems to ensure a high level of security.

The following services are available in KD:

- Cargo consolidation, de-consolidation, trans-loading and storage
- Cargo sampling, surveying, remarking and re-packing
- Central Distribution Centre (CDC)
- Co-loading among Non-vessel Operating Common Carriers (NVOCCs)
- Liner Services Container Operations
- It uses integrated computer system called KDNet. It is used to control shipments processes and procedures and provides on-line tracking of the containers.

Figure 28: PSA Singapore Keppel Distripark



Source: <https://www.singaporepsa.com/our-business/shippers-services/keppel-distripark-kd>

The Korean government introduced establishment of customs-free zones (CFZs) for encouraging International Logistics Centres in ports like the Ports of Busan, Kwangyang, and Incheon in December 1999 to compete the ports in Northeast Asia. Objectives of establishing Customs-free-zones is to develop major Korean container ports as logistics centres in Northeast Asia. They summarise the objectives as follows:

- promote international Cargo flow,
- to attract foreign investment,
- to enable growth of the port and port city mutually.

In order to achieve these objectives various activities related to international logistics are allowed in the customs-free zones (CFZs). These activities are mainly “loading, unloading, transportation, storage, exhibition, repair, sale or processing of goods, brokerage of international ship transaction and supporting businesses such as financing, insurance, customs clearance, and wastes collection or disposal” are also provided in the zones (UN, 2002: 55, 56).

Table 12: Tax favors and incentives for the logistics centres in ports in the ESCAP region.

Country	Tax and incentives for the construction of logistics centre in ports
China	15% of tax on juridical persons levied. If a firm operates D.C. more than 10 years, tax on juridical persons will be exempted for a specified period of time. When the specified period expires, 50% of tax will be exempted.
Hong Kong, China	16% of tax on juridical persons and 15% of property tax levied. No tax on interest income, dividend income etc.
Taiwan Province	In Export Processing Areas, import tax, commodity tax and trade tax will be exempted. In Science Industrial Areas, tax on juridical persons will be exempted for 4 years when a firm increases its facilities.
Japan	35% of tax on juridical persons and total tax on permanent asset will be exempted for firms that employ more than 20 workers for 5 years.
Singapore	Economic Development Board and Trade Development Board provide various incentives. 10% of tax on juridical persons levied. Over depreciation system adopted.

Source: UN, 2002: 56, 57

ATL Logistics Centre Hong Kong (ATL) is established in 1981 as a subsidiary of DP World. ATL Logistics Centre is the world's first and largest intelligent multi-storey drive-in cargo logistics centre. It is located in the Kwai Chung Container Terminals in Hong Kong and has an easy access to commercial, population centres and airport (http://www.atlhk.com/en_atl_main.html).

Figure 29: ATL Logistics Centre Hong Kong



Source: http://www.atlhk.com/en_atl_main.html

ATL Logistics Centre providing of 9,3 million square feet total floor area consisting of 2 sections. Centre A has 7 floors and Centre B has 13 floors offering warehouse and office leasing as well as full range of logistics operations such as (UN, 2002: 58; http://www.atlhk.com/en_atl_main.html);

- Inventory Management
- Transportation / Distribution Planning
- Stock Replenishment
- Local Distribution
- Cross-docking
- Synchronized Material Flow
- Return Goods Arrangement
- Pick & Pack Services
- Other Value Added Service; Garment-On-Hanger Operation, Bar Code Scanning, Palletization, Slip Sheet Wrapping, P.O.V. Handling, Heavy Cargo Handling, Damaged Container Transloading, Surveyor Inspection, Damaged Pallet Repairing

The strategic geographical position of United Arab Emirates (UAE) and its improved logistics infrastructure make it one of the largest logistics hubs in the World. Dubai has become as a re-distribution destination for international shipments. The logistics industry constitutes more than 14.0 per cent of Dubai's GDP and it is expected to growth in the UAE, as a result of government investment plans despite of uncertain global economic conditions and low oil prices.

According to the Colliers International Report (2015) although port infrastructure has improved significantly in UAE in recent years, the transportation network in the region requires upgrading. Road freight does not reach all locations and rail has not played a significant role in the transportation of goods within the region. However, there are projects to upgrade rail transport in UAE such as Gulf Railway and Etihad Rail projects. They are planned to connect major centres with major transport hubs, distribution centres and storage facilities and free trade zones across the UAE. Another project have launched an e-commerce hub Matajircom. The project involves various sized warehouses, offices, e-commerce tailored solutions such as fulfilment facilities and services, financial infrastructure and call centre services. The hub will allow a customer 100% ownership, 100% repatriation of capital and profits, and will offer 0% corporate and income tax (Colliers, 2015: 10, PR Newswire 2016).

Dubai Logistics City is part of the Dubai World Central. It is first truly integrated logistics platform in the world. It is situated next to the upcoming Dubai

World Central International Airport (4th largest airport in the world) and adjacent to the Jebel Ali Port and Free Zone. It provides sea-air or air-air transport combinations, logistics and value added services, including merge-in-transit, customization, postponement, packaging and labeling light manufacturing and assembly. Its planned capacity is 12 million tones of air cargo annually. It has own staff village surrounded with sports and leisure facilities covering ver 21,5 km². Dubai Logistics Centre offers (http://www.uaefreezones.me/uaefreezones.me/dubai_logistics_city.html;

<http://www.uhyuae.com/uploads/Dubai%20Logistics%20Citydoc9122012123059.pdf>).

- Air cargo terminals
- Land plots for industry or contract logistics
- Land plots for forwarders
- Land plots for aviation industry
- Shared forwarders warehouses
- Integrator facilities
- DLC office park
- Amenities
- DLC Labour Village, easy availability of skilled workforce
- 100% foreign ownership
- No personal, income and corporate taxes and various tax treaties concerned with the avoidance of double taxation
- Liberal visa regulations and free capital transfers

Figure 30: Dubai Logistics Centre

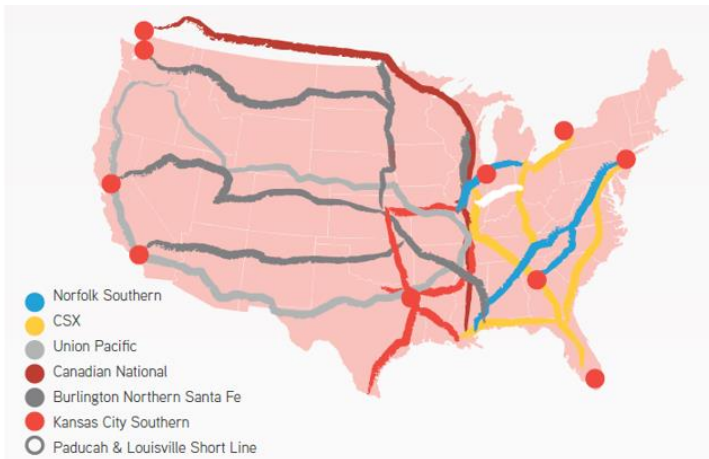


Source: <http://www.uhyuae.com/uploads/Dubai%20Logistics%20Citydoc9122012123059.pdf> (15.02.2017).

2.8.3. Logistics Centres in US

US has a number of major logistics hubs, each supported by a high density of modern logistics facilities and intermodal infrastructure. There are two important trends significantly influence the US market. An significant increase in the port-centric infrastructure quality. It will be critical for the logistics clusters to have the required infrastructure to connect both first mile and last mile logistics. A vast increase in intermodal traffic, intermodal freight has been the fastest growing transportation mode in the US growing by over 400% since 1980. All of the key North American logistics clusters are linked by intermodal infrastructure, in particular the Class 1 Railroad Network (Figure 31).

Figure 31: North American Logistics Clusters: The Class 1 Railroad Network



Source: Colliers International

Opening of the new Panama Canal in 2015 increased the competition for container imports as trade with Asian countries increase once the canal expanded. Ports need to get ready for postPanamax vessels because these ships are expected to account for 60% of global capacity by 2030, from only 16% today. Key Logistics Clusters in US are shown and numbered in below map (figure 32) their features are compared in table 13 below.

Figure 32: Map of Key Logistics Clusters in US



Source: Colliers International, 2015: 8

Table 13: Key Logistics Clusters in US

No	Logistics Cluster Name		Features
1	The Port of Metro Vancouver	26 ha	% 67,8 of its cargo delivered by rail, A post-Panamax ready port, 5. largest port authority in North America
2	The Port of Los Angeles	65 ha	Handle 40% of US container traffic Alongside the largest combined US industrial market by inventory Ongoing works on terminal expansion and integrated with new rail terminals to handle %50 of its cargo by rail eventually.
3	BNSF Alliance Global Logistics Hub	7,300 ha	First holistically planned intermodal/inland port facility, started in 1993 Hosts the Fort Worth Alliance Airport - the world's first 100% industrial airport Sits on Interstate Highway from Mexico to Canada, and the Texas Highways Set to benefit from continued re-shoring of manufacturing operations to the U.S. and Mexico.
4	BNSF Logistics Park Chicago	176 ha	The nation's busiest inland port, Connected to west coast ports in Long Beach/ LA
5	Ridge Port Logistics Centre	607 ha	Refrigerated express rail service for produce and other perishables grown in central California and railed to Chicago

Source: Colliers, 2015: 8

2.9. LOGISTICS CENTRES IN TURKEY

Development and current situation of the logistics sector and logistics centre types in Turkey have been explained in this section below.

2.9.1. Overview of Logistics Sector in Turkey

Turkey's geo-strategic location situates the country as a platform for economic, social and cultural exchange between Europe and Asia and Russia to Africa, allows it to be a hub for over USD 2 trillion freight carried in the region. According to Colliers International strategically located hubs in Turkey which are integrated in the global supply chains will gain further importance. According to LODER (Logistics

Association in Turkey), Turkey's current logistics industry size is estimated to reach USD 108-140 billion by 2017. The establishment of global supply chains and Turkey's focusing on the export-oriented development strategy has been a powerful forces shaping contemporary freight distribution. Global logistics players are also interested in investing in Turkey such as DP World and APM terminals because of the growth potential of the Turkish logistics sector. Turkey has one of the largest road transport fleets in Europe. Maritime transportation is the mostly used transportation method for Turkey's exports and imports. Railways in Turkey is operated by the General Directorate of Turkish State Railways (TCDD). Since most of the railways have been built long time ago they need to be modernized. TCDD is also building logistic centres/villages in Turkey that will serve to lower the transportation costs by offering various different transportation modes within. TCDD plans to spend TL 514.9 million on building these logistics centres/villages and it is estimated that, total freight carried in the centres/villages will reach a total of USD 500 billion by 2023 (Invest in Turkey, 2014: 6).

Turkey moved up from 39th place in 2010 to 27th in 2012 but moved down 34th place in 2016 out of the 160 countries in the World Bank Logistics Performance Index Global Ranking. Turkey's LPI's ranks and scores since 2007 compared in table 14 below (World Bank, 2017).

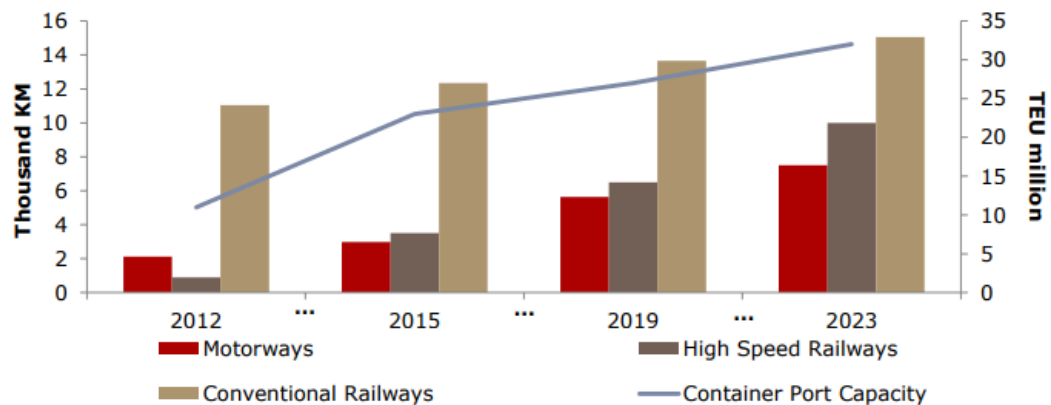
Table 14: Turkey's LPI ranks and scores since 2007

Years	2016	2014	2012	2010	2007
LPI Rank	34	30	27	39	34
LPI Score	3.42	3.50	3.51	3.22	3.15

Moreover, it is ranked third in the top 10 upper middle income performing countries. According to the index, Turkey performed better than 3 out of 4 BRIC countries - Brazil, Russia and India. Turkey has also had a rising performance in Linear Shipping Connectivity Index through the years. Turkey has moved up 9 places from 2010 to 2013, establishing itself at 20th place, surpassing India, Russia and Brazil (Invest in Turkey, 2014: 19, 21).

Turkey is part of the European transport networks program with corridors IV and X extended to Istanbul. Turkey significantly invests in the construction of railroads, the electrification of the existing network and especially the connection of railroads to harbour logistic zones. Turkey is also actively involved in the TRACECA program, in the Europe-Caucasia-Asia transport corridor and is developing the railroad network connecting the East Anatolia (Kars) to Azerbaijan and Georgia (CIHEAM, 2014)

Figure 33: Growth of Logistics Infrastructure in Turkey



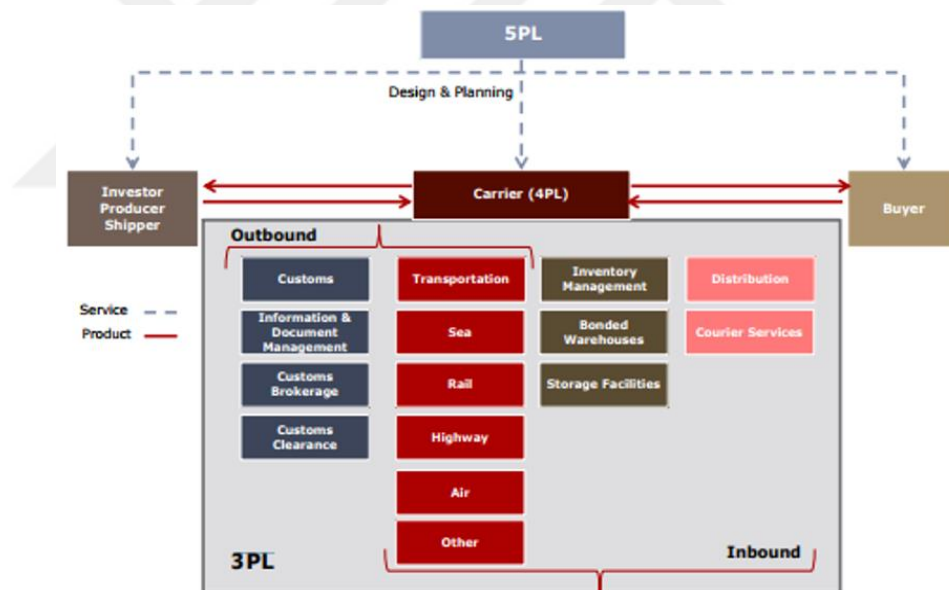
Source: (CIHEAM, 2014)

The Government of Turkey included the Logistics Sector in the 10th Developments Plan's priorities list as "Program for Transition from Forwarding to Logistics". Sector has high expectations about the resolution of the long-lasting problems and enactment of the required legislations. All representatives in the sector think that Logistics Master Plan should be attached the top-priority on government's agenda (UTIKAD, 2016/3: 30). Logistics Coordination Committee has been established and announced in the Official Journal of 28th January. The committee has been established for the purpose of stipulating the working principles of public organizations and institutions providing services in connection with logistics and coordinating the affairs between them. (UTIKAD, 2016/3: 30).

The figure 34 below demonstrates an overview of logistics service providers, 3PL, 4PL and 5PL, within the supply chain. "A 3PL firm is a firm that provides and manages logistics services within the supply chain between

manufacturer/shipper/wholesaler and distributor/customer”. Turkish 3PL companies have also excelled in this sector. The leading local logistics companies such as Omsan, Netlog, Reysaş, Mars, Borusan and Ekol are keen to take advantage of improvement of the industry. The total revenues of these companies grew with 21% from 2008 to 2012. Also all of the top 10 global 3PL companies either directly operate or have agencies in Turkey. “A 4PL provider creates value by redesigning everything from the business perspective to processes as it manages logistics for carriers, forwarders or warehouses”. Few logistics companies also provide 4PL services in Turkey. Another emerging sub-sector for logistics service providers is “5PL firms plan, organize and implement logistics solutions on behalf of a contracting party by using the appropriate technologies as needed.” Currently, there are no 5PL companies operating in Turkey (Invest in Turkey, 2014: 15).

Figure 34: Overview of logistics service providers, 3PL, 4PL and 5PL in the supply chain.



2.9.2. Logistics Centres in Turkey

Logistic centres, which compose the main backbone of the logistic sector, are gaining new living spaces for the cities as well facilitating the urban traffic. The centres of the load and warehouses located in the city are being transferred to newly constructed logistic centres and the integration of these areas with the city is being provided. They contribute to the facilitation of the urban traffic by realizing the

loading-unloading and transportation activities in the outside of the city (<http://en.tcdd.gov.tr/logistic-centres+m129>, 11.05.2016).

The purpose of the Logistics Village project is not only limited to Turkey's internal and external transport. The main objective of the project is to make Turkey “a logistics base” in its geographic area. Efforts to establish logistics centres launched in 2005 by TCDD and were conducted in coordination with the institutions, organizations, association such as Infrastructure Investments General Directorate (AYGM), Turkey Chambers and Commodity Exchanges (TOBB), Turkey Economic Policy Research Foundation of Turkey (TEPAV) , Customs and Tourism Enterprises Co. (GTI), UND Logistics Investment Co., Rail Freight Association (DTD), International Transport and Logistics Service Providers Association (UTİKAD) (http://www.denizticaretgazetesi.org/turkiyenin_lojistik_koyleri_haber8059.html, 11.05.2016) .

Legal infrastructure of logistics centres in Turkey edited by adding "Specialized Organized Industrial Zones (OIZ)" to the definitions of " Organized Industrial Zones (IZ)" with the Law on the Amendment of the Organized Industrial Zones (OIZ) Act at the official newspaper dated November 10, 2008 and numbered 27050 (Repeated) (Law No: 5807, Article 1 (d)). Regarding the organization and duties of the Ministry of Transport, Maritime and Communications Decree of Law No. 655 dated 26.09.2011 has been issued. Related law organizes duties of "General Directorate of Railway Regulation" in connection with logistic villages in article 8. The definition of the duties as it follows; "Planning and designing location, capacity and similar qualities, determine the procedures and principles for the establishment and to allow them, co-ordinate the relevant organizations in the establishment of necessary infrastructure and required land acquisition and monitor and control the operations of Logistic villages, centres or bases " (Bayhan et al., 2017: 560).

Logistic Centres have been initiated by both public and private sector since 2000's in Turkey. The lack of a legal framework for logistics centres is causing these attempts to break apart and even harm each other in some areas. These logistics centres, some of which are logistic centres / villages like in western countries and some of which are just in a transfer terminal scales. This will lead to inefficient investments

that are not well planned throughout the country and their functions, sizes and locations are not appropriate to regional existing and potential needs (Tanyaş et al., 2012: 51).

The logistic centres already operated or are planned to be built in Turkey initiated either by public/TCDD or the private sector can be summarized as follows.

2.9.3. Public Sector Initiated Logistics Centres

There are 3 type of public initiated logistics centres in Turkey, except TCDD logistics centres the other two types are only in planning stage.

2.9.3.1. TCDD Logistics Centres

In Turkey the construction of a logistics village was started mainly in 2013 and is expected to reach 13 villages into service by the end of 2016. The TCDD's Logistics centres project was launched in 2005, the project was to establish facilities in logistics centres in 17 locations in different scales, and later Bitlis (Tatvan) and Habur centres had also been involved in the project. In addition, the General Directorate of Infrastructure Investments (AYGM) began to establish a logistics village in Kemalpaşa, so the total number reached to 20 logistics village in Turkey; İstanbul (Halkalı), Kocaeli (Köseköy), Eskişehir (Hasanbey), Balıkesir (Gökköy), Kayseri (Boğazköprü), Samsun (Gelemen), Denizli (Kaklık), Mersin (Yenice), Erzurum (Palandöken), Uşak, Konya (Kayacık), İstanbul (Yeşilbayır), Bilecik (Bozüyük), Kahramanmaraş (Türkoğlu), Mardin, Sivas, Kars, İzmir (Kemalpaşa), Şırnak (Habur) ve Bitlis (Tatvan). These cities are a high potential of freight transportation in connection with organized industrial zones (<http://en.tcdd.gov.tr/logistic-centres+m129> and http://www.denizticaretgazetesi.org/turkiyenin_lojistik_koyleri_haber8059.html, 11.05.2016)

Map of Turkey showing the locations of logistics centers categorized by their development status:

- Logistics Centers put into service (9):**
 - Avrupa Yakası / İstanbul
 - Halkalı/İstanbul
 - Köseköy/İzmit
 - Geleмен/Samsun
 - Gökköy/Balıkesir
 - Uşak
 - Hasanbey/Eskişehir
 - Sivas
 - Bogazköprü/Kayseri
 - Palandöken/Erzurum
 - Tatvan/Biiliis
 - Karaman
 - Mardin
 - Habur
- Logistics Center under construction (5):**
 - Bozüyük/Bilecik
 - Kayacık/Konya
 - Türkoglu/Kahramanmaraş
 - Yenice/Mersin
 - Kars
- Logistics Centers in design, tender and expropriation studies (7):**
 - Kemalpaşalızmir AYG
 - Kaklık/Denizli

Source: <http://www.tcdd.gov.tr/content/33> (11.02.2019)

So far, 9 projects completed (Istanbul (Halkalı), İzmit (Köseköy), Samsun (Gelemen), Eskişehir (Hasanbey), Balıkesir (Gökköy), Uşak, Denizli (Kaklık), Erzurum (Palandöken) and Kahramanmaraş (Türkoğlu)) put into operation and construction of the 5 project continues. Bilecik (Bozüyük), Konya (Kayacık), Mersin (Yenice), İzmir (Kemalpaşa) and Kars logistic centres are under construction. The tendering, project and expropriation works of the other 7 logistic centres are going on (<http://www.tcdd.gov.tr/content/33>, 11.02.2019).

According to plannings; warehouses, road - rail links, loading, unloading and storage areas, the bonded area, dangerous and special goods loading, unloading and storage areas, bulk unloading areas, repair and washing facilities, gas stations, social and administrative facilities, customers offices, staff offices and social facilities, truck parking, other parking areas, management centres, banks, restaurants, hotels, kiosks and information centres will place in these centres. Once the logistics centres put into service, they will contribute to Turkey's logistics sector \$ 40 billion annually, with the additional 27 million tons transport capacity, 9 million square meters of container stock and handling area and provide employment for 10.000 people in logistics centres spreaded to all regions

(http://www.denizticaretgazetesi.org/turkiyenin_lojistik_koyleri_haber8059.html,

11.05.2016, <http://www.dunya.com/guncel/iki-yilda-7-lojistik-koy-faaliyete-basladi-6sinda-ise-acilis-yakin-275815h.htm>, 19.05.2016)

In the logistics centres, established by TCDD includes;

- Container loading, unloading and storage fields,
- Customs bonded area,
- Customer offices, parking area, truck parking,
- Banks, restaurants, hotels, maintenance-repair and cleaning facilities, gas stations, warehouses,
- Admission and dispatch tracks of the train formation.
- Trains, manoeuvring and loading and unloading areas are planned, constructed and operated by TCDD but storage, warehousing and other logistics areas are planned constructed and operated by the private sector (<http://en.tcdd.gov.tr/logistic-centres+m129>, 11.05.2016).

TCDD, taking into account the following factors in selecting the location of logistic centres;

- expansion availability of the land and infrastructure,
- geographical location,
- natural environment and land use,
- proximity to the railway line and highway,
- connection to the sea and airport,
- provision of different transport modes combinations and intermodal transport facilities,
- proximity to the organised industrial zones,
- the variety of industries in the region, urbanization and planning decisions, regional industrial development plans.

Apart from Logistics Village projects, also “Cargo centre project” was launched; projects in Karapınar, Andaval- Nigde, Tırmıl-Mersin and Horozluhan are executing http://www.denizticaretgazetesi.org/turkiyenin_lojistik_koyleri_haber8059.html, 11.05.2016).

2023 targets announced by the Ministry of Transportation and logistics centres is one of the notable titles in. Turkey’s industry disconnected rail map is one of the

most important obstacles in the development of the logistics centres. (<https://tr.railturkey.org/2013/12/05/2023-hedefleri-lojistik-merkezler>, 12.05.2016)

2.9.3.2. Logistics Free Zone

The authority of establishing, managing and operating Logistics Free Zones, Foreign Trade Centres and Logistic Centres at home and abroad have been given to Ministry of Economy General Directorate of Free Zones, Foreign Investments and Services in 2011. However, details of this decree have not been determined. It is estimated that Logistics Free Zone's logistics activities and current free zone activities will be carried out jointly and companies in this region will benefit from free zone incentives (exemptions). It is also mentioned in the decree that "Foreign Trade Centres and Logistics Centres" will be established. It is not clear whether these centres, which are also called Economy Free Zones, are the same or different centres, and whether they include Logistics Specialist Organised Industrial Zones. Because it is a new arrangement, it will take time to establish such free zones in Turkey (Tanyaş and others, 2012: 52, 53).

2.9.3.3. Ministry of Customs and Trade Logistics Centres

Regarding the duties of the Ministry of Customs and Commerce, Decree Law No. 640 dated 03.06.2011 has been issued. The sections related to the logistics centres are as follows (Tanyaş and others, 2012: 53).

ARTICLE 12. e) Allowing, operating, operating and supervising the opening and operation of temporary storage places, warehouses, logistic centres, warehouse stores, stores and sales departments; carry out the liquidation procedures in accordance with the customs legislation.

ARTICLE 7. ç) To implement the free circulation entrance, export, re-export, destruction, abandonment of customs procedures and to carry out customs procedures in free zones, logistic foreign trade zones, foreign trade centres.

ARTICLE 15. h) (Annex: 8/8 / 2011-649-KHK / 23 md.) Effective and efficient planning and implementation of the movement of goods subject to customs inspection and To coordinate the activities to be carried out for this purpose, to

establish the procedures and principles regarding the establishment and operation of the logistics centres and the operations to be carried out.

2.9.4. Private Sector Initiated Logistics Centres

In addition to public logistics centres, the type of private sector initiated logistics centres in Turkey can be summarized as follows.

2.9.4.1. Logistics Specialized Organized Industrial Zones

These logistics centre are established under the status of Specialized Organised Industrial Zones according to Article 4 of the Law on Organized Industrial Zones (OIZ) no. 4562 with the approval of Ministry of Science, Industry and Technology. The Specialized Organised Industry Zone is defined in the same law as follows; "Organized industrial zones where facilities operating in the same sector group and in sub-sectors included in this sector group with Organized Industrial Zones established for logistic purposes ". The law brings at least 500 acres of land for the establishment of Organized Industrial Zones. The expropriation and infrastructure costs of the Logistics Specialized Organized Industrial Zones are covered by the public and the firms are allocated for the cost price. Organized Industrial Zones are managed by board of directors elected by entrepreneur delegation (Tanyaş and others, 2012: 51)

The first official application to the Ministry of Industry, Science and Technology is the Mersin Logistics Specialized Organized Industrial Zone. The area planned to be established 3.000.000 m², it is 14 km from Mersin International Sea Port, 1.5 km from D-400 highway, 2.2 km from railway. Total closed area is planned as 460.000 m² and 46 companies (on 15.000 m² - 30.000 m² parcels) are planned to be located on the first stage (Tanyaş and others, 2012: 52).

2.9.4.2. Road Transport Logistics Centres

Consolidation and deconsolidation centres for road transport where the private sector transportation companies come together and are located close to the city and main road transportation route. They provide storage and transportation services. Thus, transport and storage companies that serve a scattered figure in the city benefit from the synergy of using a common space. The most typical example is Ankara Kazan Logistics Base. After being established by 45 international transportation companies with cooperative status, the base converted into an incorporated company has a gross area of 700.000 m², 198.000 m² closed and the rest is open area. There are over 400 companies and about 2,000 people working, with 2,500 TIR truck traffic per day. There are warehouses / warehouses, bureaux, customs administration, maintenance and fuel facilities, TIR-truck park and social facilities. There is no rail connection of the logistics base with highway connection. Another example for the road logistics centre is Manisa Organized Industrial Zone Logistics Centre which was invested by the management of in 2010 with a total of US \$ 20 million. The total area is 306.000 m² and the centre is located in Manisa Organized Industrial Zone ownership. The centre has a closed area of 11.000 m² in total. In the centre there is a TIR-truck park, a warehouse with a temporary storage permit, there is a customs area and container terminal area for TIR and trucks of 7.700 m² size. The centre is connected to the TCDD Muradiye station with a blind line of 7.7 km in length and has an extension area of 10 hectares follows (Tanyaş and others, 2012: 55).

2.9.4.3. Goods/Cargo Terminals

Such enterprises are defined in the Road Transport Directive as follows; "A building or facility which has the features specified in this regulation and which serves domestic and international goods / cargo transporters / operators and / or agencies, commissioners, transport organizers and their goods / cargo senders" and they are operating with T3 authority document. If loading / unloading / transfer etc in these facilities are taking place and agencies / brokers / organizers are active, T3 certificate is required. Only those who provide garage / parking services do not need T3

certificate. Although there are not many such terminals in Turkey, the Marmara Nakliyeciler Terminali in Gebze can be an example (Tanyaş and others, 2012: 55).

Logistic centres listed below are being operated or planned to be built around in Turkey by the private sector (table 15).

Ankara Logistics Centre; It is the first international logistic centre in Turkey and built over a 389,000 square meter area in 2014 by 45 international transport companies; more than 400 companies are operating within it. The centre has a capacity of 2,500 trucks/day and is expected to be connected to the railway network. **Tekirdağ Logistics Centre;** A logistic centre close to the Tekirdağ Harbor and Asyaport (an international container port) would increase import/export freight activity and decrease transportation cost and time. Asyaport will increase the container traffic in the region, therefore there is need for a logistic centre to manage the increased freight traffic. **Çorlu Logistics Centre;** Çorlu Logistics Centre with a total area of 150 hectare, advantageously located on an international highway and will be connected to the Anatolian side by rail when the Northern Marmara Highway is ready. The region is already attracted by domestic and international investors. **Marmara Ereğlisi Logistics Centre;** Marmara Ereğlisi is a very active region with Martash Port, Botaş Port and fuel shipments carried out with dolphins over the sea. This region stands out with its LNG, petroleum, scrap metal, agricultural products and an active region where petroleum is dispatched through the Martaş port and Botaş port. **Muratlı Logistics Centre;** Intermodal railway freight terminal has been planned to be built in Muratlı//Tekirdağ. The intermodal railway freight terminal that is to be built will ensure a more efficient use of the railway tracks of the Trakya region. With the advance of the BALO project, freight wagons from Anatolia will reach Europe through the Tekirdağ port. **Havsa Logistics Centre;** The infrastructure of the logistics centre has been completed and planned to be operated by the private sector. The centre creates an opportunity to store, pack and process agricultural and animal products and sent to target markets. It's extremely close to the border gates and international road and rail networks.

Table 15: Private Sector Initiated Logistics Villages and Centres

Private Sector Initiated Logistics Villages and Centres	
1- Ankara Logistics Base	Operating
2- Manisa Organized Industrial Zone Logistics Centre	Operating
3- Marmara Nakliyeciler Terminali (Gebze)	Operating
4- Tekirdağ Logistics Center	project, expropriation etc
5- Çorlu (Tekirdağ) Logistics Center	project, expropriation etc
6- Marmara Ereğlisi (Tekirdağ) Logistics Area	project, expropriation etc
7- Muratlı (Tekirdağ) Intermodal Railway Freight Terminal	project, expropriation etc
8- Havsa (Edirne) Logistics Center	project, expropriation etc
9- İskenderun (Hatay) Logistics Village	project, expropriation etc
10- Antakya (Hatay) Logistics Center	project, expropriation etc
11- Osmaniye Logistics Center	project, expropriation etc
12- Kocaeli Logistics Village	project, expropriation etc
13- Samsun Logistics Village	under construction
14- Trabzon Logistics Center	project, expropriation etc
15- Şanlıurfa Logistics Center	project, expropriation etc
16- Diyarbakır Logistics Center	project, expropriation etc
17- Konya Logistics Center	project, expropriation etc
18- Bursa Logistics Center	project, expropriation etc
19- Karabük Logistics Center	project, expropriation etc
20- Mersin Logistics Domain Organized Industrial Zone	project, expropriation etc

Source: <http://www.ankaralojistikussu.com/>, <http://www.moslojistik.com/>,
<http://www.capital.com.tr/iller/tekirdag/liman-ve-lojistik-kenti-olacagiz-haberdetay-9066>,
http://www.trakya2023.com/uploads/docs/rapor/trakyaka_lojistik_master_plani.pdf ,
Mevlana Kalkınma Ajansı (2016), Tanyaş, et al. (2012), Yılmaz, et al., (2014),
<http://www.milliyet.com.tr/kocaeli-ye-dev-lojistik-destegi-geliyor-kocaeli-yerelhaber-604519/>, <https://anahtar.sanayi.gov.tr/tr/news/samsun-lojistik-koy-projesi/1931>,
<http://www.radikal.com.tr/trabzon-haber/trabzona-lojistik-merkez-kurulmasi-istegi-1303979/>, <http://www.bursaeskisehirbilecik2023.com/rapor/pdf/2.pdf> ,
<http://www.karacadag.org.tr/ContentDownload/%C5%9Eanl%C4%B1urfa%20Lojistik%20Fizibilite%20Raporu.pdf>, Tanyaş, et al. (2013) , Yıldıztekin and Çelik (2012),
<http://www.karacadag.org.tr/SayfaDownload/Diyarbak%C4%B1r%20Lojistik%20Merkez%20Raporu.pdf> ,<http://www.invest.gov.tr/en-US/infocentre/publications/Documents/TRANSPORTATION-LOGISTICS-INDUSTRY.pdf>.

İskenderun Logistics Centre; A logistics village will be built in Iskenderun along with a logistic centre each in Antakya and Osmaniye. In Iskenderun, a Logistic Village is planned within the port basin with large-scale storage facilities, mainly railway-

connected. To support this, a logistics centre in Antakya is planned, in which the storage functions are kept to a minimum, there is no railway connection, it is planned for the more general freight forwarding operation. In the northern region, a second logistics centre based in Osmaniye with a limited storage capacity, not in the port hinterland, but with a railway connection has been targeted. **Kocaeli Logistics Centre;** Two separate Logistic Villages will be established in the Kocaeli region on the Izmit-Kartepe-Gölcük line. It is planned that the logistic village will be the 'distribution heart' of the region. The studies shows that freight counts in Kocaeli will be high. Therefore two logistics centres in Kocaeli should be built also to decrease highway traffic by transferring freight to railway transportation. **Samsun Logistics Centre;** Samsun accommodates four different transportation infrastructure - sea, air, road and rail - and 5 organized industrial zone. It is planned for the further development of the cities of Samsun, Amasya, Çorum and Tokat. The project has been approved and feasibility, capacity and construction studies are in progress. Its planned to be 672 acres area in total employing 2000 people. **Trabzon Logistics Centre;** The project is currently seeking the opinions of logistics companies about how to build an efficient and competitive logistics centre. Ahmet Hamdi Gürdoğan, Chairman of the Eastern Black Sea Exporters' Association (DKİB), said that the logistics centre for international trade, which will make Trabzon a logistical base, should be brought to the city immediately. **Şanlıurfa Logistics Centre;** With the completion of irrigation projects, it is determined that the agricultural production of Şanlıurfa will increase, the industry will develop rapidly and in this case, export volume and logistics activities will increase. Based on the current situation and future projections, the logistics centre investment will accelerate the development of the province. 456 acres of land is allocated for logistics centre. At the first stage it was proposed to establish the logistics centre in Organize Industrial Zone Management and in the long term it might be transferred to a separate logistics centre management in the long run. **Diyarbakır Logistics Centre;** Currently, most of the industrial areas in Diyarbakır are operating in organised industrial zone, which is an important advantage, while the number of warehousing and other logistics facilities is low indicating that there is a need for planned logistics infrastructure investments. The first part of the logistics centre investments to be made by TCDD as the terminal area and the second part of the logistics centre planned as

Logistics Specialized Organised Industrial Zone is considered as the most effective investment model for Diyarbakır Logistics Centre. It is expected that the logistics sector will develop with the increasing trade in the region. According to the project, a logistics centre will speed up the process. **Konya Logistics Centre;** It is planned to transport important products for the Konya industry and agriculture from Konya Lojistik Centre. It will be close to the Konya Organized Industrial Zone to provide an active use of the logistics village. The total area allocated for the logistics centre is 1000 acres area, 700 acre region that is right outside TCDD's 300,000 square meter railway freight transfer station. **Bursa Logistics Centre;** Bursa's logistic potential is depends on the 13 industrial districts it has. Therefore is a clear need for a logistic centre. A railway freight transfer station and a consolidation centre have been planned to be built. **Karabük Logistics Centre;** Karabük has a developed iron-steel industry, forestry industry and mining and textile sectors are developing as well. In addition its closeness to Central Anatolian markets, it already has a railway station and being on the intersection of the Istanbul-Ankara-Samsun highway. These makes Karabük havng a high potential location to built a logistics centre. Within this scope, "Karabük Logistic Centre Feasibility Project" was prepared by Karabük Chamber of Commerce and Industry. **Mersin Logistics Centre;** The logistics centre has been planned to be built 14 km away from the city centre and will have an area of 3 million m2. (<http://www.invest.gov.tr/en-US/infocentre/publications/Documents/TRANSPORTATION-LOGISTICS-INDUSTRY.pdf>, 06.08.2016).

SECTION 3

LOGISTIC CENTRES AS TOOL FOR HORIZONTAL COLLABORATION

3.1. HORIZONTAL COLLABORATION CONCEPT

Collaboration between companies is an agreement that based on two or more independent companies working together in order to carry out their operation. Collaborations can be considered in two ways; vertical and horizontal collaborations. Vertical collaborations occur between the companies operating at the different level(s) in the market or supply chain where Horizontal collaboration takes place between the businesses operating at the same level in the supply chain or market (EU, 2001 cited by Leitner et al., 2011: 332).

The impact of relationships between competitors has been dealt with within the research areas of strategic alliances and business networks. Studies dealt with the strategic alliance approach focus on formal agreements, since strategic alliances are mostly based on a written contract determining the scope of collaboration; how to divide the outcome and ownership etc. On the other hand the “business network approach is more concerned with both informal and formal collaboration. Powell, Koput and Smith-Doerr (1996) states that companies operates in different industries are involved various types of alliances including R&D partnerships, joint ventures, collaborative production, and co-marketing arrangements”. At the same time CEO of Centocor points the formal collaboration agreements as “the tip of the iceberg, it doesn’t include handshake deals and other informal collaborations” (Kock et al., 2005: 4, 5).

From a theoretical perspective, Horizontal collaboration can be approached by various disciplines; economy, marketing, operations researches, psychologists. The reasons why horizontal collaboration approach has started to be on the agenda of companies; “the shortening of product life cycles, fierce competition in global markets and heightened customer expectations have caused companies’ profit margins to shrink, as a result there exists a strong incentive to decrease the costs”. As horizontal collaboration between companies is a current approach for optimizing cost structures (Leitner et al, 2011: 332); Horizontal collaboration can occur among competitors or unrelated companies (Crujisen et al., 2007b: 22). Burgers et al. (1993: 419) referred to

alliances between competitors as horizontal alliances and they state that “horizontal alliances can be distinguished from vertical alliances between firms operating in adjacent stages of a value chain”. Caputa and Mininno (1996: 80) define Horizontal integration as is the co-ordination between institutions placed on the same level of the distribution channel. “Practices between companies operating at the same level(s) in the market or logistic chain are defined as horizontal collaboration” by the European Union, “Co-operation is of a ‘horizontal nature’ if an agreement is entered into between actual or potential competitors” (EU, 2011: 4).

European Union (2011) define the benefits of Horizontal collaboration as is below (EU, 2011: 4);

- share risk and costs
- increase investments,
- pool know-how,
- raise product variety and quality,
- initiate innovation faster.

On the other hand it may lead to some competition problems, such as (EU, 2011: 4);

- “the case if the parties agree to fix prices or output or to share markets”,
- “if the co-operation enables the parties to maintain, gain or increase market power and thereby is likely to give rise to negative market effects with respect to prices, output, product quality, product variety or innovation”

Bengtsson and Kock (1999: 184 and 2000:412) identified four types of cooperative relationships between competitors;

1. Coexistence: “a relationship that does not include any economic exchanges and the companies’ goals are stipulated independently”.
2. Cooperation: “tight bonds exist between companies that define and pursue common goals”.
3. Competition: “Companies rely on the same or comparable suppliers and target the same customers”
4. Co-opetition: “companies’ goals are stipulated if the competitors cooperate, but not if they compete. It is especially beneficial if cooperation takes place

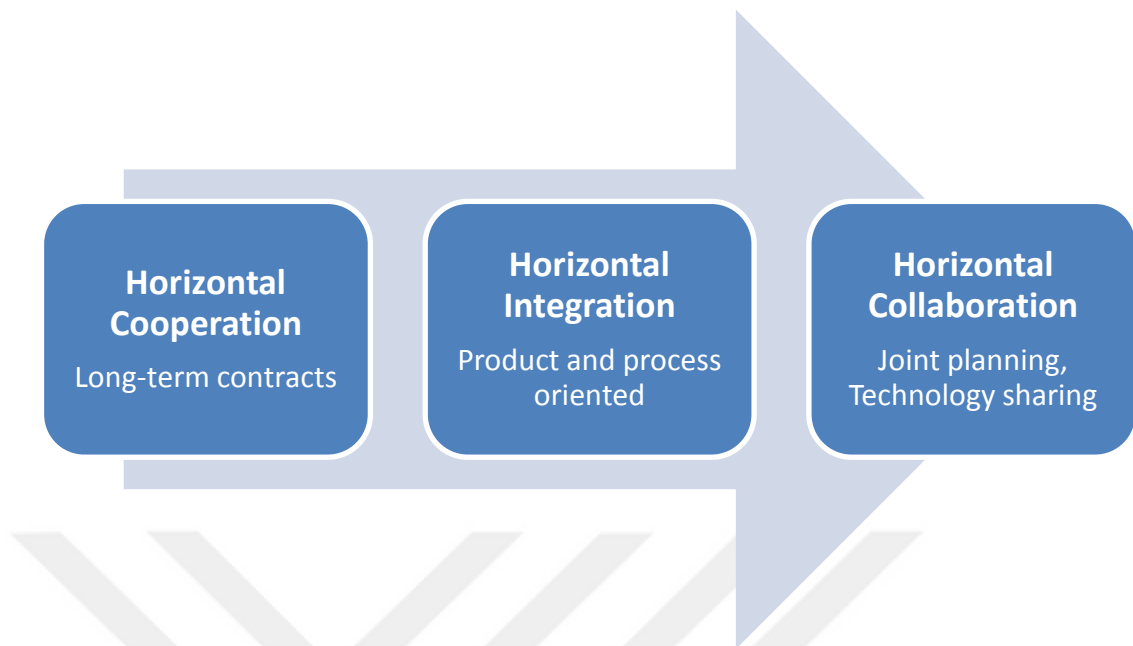
for non-core activities, while competition remains unchanged for core activities” (Cruijsen et al., 2007b: 24).

Cooperation, collaboration, alliances and partnershiping are all used to refer to concerted practices on horizontal supply chain links (Cruijsen et al., 2007b: 24). Vertical links are more common and easier to implement than horizontal links. For example horizontal links can achieve reduce inventory-carrying costs, unproductive waiting time, empty running time and improve lead time performance by adopting methods such as joint planning and technology sharing (Mangan et al., 2008: 255, 256).

Types of relationships can be considered as the minimum and maximum levels of cooperation. In between these two extremes there are cooperation types that can be perceived as “fuzzy” and lacking structure (Cruijsen et al., 2007b: 24). Cruijsen and others provide an anthology of sometimes overlapping relationship referred to as being cooperative: “service agreements, joint ventures, cooperatives, consortia, cooperative agreements, licensing, industry standard groups, action sets, (non)equity agreements, collaboratives, mutually adaptives, bilateral governance, alliances, collaborative supply chains, supply networks and partnerships” (Cruijsen et al., 2007b: 24).

Lambert et al. (1999: 166) identify the real cooperation as “there is a tailored relationship based on mutual trust, openness, shared risk and shared rewards that yield a competitive advantage, resulting in business performance greater than would be achieved by firms individually”. They also state the horizontal relationship journey starts with “Arm’s length” relationship; the degree of integration determines the degree of relationship continues with Horizontal Cooperation and ends with Horizontal Integration. Mangan and others (2008: 255, 256) determine the level after integration is as “collaboration” and according to them; while integration is product and process oriented, collaboration is focused on relationships where the relationship is more close and strong. Studies of Mentzer et al. and Golicic et al. states that collaboration entails much more than cooperation for supply chain executives, especially in terms of sharing information, risks, knowledge and profit and in the required level of closeness (Leitner et al., 2011: 333). Based on these studies Level of Horizontal Relationships can be demonstrated as in figure 36 below.

Figure 36: Level of Horizontal Relationships



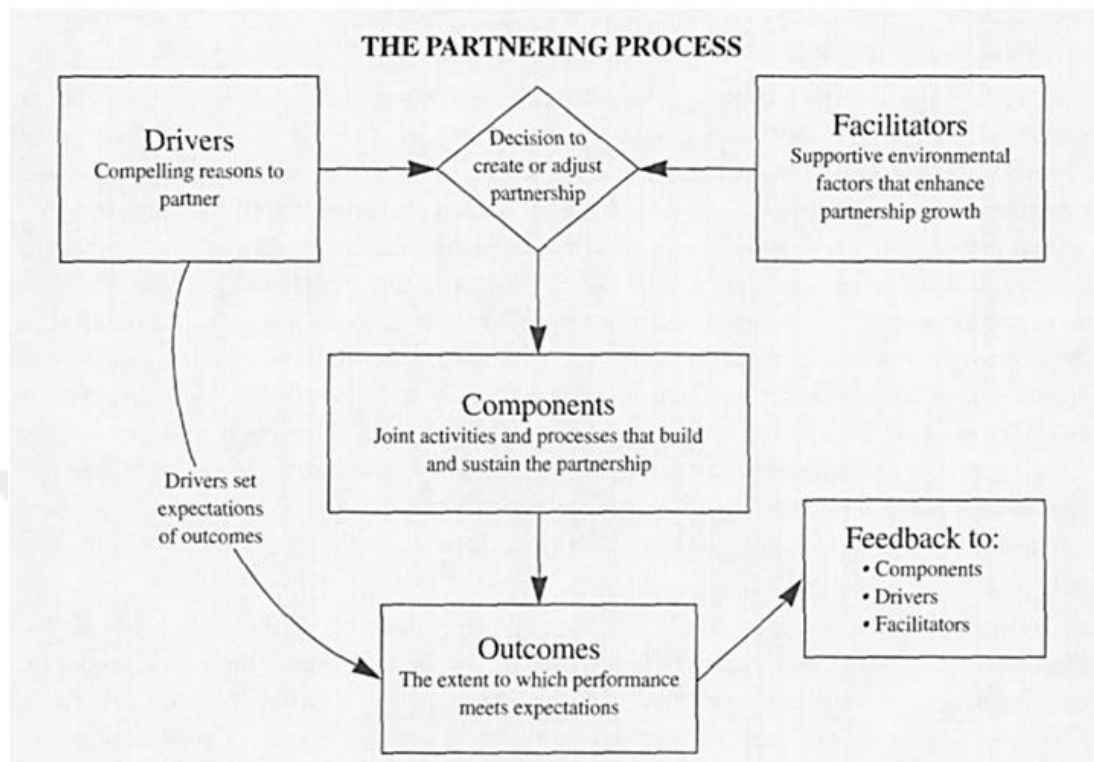
Source: Author adaptod from Lambert et al., 1999: 166, Cruijsen et al, 2007: 25 and Mangan et al., 2008: 255, 256).

Cruijsen et al (2007b: 25) categorized Horizontal Cooperation into three types. In Type 1 cooperation companies coordinate their activities and planning for a single activity or division of each company for a short-term. In Type 2, partners coordinate multiple divisions or functions for a long-term. In Type 3, each partner regards each other as an extention of itself. There is no fixed end date of cooperation and this type of cooperation is often referred to in literature as a “strategic alliance”. Whereas the type 1 and type 2 cooperations were by the absence of a formal contract, type 3 is defined as a long-term contractual agreement.

European Union (2011) determined the most common horizontal co-operation agreements that are “R&D agreements, manufacturing agreements including subcontracting and specialisation agreements, purchasing agreements, commercialisation agreements, standardisation agreements including standard contracts, and information exchange” (EU, 2011: 4).

Lambert et al. (1999) explains The Partnering Process as in the figure 37 below. The partnering process includes; drivers, facilitators, components, outcomes of the process and feedback to the parties as the final stage of the process.

Figure 37: The Partnering Process



Source: Lambert et al. (1999: 168)

3.2. HORIZONTAL COLLABORATION IN MARITIME INDUSTRY

In the maritime industry, horizontal cooperation, particularly in the form of strategic alliances, is widely seen. In recent years, the maritime sector is experiencing stable change, particularly in nature of competition. In the past shipowners and ports used to compete with one another, today, the competition is no longer between individual shipowners or ports their competitiveness stands on the basis of whether or not they belong to a successful international maritime logistics chain. Therefore more and more market actors are continually trying to gain control over the maritime logistics chains through horizontal and vertical alliances, acquisitions and mergers. Especially shipping companies have been taking the initiative in this development. Following points are underlined by the authors as a starting point for horizontal and vertical alliances (Heaver et al., 2001: 305, Van de Voorde and Vaneslander, 2009: 5, 10, 11).

- The global economy is also experiencing rapid change: international trade and also sea-bound trade have seen a major growth recent years. Consequently a international labour and capital have been redistributed and markets are more end more integrated and globalised.
- There also have been substantial scale increases on shipping companies achieved mostly through horizontal cooperation. Additionally, shipping companies have set their sights on inland transport services and terminal operators as each link should contribute to the optimisation of the chain.
- There also have been important structural evolutions within ports. Traditional stevedoring firms have evolved towards more complex terminal operating companies (TOCs). In some cases, shipping companies have established their own terminal operating branch, they may operate as dedicated terminals for the shipping company itself (e.g. Cosco Pacific), or they may operate more independently (e.g. APM Terminals).

Van de Voorde and Vaneslander analysed horizontal and vertical cooperations types in the maritime industry that showed in Table 16 below. They analyse cover only the cooperations among shipping companies, terminal operator companies, port authorities and hinterland operators (Van de Voorde and Vaneslander, 2009: 11,12).

The most recent transaction among TOC's was the takeover of P&O Ports by Dubai Ports Authority, after which the company was renamed DP World. Spanish operator Dragados was involved in takeover talks with various operators, including HPH and DP World. Among shipping companies, alliances and vessel-sharing agreements are presently the most preferred option. CMA-CGM tookover Delmas in 2005, the acquisition of P&O Nedlloyd by AP Moeller in 2006, the purchase of CP Ships by Hapag Lloyd in 2007. However, Vertical cooperation now seems to have been implemented much more widely by shipping companies. Thus shipping companies gain control over port capacity e.g. dedicated operating contracts. Table 16 provides an overview of the dedicated terminal agreements involving the top-5 container shipping companies (Van de Voorde and Vaneslander, 2009: 13, 16).

Table 16: Dedicated terminals top-5 container shipping companies

Shipping company	Terminal	Date of announcement	Terminal operator
Maersk	Rotterdam	1998	APM Terminals
	Bremerhaven	1999	APM Terminals - Eurogate
	Algeciras	2005	APM Terminals
	Lazaro Cardenas	2007	HPH
	Felixstowe	2008	HPH
	Tanger	2008	Maersk - APM Terminals - Akwa Group
MSC	La Spezia	1971	Eurogate - MSC
	Napels	2002	MSC - Cosco
	Bremerhaven	2004	Eurogate
	Antwerp	2005	PSA - MSC
	Valencia	2006	MSC
	Las Palmas	2007	MSC - Dragados
	Le Havre	2007	MSC
	Kumport		Limar Port and Ship Operators SA
CMA-CGM	Le Havre	2006	CMA-CGM - GMP
	Busan	2007	Macquarie - Bouygues - Hyundai - KMCT - BPA - KUKJE - KCTC
Hapag-Lloyd	Hamburg CTA	2001	HHLA - Hapag-Lloyd
Cosco	Singapore	2003	PSA

Source: Company annual reports cited by Van de Voorde and Vaneslander, 2009: 16

The authors analysed various existing forms of horizontal&vertical cooperations in the maritime industry showed in Table 17. It provides a detailed and updated overview of horizontal cooperations among terminal operator companies, between shipping companies and vertical cooperation between shipping companies, and Terminal Operator Companies (Van de Voorde and Vaneslander, 2009: 11, 12).

Table 17: Existing Forms Of Horizontal&Vertical Cooperations in the Maritime Industry

Players	Shipping companies	Terminal operating companies	Port authorities	Hinterland operators
Shipping companies	* Vessel sharing agreements (e.g. CMA-CGM FAL4 and China Shipping AEX 3 on North Europe - Far East from August 2008) * Joint-ventures (e.g. Swire Shipping, Ahrenkiel and MOL on Tasman Orient Line between Far East and Darwin from May 2008) * Consortia (e.g. Hamburg Süd and Hapag Lloyd on Europe - Caribbean/WCSA) * Alliances (e.g. Grand Alliance: Hapag Lloyd, MISC, NYK and OOCL) * Mergers/acquisitions (e.g. CSAV bought remaining 25% in Companhia Libra de Navegação in July 2008) * Conferences (e.g. ESPMC-WITASS Conference: Container Cargo Lines, CMA CGM, CSAV, Hapag-Lloyd, Hamburg Süd and "K" Line, to be liquidated October 2008)			
Stevedores	* Joint-ventures (e.g. CHKY Alliance carriers (Coscon, Hanjin, "K" Line, Yang Ming) and ECT (Hutchison) at Rotterdam Euromax from September 2008) * Dedicated terminals (e.g. MSC at Antwerp Delwaiedok, operated by joint venture MSC and PSA-HNN) * Share (e.g. Tangier Med Gate: 50% Eurogate Tanger (itself 20% CoMaNav, 40% Contship Italia, 40% Eurogate) and 20% CMA CGM, 10% CMA CGM subsidiary CoMaNav, as well as 20% MSC from May 2008) * Consortia (e.g. Pacific International Lines (PIL) and Container and Terminal Services (CTS) at Chittagong Container Terminal (CCT) from July 2008)	* Mergers/acquisitions (e.g. MSC 51% from NYK Ceres Terminals in New Orleans Terminals) * Joint-venture (e.g. National Container Company (NCC, 80%) and Eurogate (20%) at Baltic Container Terminal, open 2009)		
Port authorities	Concessions for dedicated terminals (e.g. APM Terminals at Lazaro Cardenas from 2008).	* Concessions (vb. Antwerp Deurganckdock by PSA and DP World since 2004) * Joint-ventures (e.g. Ningbo Port Authority and HPH in Ningbo Beilun Port Phase II since 2001)	* Alliances (e.g. Port of Rotterdam and Humber Trade Zone since 2004)	
Hinterland operators	* Block trains and capacity sharing (e.g. NYK between Rotterdam and Duisburg) * Acquisitions (e.g. Maersk acquired Roadways in UK)	* Joint-ventures (ECT in Duisburg Inland Port, with own rail and inland navigation shuttles between Rotterdam and Duisburg)		* Alliance (e.g. Railion (DB's freight section) signed a cooperation agreement with EW&S for traffic from the Benelux countries, Germany, and Eastern Europe.)

Source: Heaver et al. (2001) cited by Van de Voorde and Vaneslander, 2009: 17.

In particular, liner shipping in maritime industry has long been managed by cooperation arrangements; first in the form of conferences, then with the emergence of containerization also agreements takes place in the form of a consortium, ship sharing contracts, strategic / global alliances, capacity balancing contracts and discussion / talking contracts. Container liner industry has been concentrated on carrier alliances due to changes in the service patterns of the liner shipping industry. The changes mainly resulted from the introduction of larger vessels. When we look at the developments in the Asian shipping industry reveals the emergence of alliances. Service routes of the 70-100 different sizes container vessels increased 29 in 1992 to 35 in 1998. The alliances formation allowed expansion of service scope, increasing number of ports of direct calls which means shorter transit times. If the economic conditions and growing competition in the industry continues, alliances in shipping industry will expand from “vessel sharing to sharing of other assets, such as container boxes, inland hubs, port terminals and information systems”. (United Nations, 2002: 10, 11, 12, Premti, 2016: 2).

In June 2013, Maersk, MSC and CMA CGM, the three largest freight lines in the world, announced exploring opportunities for cooperation in the form of a global alliance. It is called P3 network and was planned with a capacity of 2.6m TEU, 252 vessels, gaining 37.6 per cent of market share across the world. P3 network had a written vessel sharing agreement for ten years, according to the agreement an independent joint centre managed the schedules, slot allocations and utilization of the network vessels. At the same time, the three participating companies would continue to have separate identity and commercial departments handling the sales, marketing and customer services and competing on price (Premti, 2016: 22).

Immediately after P3 alliance announcement, the G6 alliance announced expanding scope of the cooperation between the routes Far East and the western coast of the United States and the borders of Northern Europe and the United States. G6 alliance was actually established in 2012 and composed of APL, Hapag-Lloyd, Hyundai Merchant Marine, MOL, NYK Line and OOCL. In February 2014, there was another alliance announcement that Evergreen joined the CKYH alliance composed of

Cosco, Hanjin, Yang Ming, and K-Line, resulting in a new expanded alliance, called CKYHE. The global market shares of the three big alliances would be as below in table 18 (Premti, 2016: 22,23):

Table 18: Global Mareket Shares of Three Big Alliances of Shipping Lines

Shipping Lines Alliances	Market Share
P3 (Maersk, MSC and CMA CGM)	37.6 %
G6 (APL, Hapag-Lloyd, Hyundai Merchant Marine, MOL, NYK Line and OOCL)	17.8 %
CKYHE (Cosco, Hanjin, Yang Ming, and K-Line)	16.9 %

Source: Premti, 2016: 22, 23

In June 2014, the European Commission declared it did not find any anti-competitive issues and had no objections to the proposed P3 alliance. However, two weeks later, the Chinese competition authorities rejected the P3 alliance. Following the rejection, two of the P3 parties, Maersk and MSC, announced to establish a new alliance, new vessel sharing agreement, called the 2M. Later on, in September 2014, a new alliance was announced called “Ocean Three” (O3) by three carriers; CMA CGM, United Arab Shipping Company (UASC) and Chinese CSCL (Premti, 2016; 24).

In the current situation, all countries in the world are adopting competition as an instrument of economic development. However, countries do not ban conferences or exclude exceptions for conference agreements. Some countries that have recently established competition legal frameworks do not provide exemptions for maritime transport conferences, and in some countries there are no specific regulatory regimes for “non-ratemaking agreements”.

At the same time, it appears that competition authorities have a tendency to promote cooperation agreements to discourage any shippowners group from co-ordinating freight rates and capacity regulation. Therefore, it is important to ensure fair and adequate competition regulatory system to encourage shipowners to continue their cooperation in order to achieve operational improvements (Premti, 2016: 28).

3.3. HORIZONTAL COLLABORATION IN LOGISTICS

The growing intensity of competition due to globalisation, increasing customer expectations a wider variety of services as well. Under this conditions, collaboration appears as a commercial strategy for LSP companies, either vertically with customers or horizontally with other LSP (Leon and Juand 2014: 84).

Crujisen defined the Horizontal Collaboration in Logistics as “cooperation between two or more firms that are active at the same level of the supply chain and perform a comparable logistic function on the landside”. They also state that there are various studies on horizontal cooperation in maritime shipping and aviation industry but very limited in logistics. Although horizontal cooperation practices are widespread in the maritime and aviation industries, these industries are different from logistics and land transport in terms of the number of competitors and with more capital intensive assets. Also the preferential treatment of domestic airliners in the granting of traffic rights is main driver for horizontal cooperation in aviation (Crujisen et al, 2007b: 26, 27).

In the logistics industry, “it is widely accepted that economies of scale are necessary to decrease transport costs, congestion and transport emissions and horizontal cooperation seems to be a current method for solution”. Various types of horizontal cooperation have already been initiated in the logistics centres in Netherlands and Belgium where the logistics centres are dense (Crujissen et al. 2007b: 23). Caputo and Mininno (1996: 87) examines the horizontal integration of logistics functions in the Italian grocery, they suggests if various policies such as “standardized pallets, multi-supplier warehouses, multi-distributor centres, co-ordinated routing and

joint outsourcing” that competing companies apply, they can reduce their logistic costs.

In the past decade intermodal transportation also has gained highly importance due to the increasing transport volumes and its negative effects. Intermodal services’ success and development depends on the collaboration and coordination of logistics service providers. In other words intermodality increasingly urges for collaboration and coordination among modes and service providers. Trains can only be filled by a minority of the companies alone, usually they need to be filled by third-party operators who attracts cargo from different parties and charges each of their customers individually. For sustainable collaboration, it is mandatory that costs of the collaboration must be less than or – at most – equal to operating individually (Theys et al, 2008: 1, 5, 7)

Bahrami (aktaran Cruijsen et al, 2007b: 28) analysed three different scenarios in a case study of two German consumer goods producer that have merged their distribution activities. The three scenarios are; 1. The situation without collaboration, 2. Joint distribution within the current situation, 3. Optimization of the joint distribution within collaboration. The results indicate that scenario 2 saves 2.4 % compared to scenario 1 and scenario 3 saves 9.8 % compared to scenarios 2. Hageback and Segerstedt studied consequences of joint transportation in the small town in Sweden. If the approx. twenty companies cooperate to better fill incoming and outgoing trucks, the possible cost saving will be around 33%.

3.3.1. Drivers and Benefits of Horizontal Collaboration in Logistics

Today, the most common problems that Logistic Service Providers (LSPs) face are actually the drivers of the horizontal collaboration. These problems are mainly “low capacity utilisation, empty haulage, a negative public image and declining profit margins caused by mainly the stiff competition in global markets, high fixed costs, rising petrol and labour prices, the proliferation of products with shorter life cycles and the increasing expectations of customers”. Horizontal collaboration are particularly

useful to cope with these problems and to increase efficiency and competitiveness of participating logistics companies (Verstrepen et al., 2009: 229).

“Horizontal cooperation can improve the performance of both core and non-core processes” of LSPs (Verstrepen et al., 2009: 231). The drivers to cooperate can either be internal or external motives. The internal motives e.g. management decisions related to reinforcing a weakness or enlarging the resources of the company. The external motives e.g. evolving market conditions or customer requirements, economic environment and the LSP industry in general (Verstrepen et al., 2009: 231).

The benefit expectation of each participant from the collaboration is the overall driver of the horizontal collaboration formation (Parkhe, 1993). Barlett and Ghoshal (2004), Cruijsen et al. (2007) states below horizontal collaboration benefits;

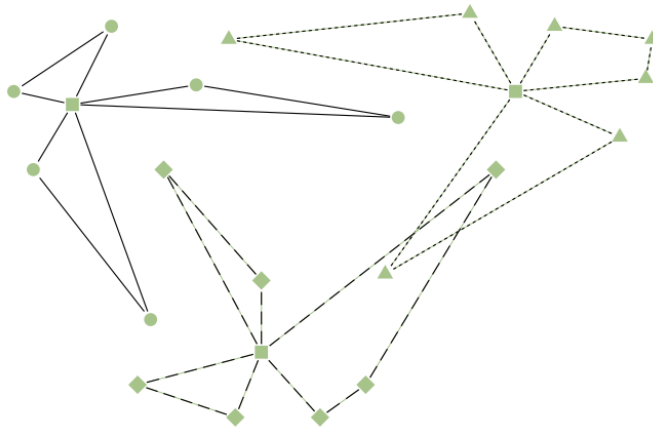
1. “Gain scale economies (production and/or marketing)”
2. “Pooling their resources and concentrating on core activities”
3. “Fill gaps in technical or market expertise”
4. “Sharing and leveraging the specific strengths and capabilities of participants”
5. “Focus combined competitive energies on defeating mutual rivals”
6. “Trading different or complementary resources to achieve mutual gains “
7. “Help firms to cope with unpredictable changes in consumer purchasing patterns” (Bartlett and Ghoshal, 2004: 2; Burgers 1993: 420, Cruijsen et al, 2007b: 28).

Another better-known distinction of horizontal collaboration benefits is economies of scale and economies of scope. While economies of scale refer to the decreasing unit costs, economies of scope refer to adding new products or services. For example setting a joint route planning is an example for economies of scale through horizontal collaboration and if two companies serving different markets can extent their market size by horizontal collaboration is an example for economies of scope (Cruijsen et al, 2007b: 29)

Leon and Juand (2014), Cruijsen et al (2007) and Verstrepen et al. (2006) states the benefits of horizontal collaboration in logistics ranging from reducing costs to social responsibility, as an overview the benefits are as follow;

1. **Cost and Productivity;** Cost reduction and increase productivity are seen the most important benefits. Collaboration provides companies with a platform to access the skills and capabilities of each of them (Cruijssen et al. 2007b: 29; Hamel 1991: 84; Leon and Juand 2014: 85).
 - They can improve their operational processes; reduce empty backhauls or deadheading (return trips with no load) and thus reduce the costs. Figures 38 and 39 shows a typical non-cooperative scenario where each service provider designs its own set of routes to deliver its own customers and the following figure below shows the same routing problem in a cooperative scenario, some routes are merged in order to increase the utilization of vehicles during a roundtrip. When the two figures are compared; it can be seen that routing distances, routing times, and so gas emissions are decreased throughout horizontal collaboration (Cruijssen, 2006: 29; Gibson et al. 2002: 669; Leon and Juan 2014: 85).
 - Joint purchases for non-core activities (e.g. vehicles, computers and fuel) reduces purchasing costs (Cruijssen, 2006: 29)

Figure 38: Non-comparative set of routes



Source: Leon and Juan 2014: 87

Figure 39: Cooperative set of routes



Source: Leon and Juan 2014: 87

2. **Customer Service;** Collaboration offers partners, skilled labour force, higher R&D level, access to advanced technology, to learn from each other's experience, skills and capabilities and consequently generates service quality

improvement, “greater customer value added at lower cost”. (Cruijssen, 2006: 29; Hamel 1991: 86; Leon and Juand 2014: 85).

3. **Market Position;** “Cooperation are a useful tool to expand the available fleet, service range and geographic coverage and market share enhancement” also can provide a risk sharing for companies in uncertain market conditions and a very effective way of sharing the large investments needed for research and development projects (Cruijssen, 2006: 29, Leon and Juand 2014: 84).
4. **Social relevance;** Road transport has been growing steadily in Europe an annual growth of 1,6 % per year between 1995-2012 (Eurostat 2014: 36). The growth of road freight increase congestion, time losses, noise and air pollution and experts claim that road traffic will further increase in the next decade. Classic solutions to that is a modal shifting to more environment friendly modes namely rail freight transport. Rail transport is a significant solution for FTL shipments but not as much as for LTL shipments as they have quite large share in the freight market and can only be serviced by road. In this case there needs to find another solution/solutions when modal shift is impossible. Increasing efficiency of existing road transports can be another solution, ton-kms can be kept under control. Capacity utilisation by exchanging loads and equipment, load exchanges, central planning, shared distribution centres etc between LSPs through horizontal cooperation can be an effective way to increase efficiency of existing road transports (Verstrepen et al. 2006: 238)

3.3.2. Faciliators of Horizontal Collaboration in Logistics

Horizontal collaboration has many benefits for the logistics companies but it is not an easy process to manage, still there are some facilitators that help the process succeed.

1. **Information sharing;** Appropriate and reliable information sharing is must to maintain horizontal collaboration, each member benefits from information sharing, for example information sharing can replace unnecessary costs for transportation or storage of goods (Lee and Whang 2001 cited by Cruijssen et

al. 2007: 32). Information can be divided into two groups for each partners; proprietary and shared information. Proprietary information is for companies' internal process that is private to the company, the shared information is available to all participants in collaboration (Stafansson 2002 cited by Cruijssen et al. 2007b: 33). The shared information could include transportation orders, inventory levels, sales data, capacities and performance metrics (D'amours et al 1999; Gavirneni 2001; Lee and Whang 2000 cited by Cruijssen et al. 2007: 33)

2. **Incentive Alignment;** Actions and decisions by one company will often costs or benefits to other partner in a collaboration, for collaboration to succeed partners must act harmoniously to achieve joint goals. "Incentive alignment aims at providing a mechanism for alignment of the benefits and burdens so that responsibility for the attainment of overall profitability is internalized to the individual participants" (Cruijssen et al. 2007b: 34). Simatuapang and Sridharan (2002) determines strategies that can be used to align partners' behaviour with the overall goal of the collaboration:
 - Productive behaviour; Observable productive actions that lead to a common goal should be rewarded.
 - Pay for performance behaviour; Performance metrics should be used to evaluate the achievements of each partner.
 - Equitable compensation behaviour; Joint goals and gain-sharing mechanism should be set (Simatuapang and Sridharan, 2002: 26, 27)
3. **Relationship Management and Contracts;** although trust is a vital facilitator for collaboration, the competitive element in horizontal collaboration increases the threat of opportunism and lowers the level of trust. Because one of participants may misuse the information obtained in the collaboration. However, due to the nature of horizontal collaboration there might be special connections such as shared customers, sector associations etc. raise the level of trust (Lambert et al. 1999: 175, Cruijssen et al. 2007b: 34).

The formal relationship in collaboration can be regulated by two ways of formal contract; a “strict contract” and an “open contract”. Lambert et al. (1999) stated that shortest and least specific agreements that one or two pages document that designing the basic philosophy and vision of the partnership is sufficient to make the collaboration a success (Lambert et al. 1999: 175). According to Verstrepen et al. (2006) writing down all practical agreements may even turn out to be a weak point in practical cases of horizontal collaboration. Therefore an open contract is probably the best way to structure a horizontal collaboration. However, the lack of a written agreement can lead to some problems in the conflict situation or if the collaboration comes to an end. Therefore “setting up a contract including only the core aspects of the horizontal collaboration such as determining the basic rules of the game and vision for the future and revising it regularly will be suitable” (Verstrepen et al., 2006: 242). Also Todeva and Koneka (2005) mentioned that horizontal collaboration process depends on unanticipated future conditions that cannot be captured in formal contractual agreements and successful strategies require basic trust, mutual understanding, unrestricted learning, and interorganizational knowledge-sharing (Todeva and Knoke, 2005: 134)

In addition to contractual issues, if companies show a certain level of mutuality, symmetry and strategy fit, it will be helpful for horizontal collaboration long term success. That means if the partner companies are able to put themselves in each other shoes, if they have comparable capacities such as market shares, financial strength, productivity, reputation, technological abilities and finally, if partner companies’ organizational structure and strategies well suited each other will be helpful for efficient horizontal collaboration (Lambert et al. 1999: 173, Cruijssen et al. 2007b: 36).

4. Information technology

Information technologies make the collaboration feasible and support longer-term success of collaboration because they enable efficient communications and lower the cost of communication and also helps to reduce transaction costs

and transaction risks between partner companies (Esper and Williams 2003: 59).

5. Physical proximity

Verstrepen et al. (2006: 232) are aware of over 50 formally articulated horizontal logistics partnership in Belgium and the Netherlands where the European logistics centres are dense. The authors asked the views of managers of LSPs to indicate to what extent they agreed with propositions on the opportunities, impediments and drivers for horizontal collaboration. They collected the by sending survey, they sent the first survey to 1537 Flemish LSPs in March 2004 and 12000 Dutch transportation companies in June 2004 (Verstrepen et al. 2006: 232). The main findings are that in general Flemish LSPs strongly believe in the potential benefits of horizontal collaboration to increase their profitability or to improve the quality of their services. The impediments for collaboration that respondents agree with most are finding a reliable party to lead the collaboration and constructing a fair allocation mechanism for the benefits (Verstrepen et al. 2006: 232).

3.3.3 Impediments for Horizontal Collaboration in Logistics

Although there are many benefits of collaborations, 70 percent of strategic alliances fail for some reasons (Zineldina and Bredenliö 2003; Cruijssen, 2006: 31). Firms hesitate to enter into alliances unless they have a clear incentive. Alliances are tending to failure and difficult to manage (Burgers et al, 1993: 420). Cruijssen et al. (2006:32,) grouped the impediments of horizontal collaboration in four groups;

- 1. Partners;** Finding potential partners, evaluating their abilities and reliability and selecting the partner is a difficult decision.
- 2. Determining and dividing the gains;** The narrow scope of most alliances prevents full understanding of the collaboration's nature, extent, fair gain sharing, fair distribution of expected and unexpected costs and distribution of risks or gains occur. The rules must easy and transparent, for example;

- “Proportional to the total load shipped”
 - “Proportional to the number of customers served”
 - “Proportional to the transportation costs before collaboration”
 - “Proportional to distance travelled for each shipper’s orders”
 - “Proportional to the number of orders”.
- 3. Negotiation;** For cooperation’s longer term success, negotiation process should always be based in a win-win situation. Bargaining power of partners is the most important factor during the negotiation process, if the levels are not closed to each other, cooperation could lead to a take-over (Cruijssen 2006: 33).
- 4. Coordination and information and Communication Technology;** Cooperation requires data exchange through information and communication technologies, but the most of logistics companies are small and medium sized companies and they are usually behind in implementation of ICT systems (Stefansson 2002; Gunasekaran and Ngai 2004 cited by Cruijssen 2006: 33).

3.3.4 Types of Horizontal Collaboration in Logistics.

Verstrepen et al. (2006: 234) classified 4 dimensions of horizontal logistics cooperation.

- “Operational/tactical/strategic”
- “Competitive/non competitive”
- “Combined assets”
- “Objectives”.

Operational/tactical/strategic: Verstrepen et al. (2006: 234) make a distinction between operational, tactical, and strategic collaboration. They refer to Operational collaboration as the daily operations within the logistics company, e.g. “sharing operational information”, Tactical collaboration as achieving mid-term objectives and involving more intensive planning and more substantial investments, e.g. “servicing a

market together” and “sharing logistic resources”, Strategic collaboration as achieving long-term company objectives, related to the mission statement, core activities and core competences of the company, e.g. “joint learning”, “joint development of innovative concepts” and “joint investments”.

Competitive/non competitive: Horizontal logistics collaboration can either be competitive or non-competitive. Non-competitive horizontal collaboration occurs if logistics companies servicing different industries (e.g., tank transport, express services, removal services) and competitive horizontal collaboration occurs If the companies are servicing the same industries, they are direct competitors (Verstrepen et al. 2006: 235).

Combined assets: According to Verstrepen et al. (2006: 235) horizontal collaboration can be based on sharing of tangible or intangible assets. They identify six groups of assets that can be combined to the benefit of all participants: orders, logistics facilities, rolling stock, market power, supporting processes, expertise.

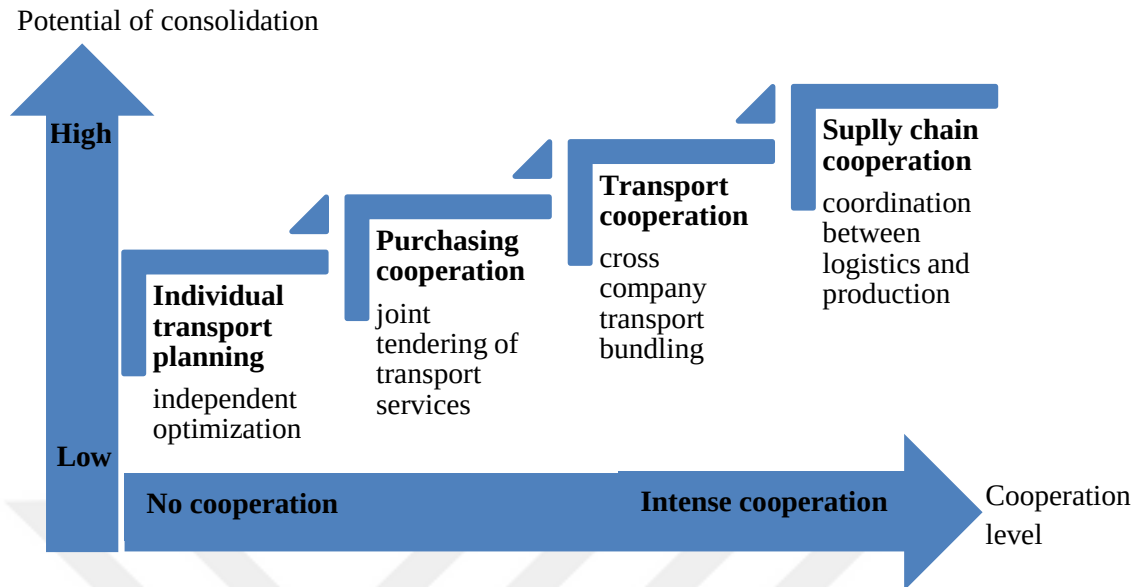
Objectives: Verstrepen et al. (2006: 235) present a last dimension for horizontal collaboration based on the explicit objectives of horizontal collaboration which are cost reduction, growth, innovation, information and quick response, social relevance. The most frequent objective of horizontal cooperation is cost reduction; most of companies develop partnership relations to decrease the costs. Another objective of horizontal cooperation is growth because cooperation can establish financial growth (increased turnover or profit) or geographically extend their coverage by combining the networks of all partners. Also through collaboration partners could be more innovative as they experience new/different systems and technologies and increase interorganisational learning, eventually all they can increase the quality of the services offered by cooperating logistics companies. Horizontal cooperation is also often the fastest way to reduce response time. Because cooperation and information technology allow a real-time information and enable it quicker than rivals do, thereby the shortened response time and improved ability to react to changes quicker than rivals, offers the partners a competitive advantage. For example, courier companies may exchange orders to cut lead times to levels that would be impossible to achieve

individually. Horizontal cooperation is also more advantageous way to enter a new market successfully even if the company would be qualified enough to act individually. For instance many Western European logistic companies develop the logistic partnerships of with partners in Eastern Europe and the Far East (Verstrepen et al. 2006: 236-237).

3.3.5 Implementing Horizontal Collaboration in Logistics

The existing literature on horizontal collaboration concentrate on potential cost savings through transport bundling and the optimisation of logistics processes and lacks a general framework for horizontal logistics collaboration. Leitner et al. developed a framework (figure 40) that offer companies different horizontal collaboration forms to optimise transport efficiency by considering obstacles like “direct transport running under capacity, use small carriers, less-than-truckload (LTL), long running times, increased transportation tariffs due to small quantities” (Leitner et al. 2011: 333).

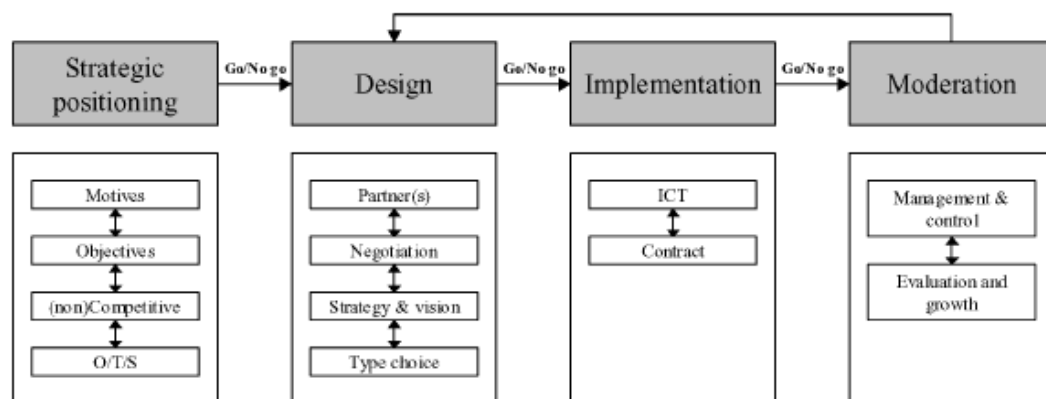
Figure 40: Cooperation Framework for Horizontal Cooperation in Logistics



Source: Leitner et al. 2011: 334

Verstrepen et al. (2006: 239, 244) divided the implementation and management stages of horizontal cooperation in four phases and called it “life cycle of Horizontal cooperation”. The four phases are: “Strategic Positioning, Design, Implementation and Moderation and each of them are necessary and must be carried out carefully in order to make the cooperation a success.

Figure 41: Implementation and Management Stages of Horizontal Cooperation



Source: Verstrepen et al. 2006: 239

1st. phase - Strategic positioning: In this starting point of the cooperation Logistic company becomes aware of the need to cooperate and decides whether to cooperate or not. During this stage Logistics Company decides (Verstrepen et al. 2006: 239);

- “What they can expect from cooperation?” (motives),
- “How they can benefit from the partnership?” (objectives),
- “Whether they want to cooperate with direct competitors or not (competition)”,
- “Whether the cooperation will take place at the strategic, tactical or operational level (intensity)”.

2nd. Phase – Design: When the logistics company decides to cooperate, they must go through the below decisions (Verstrepen et al. 2006: 240);

- “Identify the right partner/partners”
- “Negotiate about the business and financial conditions of the cooperation”
- “Define strategy and vision of the cooperation”
- “Choose the shape of the cooperation”.

In this stage the company must identify its and its partner’s hard (business economics and strategic fit) and soft (trust and cultural fit) features for long-term cooperative relationships. Also it is advisable to choose partners of approximately the same size and market power in order to limit the danger of one side dominance, a too strong dependence or balanced gain sharing. Then negotiation process follows; there is no a ‘unique recipe’ for success but it must result in a win-win situation. Instead of fierce negotiations, a positive attitude during the negotiations will better contribute to the cooperation. Finally when the parties agreed on conditions for cooperation then should select the appropriate format for the cooperation (Verstrepen et al., 2006: 240, 241).

3rd. phase – Implementation: In this stage two tasks have to be fulfilled: a contract and Information communication technologies needs to be set up. It is suggested that there should be a written agreement for cooperation to determine the common rules of the game and the vision for the future to prevent problems in the case of growth or conflict situations. Also ICT systems should be implemented between the parties but most Logistics companies are small and medium sized companies therefore they tend

to be behind in the implementation of ICT systems. This might be a serious barrier for the implementation. However, while the lights horizontal cooperation do not require big investments in information communication technologies and parties considering high intensity cooperations usually have the necessary financial power to make the investments (Verstrepen et al. 2006: 241).

4th phase – Moderation: The final stage is the moderating (management and control, evaluation and growth) the cooperation. Key Performance Indicators (KPIs) of cooperation should be set and monitored to be able to measure the success and to correct where needed. Also conflicts and tension have a bad influence on the cooperation. To avoid them predictability and the transparency of the cooperative relationship should be increased (Verstrepen et al. 2006: 243).

SECTION 4

ANALYSING THE KEY PERFORMANCE INDICATORS IN THE SCOPE OF HORIZONTAL COLLABORATIONS FOR LOGISTIC CENTRES

4.1. AIM OF THE RESEARCH

The main purpose of the research is to identify and prioritize key performance indicators in the scope of horizontal collaborations for logistic centres. Including the main purpose and the sub-objectives of the research can be listed as follows

1. Analyze the logistics centre concept in the world and Turkey
2. Explain the necessity of horizontal collaborations for logistics companies.
3. Identifying key performance indicators for logistic centres and impact of logistics centres on horizontal collaborations among logistics firms
 - by literature analyse
 - by interviewing managers of logistics centres,
 - by interviewing logistics companies already located in a logistics centre (already users)
4. Prioritize key performance indicators for logistic centres by Fuzzy Analytical Hierarchy process (AHP) technique for stakeholders to recognize the best actions.

In accordance with the aim of the research the following research questions have been tried to be answered;

- What is Logistics Centre and what are the current Logistics Centre practices in Turkey and World?
- What is Horizontal collaboration concept in logistics? Why it is needed? What are horizontal collaboration types in logistics?
- How logistics centres affect horizontal collaboration level among logistics service providers?

- What are the key performance indicators in the scope of horizontal collaborations for logistic centres?
- What are the priority order of key performance indicators of logistics centres for stakeholders?

4.2. THE DESIGN OF RESEARCH

Design and conduct of research is shaped by our mental models or frames of references that we use to organize our reasoning and observations. These mental models or frames (belief systems) are called paradigms (Bhattacharjee, 2012: 17, 18). “Paradigm is defined as a set of beliefs leading scientists in a discipline to what should be studied, how it should be studied and the way the results should be implemented” (Şakar, 2010: 96). In other words “a social reality can be viewed by different people in different ways, which may constrain their thinking and reasoning about the observed phenomenon” (Bhattacharjee, 2012: 17). Paradigms is used to organize researchers reasoning and observations and contains three elements that are methodology, epistemology and ontology (Denzin and Lincoln 1994 cited by Şakar, 2010: 96). Epistemology and ontology are the two fundamental sets of philosophical stances that shape social phenomena. “epistemology deals with how the human perceive the world and the relationship between the researchers and the reality” (Näslund, 2002 cited by Şakar, 2010: 96) and “ontology deals with the nature of reality whether objective reality exist or not” (Healy and Perry, 2000 cited by Şakar, 2010: 96). Methodology transfers paradigm’s principles into a research language (Sarantakos, 1998 cited by Şakar, 2010: 96),

There are two paradigms among social science researchers are positivism and post-positivism today. Positivism is based on creation science or knowledge that should be restricted to what can be observed and directly tested. “Post-positivism argues that one can make reasonable inferences about a phenomenon by combining empirical observations with logical reasoning”. Post-positivists view the world as a subjective construction of human subjective minds (Bhattacharjee, 2012: 17, 18).

All scientific researches have 4 processes; observation, rationalization, and validation. In the observation phase, researchers observe a natural or social phenomenon, event, or behavior. In the rationalization phase, “researchers try to make sense of the observed phenomenon, event, or behavior by logically connecting the pieces they observe, in some cases, this process may lead to the construction of a theory”. In the validation phase, “researchers test the theories by using a scientific method through a process of data collection and analysis”. Research designs vary how the researcher conduct the process whether “the researcher starts at observation and rationalize the observations (inductive research), or whether the researcher starts at rationalization or a theory and validate the theory” (deductive research) (Bhattacharjee, 2012: 17-18).

Data collection methods can be broadly grouped into two categories: positivist methods and interpretive methods. Positivist methods takes a deductive approach aiming theory (or hypotheses) testing such as laboratory experiments and survey research, in contrast interpretive methods takes an inductive approach aiming theory building such as case studies, interviews. Positivist research uses predominantly quantitative data while interpretive research relies heavily on qualitative data. The differences between data collection methods are shown in table 19 below (Bhattacharjee, 2012: 35, Şakar, 2010: 96, 97).

As it is shown in the table positivist research uses mainly quantitative data while interpretive research uses mainly qualitative data, but they both can joint use of qualitative and quantitative data as well. Sometimes, “joint use of qualitative and quantitative data may help generate unique insight into a complex social phenomenon that are not available from either types of data alone, and hence, mixed-mode designs that combine qualitative and quantitative data are often highly desirable” (Bhattacharjee, 2012: 35). Several authors are of the view that there can be benefit for combining the strengths of the two approaches in combination. Each of the two research approaches provides a distinctive kind of evidence and when used together they can offer a powerful resource (Ritchie, 2003: 38).

Table 19: Comparison of data collection methods

Data Collection Methods		
Feature	Positivist Methods	Interpretive Methods
	Quantitative data	Qualitative data
Nature of reality	Objective, simple, single	Subjective, problematic, holistic
Causes and effects	Cause-effect linkages	No cause-effect linkages
Methods	Mathematical, extensive use of statistics such as surveys, comparative studies, controlled experiments	Less emphasis on statistics, verbal and ualitative analysis such as case studies, personal experience, life story, interview, artifacts, cultural texts and productions.
Researcher's role	Rather passive, separated frm subject	Interactive and inseperable
Generalisations	Inductive generalisations	Anaytical or conceptual generalisations

Sources; Sarantakos, 1998 cited by Şakar, 2010: 98 and Bhattacharjee, 2012: 35.

Greene et al. indentified five justifications for combining quantitative and qualitative data collection methods (Greene et al., 1989: 259);

1. Triangulation: seeking convergence, corroboration, correspondence between quantitative and qualitative data.
2. Complementarity: elaboration, development, demonstration and clarification of results obtained from one method with the results of another
3. Development: aims to use the results from a method to develop or inform another method.
4. Initiation: explores the discovery of paradoxes and contradictions, the perspectives of new frameworks, the rewording of questions or the results from a method or the results obtained from the other method.
5. Expansion: aims to expand the research width and scope by using different methods for different query components.

In this research both qualitative and quantitative data collection methods were employed to answer the research questions. Secondary (content analysis of literature) and primary data collection (semi-structured interview) techniques as a qualitative research methods and Fuzzy AHP method as a quantitative research method were used to achieve the purpose of the research. Firstly, as a secondary data search, a literature review was carried out to explore the logistics centre concept and horizontal collaboration in logistics, secondly, as a primary data search, semi-structured interview methods were used to understand current situation in Turkey. Semi-structured interviews were mainly face-to-face and open-ended interviews with logistic companies located in logistics centres and logistics centres' management of the logistics centres. At the same time field observations carried on by visiting logistics centres. The primary purpose of the literature review, interviews and field observations was to generate an understanding of the research field and secondly collect the data need for Fuzzy AHP method. Then Fuzzy Analytical Hierarchy process (AHP) technique was used as a quantitative method to analyse the data collected by qualitative method.

Researches can be categorized according to their purpose, focus time and purpose of the results. Depending on the purpose researches are classified as exploratory, descriptive and explanatory. According to the time they focus, the studies are divided into two groups which are cross-sectional and longitudinal studies. For the purpose of use, researches are classified as theoretical or pragmatic research. Theoretical aim-oriented research aims to reveal the regularities in social life and relationships or to examine a social phenomenon in depth. Pragmatic researches are carried out in order to evaluation, solution or resolution of various social problems (Lin, 1976: 5).

In terms of time of focus, this research can be evaluated in the cross-sectional research group as it takes only a point in time as a basis and makes an observation at that time. Studies that include observing a case or sample at a specific time are called cross-sectional studies. Exploratory and descriptive researches are mostly cross-

sectional studies (<http://www.bingol.edu.tr/media/210799/sayt-bolum9- Araştırma Yöntem ve Tekniklerinin Seçimi.pdf>).

In terms of purpose, this research aims to explore key performance indicators in the scope of horizontal collaborations for logistic centres. This research also makes an exploratory effort to understand the impact of logistics centres on horizontal collaborations among logistics firms. In the “exploratory studies, research problems cannot be clearly established since there is not much information about the subject before starting the research. Therefore, this type of research requires the application of the qualitative method. Exploratory researches include literature review, interviews and case research” (Lin, 1976: 137).

Finally, the research design of the thesis is summarised in table 20 below.

Table 20: Research desing of the thesis

Research design	Inductive research (the researcher starts at observation and rationalize the observations)
Data collection methods	Complementarity and Development (Content analysis, Semi-structured interviews, Fuzzy AHP Analysis)
Research Purpose	Exploratory and Descriptive
Purpose of the results	Pragmatistic
Time of focus	Cross-sectional research

4.2.1. Content Analysis

Content analysis is a scientific approach that allows an objective and systematic review of oral, written and other materials. Researchers used content analysis as either a qualitative or quantitative method in their studies (Berelson, 1952 cited by Hsieh and Shannon 2005: 1277). According to Cohen, Manion and Morrison (2007), content

analysis is defined as “the process of summarizing and specifying the basic contents of the available written information and the messages they contain”. Content analysis, which is frequently used in the social sciences, can be defined as “a systematic, repeatable technique in which some words of a text such as books, book chapters, letters, historical documents, newspaper headlines and writings are summarized with smaller content categories based on certain rules” (Sert and others 2012: 351). The definition of content analysis has changed with the introduction of new techniques and practices over time. Some of these definitions are given as follow (Koçak ve Arun, 2006: 21-22);

“Content analysis is a statistical semantics of political discourse” (Kaplan 1943: 230).

“Content analysis; a. classification of signs and, b. to reveal what judgments these signs contain, c. in light of clearly formulated rules, d. it provides the evaluation of the judgments presented by the researcher as a scientific report” (Janis 1949: 425).

“Content analysis is an objective, systematic and quantitative description of the content of communication” (Berelson 1952: 17).

“By using content analysis and coding, we want to make objective, systematic and quantitative description of any symbolic behavior”(Cartwright 1953: 421).

“Content analysis is a research technique used to derive systematic and objective results from specific characters defined in the text” (Stone et al. 1966: 213).

“Content analysis is a research technique used to extract reproducible and valid results from data” (Krippendorff, 1980: 25).

“Content analysis is a research technique in which the valid interpretations derived from the text are presented as a result of a series of operations. These comments are about the sender of the message, the message itself and the recipient of the message” (Weber: 1989: 5).

“Qualitative content analysis is defined as a research method for the subjective interpretation of the content of text data through the systematic classification process of coding and identifying themes or patterns” (Hsieh, Shannon 2005: 1278).

According to Yıldırım and Şimşek (2006), the main purpose of content analysis is to reach the concepts and relations that can explain the collected data. The collected data should first be conceptualized according to the subsequent concepts and the themes that explain the data should be determined accordingly. In the content analysis, there are four stages of processing of qualitative research; data obtained from documents, coding of data, finding themes, arranging codes and themes, identifying and interpreting the findings (Sert et al., 2012: 353).

The content analysis method aims to present the problem in a systematic and impartial manner (Holsti 1969: 117-23). The goal of content analysis is “to provide knowledge and understanding of the phenomenon under study” (Downe-Wamboldt, 1992: 314).

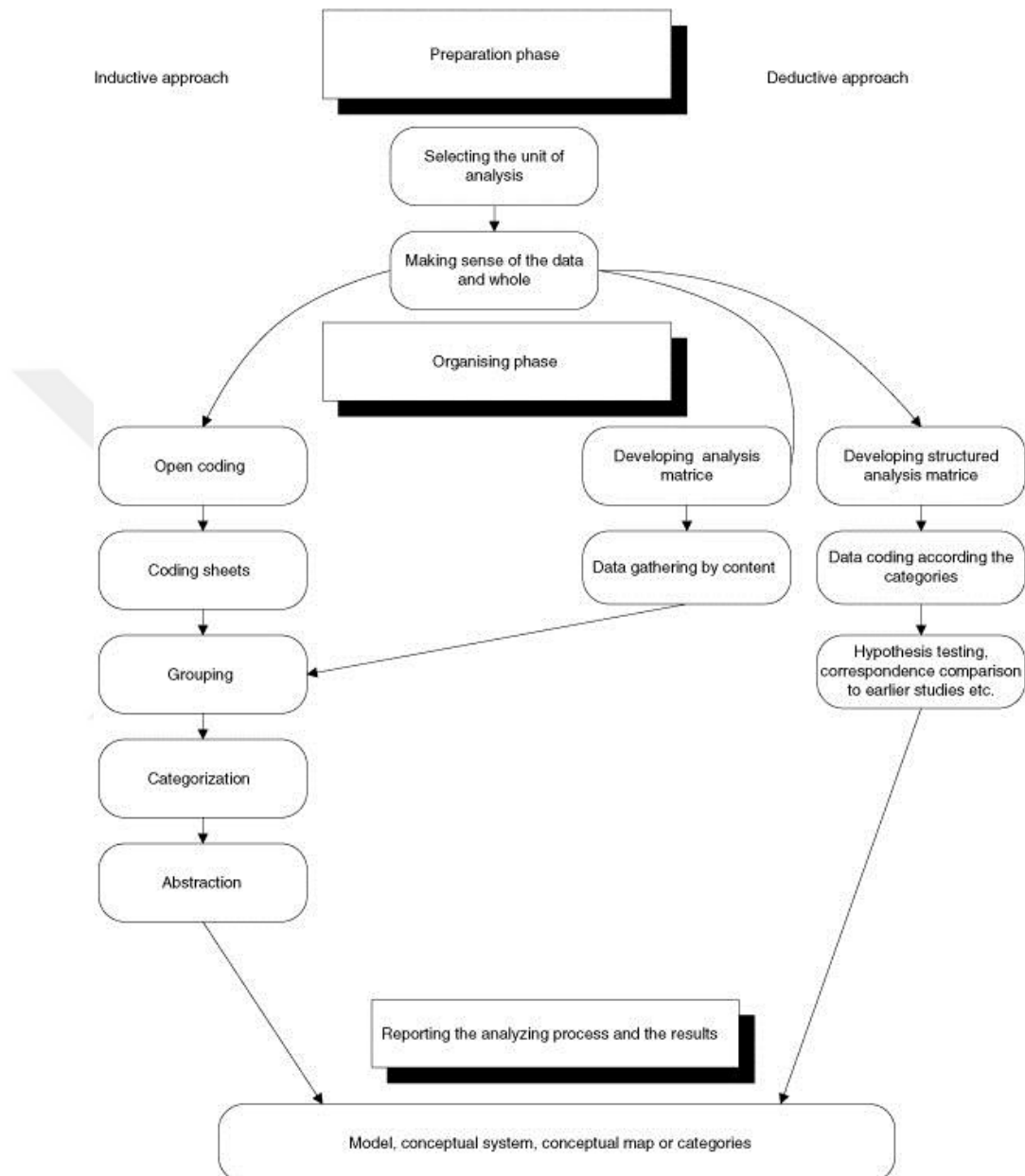
Journal articles are scanned using different methods in content analysis studies. These methods are (Kaya and others, 2013: 123, 124, 125);

- Comparative analysis of the articles of more than one academic journal with similar themes.
- The articles in the content of one or more academic journals are analyzed in terms of specific subjects.
- Studies conducted in the content of a certain academic journal, according to the source of the contributions made.
- Studies that are selected by random sample of the articles in the content of an academic journal.

Content analysis is a method that can be used with both qualitative and quantitative data; it can also be used in an inductive or deductive manner. Which of these will be used is determined by the purpose of the research. If there is not enough information before, the inductive approach is recommended (Lauri & Kyngas 2005 cited by Elo and Kynga, 2008: 109). An approach based on inductive data moves from specific to general, so that specific examples are observed and then merged into a general expression (Chinn & Kramer 1999 cited by Elo and Kynga, 2008: 109). The deductive approach is based on an earlier theory or model and therefore moves from

general to specific (Burns & Grove 2005 cited by Elo and Kynga, 2008: 109). These approaches have similar preparation phases as shown in figure 42 below.

Figure 42: Preparation, organizing and resulting phases in the content analysis process



Source: Elo and Kynga, 2008: 110

In this research content analysis method has been used to analyse literature to identify key performance indicators for logistics centres. The results of the analysis

have also been the base for the interviews; interview questions have been prepared in direction with them.

4.2.2. Semi-structured Interview

Interview as a research technique is the controlled and purposeful verbal communication between the researcher and the person in the position of the subject of the research (Cotien ve Manion, 1994: 271). The aim of the interview is to find out, understand and describe the subjective thoughts and emotions of the person systematically by directing the questions about the researcher to the target person (Kvale, 1996: 5). The main purpose of using interview technique is usually not to test a hypothesis; by contrast, trying to understand the experiences of other people and how they make sense of these experiences. For this reason, the focus is on the stories, descriptions and thoughts of other people (Seidman, 1991: 3). Generally, three types of interview technique are used (Patton, 1987: 109; Robson, 1993: 230; Wragg, 1994: 272; Gall, Borg and Gall, 1996: 310; Holstein and Gubrium, 1997: 113, cited by Törnüklü, 2000: 546);

(a) Unstructured interview; It is a form of communication with verbal interaction with another person that is spontaneously made without any interview protocol (Gali, Borg and Gall, 1996: 310 cited by Törnüklü, 2000: 546). The researcher must constantly reconfigure himself / herself depending on the person who is interviewed and prepare and ask new questions in parallel to each given answer (Törnüklü, 2000: 546).

(b) Structured interview; The researcher asks the same questions in the same way and in the same words for each participant in the research. Person's answers are closed-ended. The person answers by selecting one of the possible options offered to him / her. The structured interview offers quantitative data in a similar way to survey studies (Törnüklü, 2000; 547).

(c) Semi-structured interview; The semi-structured interview technique is somewhat more flexible than the structured interview technique. In this technique, the

researcher prepares the interview protocol which includes the questions that he / she intends to ask in advance. On the other hand, depending on the flow of the interview, the researcher can influence the flow of the interview with different side or sub-questions, and enable the person to open and elaborate his / her responses. The researcher may not ask these questions if the person has answered the questions of other questions during the interview (Türnüklü, 2000: 547).

According to Stuart et al. (2002) semi-structured interview allows the interviewees to introduce new issues and the interviewer to explore the topics more fully. As there is a check list in the semi-structured interviews every pre-decided topic can be covered and starting questions leads into more research questions during the interview, so interviewees can had develop their original statement. (Voss et al., 2002; Stuart et al., 2002 cited by Roso, 2008: 788). Characteristics of Semi-structured interviews (Cohen, Crabtree, 2006: 1);

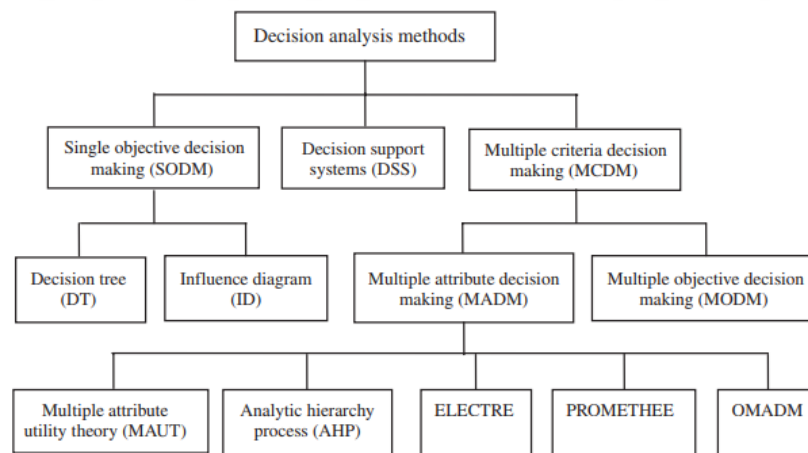
- “The interviewer and respondents engage in a formal interview”.
- “The interviewer develops and uses an interview guide which is actually a list of open-ended questions that need to be covered during the conversation, usually in an order”.
- “The interviewer follows the guide as it consist of open-ended questions discussions may diverge so the conversation may stray from the guide when interviewer feels this is appropriate”.
- “It is best used when there is no more than one chance to interview and can provide reliable, comparable qualitative data”.
- It is often preceded by observation, thus the interviewer can develop more relevant interview guide.
- The interviewer usually follows a paper-based interview guide and it is usually tape-recorded and later transcript for analysis.

In this research semi-structured interview has been used to identify key performance indicators for logistics centres and types of horizontal collaborations takes place between logistics companies operating in logistics centres.

4.2.3. Fuzzy Analytical Hierarchy Process (AHP)

The Analytical Hierarchy Process (AHP) method was used to define the principle indicators for an efficient logistic centre. AHP has been used as a quantitative research method, which is a multi-criteria decision making tool used in almost all studies related to decision making (Vaidya and Kumar, 2006: 1). Decision Analysis methods are classified into the three main groups as shown in Figure 43 below: Single Objective Decisionmaking Methods (SODM), Decision Support Systems (DSS) and Multiple Criteria Decision Making Methods (MCDM), and “SODM comprises a class of methods for evaluating the available alternatives with uncertain outcomes under a single objective situation”. MCDM classified into two groups as well; Multiple objective decision making (MODM) and multiple attribute decision making (MADM). “MCDM allows decision makers to choose or rank alternatives on the basis of an evaluation according to several criteria”. The analytic hierarchy process (AHP) takes place under MADM (Zhou et al., 2004: 2606).

Figure 43: Classification of decision analysis methods



Source: Zhou e.g. 2004: 2606

The AHP was first proposed by Myers and Alpert in 1968, and in 1977, it was developed as a model by Saaty to be used in the solution of decision-making problems (Yaralıoğlu, 2010: 42). When resolving the decision making problem using AHP, 3

steps are followed as "decomposition, comparative evaluation and synthesis of priorities" and the final decision is made according to the composite composition. These are also the basic principles of the AHP method (Saaty, 1987: 1).

The AHP is based on the principle of executive decision making by giving relative importance values to decision alternatives and criteria in complex decision problems. The main problem encountered in multi-criteria decision making problems is determining weight, importance or superiority in order to make choices by considering multiple criteria among various alternatives. The AHP gathers the identity of a mathematical method that effectively combines qualitative and quantitative data because it effectively solves this problem and adds subjective and objective considerations of the decision makers to the solution process. The AHP requires the decision maker to determine the relative importance of each criterion and then to choose between decision alternatives according to each criterion. As a result, the AHP ensures that the priorities of the criteria are determined and the alternatives are assessed based on the determined priorities of these criteria and decisions are made to achieve the aim (Aydın, 2008: 27).

Analytical Hierarchy Process method, proposed by T. L. Saati, is the most popular and practical methods of MADM. AHP technique, using pairwise comparisons (one by one) and combined results, reduces the complexity of decisions. The steps in this methodology are as follows (Jelodar 2016: 2);

- **Step 1 Definition of Decision Making Problem;** Identification of the problem of decision making occurs in two stages, namely the identification of decision points and the determination of factors affecting decision points. In the problem of decision-making to be solved by applying the AHP method; the decision problem is structured into a hierarchical model which contains three levels; goal, criteria, and alternatives. Criterias can also be divided further into subcriterias.
- **Step 2 Creating Criterias-Comparison Matrices;** Pairwise comparisons is made to obtain the judgment matrix. In this step, criterias are compared pairwise using a rating scale (1-to-9 scale in traditional AHP).The comparisons

are used to form a matrix of pairwise comparisons called the judgment matrix. The comparison matrix is a square matrix of $n \times n$ dimensions. The matrix components on the diagonal of this matrix take the value 1. A sample comparison matrix is as follows:

$$A = \begin{bmatrix} a_{11} & a_{12} & \dots & a_{1n} \\ a_{21} & a_{22} & \dots & a_{2n} \\ \cdot & & & \cdot \\ \cdot & & & \cdot \\ \cdot & & & \cdot \\ a_{n1} & a_{n2} & \dots & a_{nn} \end{bmatrix}$$

The comparison of the criterias is done one by one and mutually according to each other and their importance values. The significance scale shown in table 21 is used in the reciprocal comparison of the criterias (Bayazit, 2015: 63; Yeralioğlu, 2010):

Table 21: AHP Comparison Matrix Importance Scale

Intensity of Importance	Definitions
1	Compared criterias are equally important
3	One of the compared criterias is moderately important than the other one
5	One of the compared criteria is strongly important than the other one
7	One of the compared criteria is very strongly important than the other one
9	One of the compared criteria is extremly important than the other one
2, 4, 6, 8	Intermediate values

Source: Auther adabted from Saaty, 2008: 86

- **Step 3;** local weights of the criterias and consistency of comparisons are calculated.

- **Step 4;** final weights of alternatives are obtained. local weights of criterias are aggregated to obtain final weights of the decision alternative

AHP is used in the several transport and logistics researches. Sipahi and Timor (2010) have extensively reviewed the application of AHP in the research and transport sectors. They analysed the studies between the years 2005 and 2009. Their findings are summarised below (Sipahi, Timor, 2010: 775, 788, 791, 792);

Applications of AHP have been dominant in manufacturing, followed by the environmental management and agriculture field, power and energy industry, transportation industry, construction industry, and healthcare. They categorized articles according to application areas as in the table 22 below.

Table 22: Classification of articles by application field and methodology

Area	AHP	ANP	AHP and ANP	Fuzzy AHP	Fuzzy ANP	Fuzzy AHP and fuzzy ANP	Total
Manufacturing industry	45	2	4	23	1	1	76
Environmental management and agriculture	24		1	1			26
General decision problem	12	2	1	3	1		19
Power and energy industry	14			1			15
Transportation industry	12	1		2			15
Construction industry	8	1	1	1			11
Health	10						10
Others	44	3	2	11			60
Total	169	9	9	42	2	1	232

Source: Sipahi, Timor, 2010: 788

However, traditional AHP is criticized by scientists because it does not reflect human thought (Durán and Aguilo, 2008 cited by Balcı and others 2018: 298). The binary formulation of AHP consists of exact numbers, but the choices of decision-makers may not be precise in many cases (Kilincci and Onal, 2011 cited by Balcı and others 2018: 298). To overcome this problem, fuzzy logic accompanies AHP to make decisive decisions of decision-makers (Ayağ and Özdemir, 2006 cited by Balcı and

others 2018: 298). Fuzzy AHP allows researchers to address uncertain and ambiguous information. In this way, an improvement can be achieved in possible indefinite rankings of responder decisions (Chan et al., 2008 cited by Balci and others 2018: 298). Although AHP's aim is to capture the knowledge of the expert, traditional AHP still does not reflect the way people think. Therefore, fuzzy AHP, a fuzzy extension of AHP, has been developed to solve hierarchical fuzzy problems (Kahraman et al., 2003: 386). Kahraman et al (2003) made a literature review regarding earlier works on Fuzzy AHP. According to them; the oldest work in Fuzzy AHP appeared in van Laarhoven and Pedrycz (1983).

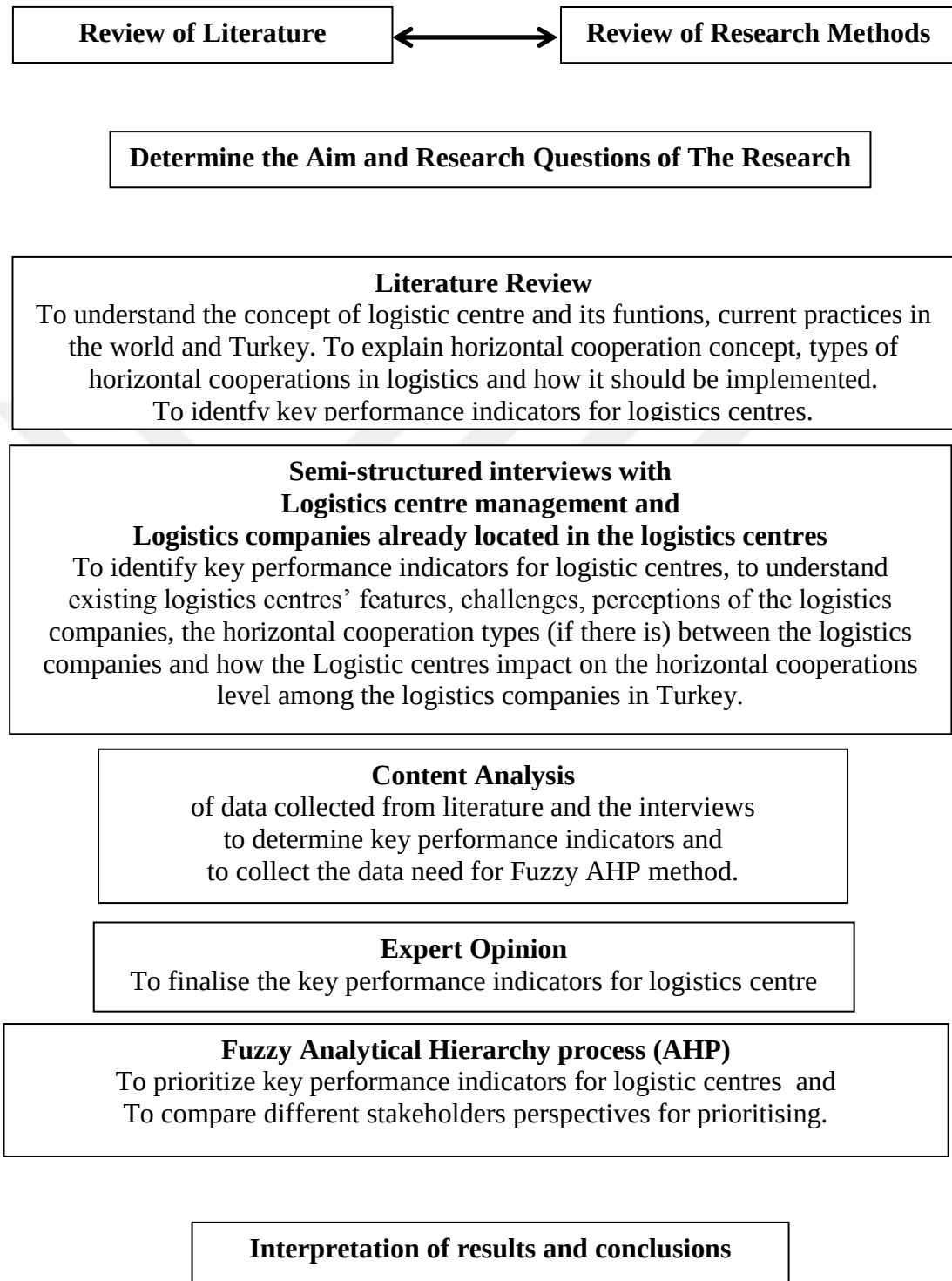
The decision maker may specify preferences in the form of natural language expressions about the importance of each performance feature. The system combines these preferences with existing data to re-emphasize qualification priorities using fuzzy AHP. In the Fuzzy AHP procedure, paired comparisons in the decision matrix are fuzzy numbers that are altered by the designer's emphasis. Using fuzzy arithmetic and α -cuts, the procedure calculates a set of weight vectors to be used to combine the scores in each property. The procedure calculates the corresponding set of points and determines a compound score that is the average of these fuzzy scores (Kahraman et al, 2003: 387).

In this research fuzzy AHP method has been used to prioritise the key performance indicators which were determined from the literature and the interviews.

4.2.4. The Research Process

In order to fulfill the aim of the research; qualitative (semi-structured interviews) and quantitative (fuzzy AHP) research methods has been used. The main objective of this process is to arrive at the priority of the KPI's for logistics centres based on the criteria and sub-criterias selected. The scheduled process of the research is shown in figure 44 below.

Figure 44: The Process Of The Research



4.2.5. The Research Population and Sampling

Since the main aim of the research is to identify and prioritize key performance indicators for logistic centres, the population of the research is the logistics centres operating in Turkey and their stakeholders; Logistics service providers, Logistics service buyers and related institutions. Different type of logistics centres are operating in Turkey both initiated by private sector and state (TCDD Logistics Centres). In this case it was decided to involve the both type of logistics centres and the logistics companies operating in those logistics centres.

When selecting the sample group from the logistics centres operating Turkey following points are considered;

- Both private sector and state logistics centres operating in Turkey were selected.
- Among private sector logistic centres; the first logistic centre started to operate operating was selected because all the others are all either too small or in the project phase or under construction.
- Among state (TCDD) logistics centres; 4 of TCDD Logistics centres were selected because these logistics centres are the longest running TCDD logistics centres. In total 5 logistics centres were selected as sample (4 from TCDD logistics centres, 1 from private sector).

Table 23: Interview Sampling Groups

Interview samplings groups	Number of Interviewees Logistics Centre Management	Number of Interviewees Logistics Companies' Managers
Private sector logistics centre (1)	3	7
TCDD logistics centres (4)	4	
Total	7	7

Regarding the sampling for fuzzy AHP survey 20 professional from different groups of logistics centre's stakeholders has been selected and 18 responses received as shown in detail table 24 below.

Table 24: Fuzzy AHPP Survey Sampling Groups

Fuzzy AHP survey samplings groups	No. of corporation survey sent	No of respondents
Logistics centres managers	5	5
Logistics service providers	6	5
Logistics service buyers	5	4
Institutions	4	4
Total	20	18

4.3. FINDINGS FROM CONTENT ANALYSIS OF LITERATURE

Literature review in the previous chapters were aiming to generate an understanding of the logistics centre concept, its development both in Turkey and World, horizontal collaboration in logistics sector and how logistic centres effect the collaboration level between the logistics companies and identify the areas need for further investigation and secondly collect the data need for AHP analysis.

Although logistics centres first appeared nearly 40 years ago in USD and followed by the EU countries, there are many different terms used for logistics centre. But the term “logistics centre” itself is subject to confusion. Terms referring to logistics centre changing from country to country even within the country. The studies showed that not only the terms, also the concepts vary as well. When the definitions of inland logistics facilities associated with logistics centre concept are analysed, we understand that from simple logistics services to the most advanced logistics services can be

provided at these facilities. In respect of regional aspect these facilities are ranged into local, regional, national or international; some of these centres serve to international shipping, while others serve to urban logistics operations (local distribution). The main reason of that is the ongoing evolution of freight and logistics concept. The terms Logistics Centre and Logistics Villages are mainly used in Turkey and these facilities are mainly possess the same characteristics as the facilities in the world.

As a result of the literature review it is understood that main concepts that shape develop in parallel with the logistics centre concept is supply chain management, intermodality, sustainability and development of ports and 3PL services (outsourcing the logistics activities).

Unlike the complexity of logistics centre term and its definition, there seem to be mostly consensus on the objectives and purposes of the logistic centres. According to various authors logistics centres' aim to contribute intermodal transport, promote local, regional, national economic activity, strengthen the logistics companies and help logistics companies to achieve sustainable competitive advantage. Despite all the benefits of logistics centre, there are still difficulties during establishing logistics centres. The main ones are; the problems caused by constraints in infrastructure, lack of legislation, capital, government support, collaboration between the institutions and inefficient administration and promoting of logistics centres.

Despite the widespread use of the concept "Logistics Centre", in addition to the definition of the concept, the features of logistics centres also vary in the literature. Logistics centre functions may vary according to the type, scale, service concept, goals of the establishment and development goals in the region. Logistics centres provide national and international transportation and basic logistics services as well as value-added services, customs services, and social services.

Different types of logistics centres have been constructed across the world, the level of services provided and the size of logistics centres differ from each other. Today more than 240 logistics centres are operated on national or international scale and numbers of new logistics centres are in the planning and construction phase across Europe. These centres' hard key elements are usually; access control, service area,

business centre, transport & logistics warehouses, intermodal warehouse and intermodal terminal. Most of them are developed by Public-Private Partnerships and provide road-rail connectivity while some of them having sea, air and inland waterways connectivity. European Union transport strategies target more efficient and sustainable transport system and it depends on three issues: vehicle efficiency, use of cleaner energy, more efficient and safer use of transportation networks with information and communication systems. Logistics centres can be considered as a tool for the European Union to implement its transport strategies and objectives.

Logistics centres development began to spread widely in Asia. Port Island 1 was developed in the Port of Kobe in 1970's in Japan. Since the 1980s, China have been constructing logistics centres behind port areas. The Port of Singapore is often considered as a role model for a large-scale logistics centres within the ESCAP region. Large-scale logistics centres allow limited manufacturing functions in addition to pure logistics activities and typically equipped with large scale warehouses, storage facilities, and assembly and processing services. Recently, Korean ports have been introducing this type of logistics centres as well. The strategic geographical position of United Arab Emirates (UAE) and its improved logistics infrastructure make it one of the largest logistics hubs in the World. Dubai has become as a re-distribution destination for international shipments. The logistics industry constitutes more than 14.0 per cent of Dubai's GDP and it is expected to growth in the UAE.

US has a number of major logistics hubs, each supported by a high density of modern logistics facilities and intermodal infrastructure. Intermodal freight has been the fastest growing transportation mode in the US growing by over 400% since 1980. All of the key North American logistics clusters are linked by intermodal infrastructure. The US's logistics village approach has been implemented for two purposes: improvement of old industrial areas with little growth and establishment of entities called Planned Unit Development (PUD) for load purposes.

Logistic Centre initiatives have been initiated by both public and private sector since 2000's in Turkey. There are 3 type of public initiated logistics centres in Turkey, except TCDD logistics centres the other two types are only in planning stage, there is

not any example yet. The TCDD's Logistics centres project was launched in 2005, the project was to establish facilities in logistics centres in 21 locations in different scales. So far, 9 projects completed and put into operation and construction of the 6 project continues. In TCDD logistics centres trains, manoeuvring and loading and unloading areas are planned, constructed and operated by TCDD but storage, warehousing and other logistics areas are planned constructed and operated by the private sector. In addition to TCDD logistics centres there are 2 other types of public initiated logistics centres in Turkey; Logistics Free Zone and Ministry of Customs and Trade Logistics Centres, however features of this type has not been determined and such logistics centres has not been established yet. On the other hand there are 3 types of Private Sector Initiated Logistics Centres which are called Logistics Specialized Organized Industrial Zones, Road Transport Logistics Centres, Goods / Cargo Terminals. Mersin Logistics Specialized Organized Industrial Zone is an example of a Logistics Specialized Organized Industrial Zones and it is the first this kind of logistics centre in Turkey. The other type is called Road Transport Logistics Centres, there are two example of this type; Ankara Kazan Logistics Centre and Manisa Organized Industrial Zone Logistics Centre. Another type in this kind is Goods/Cargo Terminals, the Marmara Nakliyeciler Terminal in Gebze can be an example.

Horizontal collaborations is a new and powerful approach that arises among the companies operating at the same level(s). Companies in different industries are involved in a wide range of collaboration activities formed in various types of interfirm alliances such as R&D agreements, joint ventures, collaborative manufacturing, complex co-marketing arrangements, production agreements including subcontracting and specialisation agreements, purchasing agreements, commercialisation agreements, standardisation agreements including standard contracts, and information exchange. Horizontal collaborations have a variety of benefits to companies such as cost optimisation, share risk, increase investments, pool know-how, enhance product quality and variety and launch innovation faster.

Although Horizontal cooperation, especially in the form of strategic alliances are common in maritime industry and aviation, it is not very common in logistics

industry as it differs from them in terms of number of competitors and capital intensive assets. Horizontal cooperation in logistics seems to be a current method to reduce rising transportation costs, for the success and expansion of intermodal services and solution for the increasing congestion and transport emissions. Horizontal cooperation has many benefits for the logistics companies but it is not an easy process to manage, still there are some facilitators that help the process succeed such as accurate information sharing, incentive alignment, relationship management and contracts, using information technologies and finally physical proximity of the partners. Almost 70 percent of strategic alliances fail for some reasons therefore companies usually hesitate to enter into alliances. The impediments that make companies stand back from cooperation are selecting the partner, determining and dividing the gains, negotiation process and implementing information and communication technologies are difficult decisions.

Previous chapters have reviewed the literature to understand the concept of logistics centre and horizontal collaboration and also relationship between the logistics centre and horizontal collaboration. To review the literature Web of Science and Google Scholar has been scanned between the years 1970-2016 based on the keywords "Logistics Centre", "Logistics Center", "Dry Port", "Freight Village", "Inland Port", "Logistics Village", "Horizontal Cooperation" and "Horizontal Cooperation in Logistics".

When the literature analysed with the key words "Logistics Centre" and "Logistics Center", it is observed that the most studies focused on the concept of logistics centre and location selection of logistics centre. When the articles selected with the key word "Dry Port", again the location selection is one of the topic mostly studied and transport chains, evaluation and development of dry ports are the other mostly studied topics. The articles with the keyword "Freight Village" is also considerably concentrated on the intermodality, studies with the keyword "Inland Port" are emphasised on handling operations and value-added services. Although much has been written about the both concepts of logistics centre and horizontal collaboration, the relationship between them has not been studied specifically. Studies

regarding the logistics centres in Turkey are mostly concentrated on the location selection but key features of the logistics centres particularly has not been studied.

After literature review the most cited articles among the articles were selected for content analysis (table 25). Content analysis carried out within the framework of the selected articles, the main concepts they use related to “establishment, management, cooperation/collaboration, functions, activities and services of the logistics centres/dry port/freight village/inland port/logistics village” both in the world and Turkey have been analysed. The concepts most often used have been determined as criterias and features related to them determined as sub-criterias.

Table 25: Selected articles to determine functions and activities of the logistics centres

Researcher	Research	Year
Caputo, M. & Mininno V.	“Internal, vertical and horizontal logistics integration in Italian grocery distribution”	1996
Heaver, T., Meersman, H. and E. Van de Voorde	“Co-operation and competition in international container transport: strategies for ports”	2001
United Nations	“Commercial Development of Regional Ports as Logistics Centres”	2002
United Nations Economic and Social Commission for Asia and the Pacific	“Commercial Development of Regional Ports as Logistics Centres”	2002
Chin-Shan Lu	“Market segment evaluation and international distribution centres”	2003
Kondratowicz, L.	“Planning of Logistics Centres, final report, Networking Logistics Centres in the Baltic Sea Region (NeLoc)”	2003
Europlatforms	“Logistics Centres Directions For Use”	2004

Woxenius, J., Roso, V., Lumsden, K.	“The dry port concept – connecting seaports with their hinterland by rail”	2004
Kock, S., Bengtsson, M., & Slotte-Kock, S.	“To Compete or Cooperate–A Strategic Dilemma”	2005
Notteboom, T. and J. Rodrigue	“Inland Terminals within North American and European Supply Chains”	2005
Ieva Meidute	“Comparative Analysis of the Definitions of Logistics Centres”	2005
Crujssen, F.	“Horizontal cooperation in transport and logistics”	2006
Verstrepen, S., Crujssen , M., Cools, M., and Dullaert W.	“A Dynamic Framework for Managing Horizontal Cooperation in Logistics”	2006
Ieva Meidute	“Economical evaluation of logistics centres establishment”	2007
Crujssen, F., Dullaert, W. and Fleuren, H.	“Horizontal Cooperation in Transport and Logistics: A Literature Review”	2007
Crujssen, F., Cools, M. and Dullaert, W.	“Horizontal cooperation in logistics: opportunities and impediments”	2007
Bergqvist, R.	“Studies in Regional Logistics – the context of public-private collaboration and road-rail intermodality”	2007
Rimienė K & Grundey, D	“Logistics Centre Concept through Evolution and Definition”	2007
Andrius Jaržemskis	“Research on public logistics centre as tool for cooperation”	2007
Roso Violeta	“Evaluation of the Dry Port Concept From An Environmental Perspective”	2007

Andrius Jaržemskis and Aidas Vasilis Vas	“Research on dry port concept as intermodal node”	2007
Cerreno, A. L. C.; Shin, H; Strauss-Wieder, A; Thepfanis, S.	“Feasibility of Freight Villages in the NYMTC Region”	2008
Jensen, A.	“Designing Intermodal Transport Systems: A Conceptual and Methodological Framework”	2008
Violeta Roso	“Factors influencing implementation of a dry port”	2008
Rodrigue J.P and Notteboom T.	“The Terminalization Of Supply Chains: Reassessing The Role Of Terminals in Port/Hinterland Logistical Relationships”	2009
Notteboom, T and Rodrigue, J.P 2009	“The Terminalization of Supply Chains: reassessing the role of terminals in port/hinterland logistical relationships”	2009
Roso V, Woxenius J, Lumsden K	“The Dry Port Concept: Connecting Container Seaports with the Hinterland”	2009
Violeta Roso and Kent Lumsden	“The Dry Port Concept: Moving Seaport Activities Inland?”	2009
Violeta Roso, Johan Woxenius, Kenth Lumsden	“The Dry Port Concept: Connecting Container Seaports with the Hinterland”	2009
Fernandes C., Rodrigues G.	“Potential As An Integrated Logistics Hub”	2009
Du, Jun; Bergqvist, Rickard	“Developing a Conceptual Framework of International Logistics”	2010
Yasanur Kayikci	“A conceptual model for intermodal freight logistics centre location decisions”	2010

Bergqvist Rickard,	“EU Baltic Sea Region Programme, Rail-Road Intermodal Terminals (Dry ports) and Necessary Market Conditions”	2011.
Higgins C. D., Ferguson M., Kanaroglou P. S.	“Varieties of Logistics Centres: Developing A Standardized Typology And Hierarchy”	2012
Tanyaş, M	“Şanlıurfa İli Lojistik Strateji Planı Belgesi Şanlıurfa İli Lojistik Merkez / Karalimani Fizibilite Raporu”	2012
Sezen B. & Gürsev S.	“Türkiye’de Kurulması Planlanan Lojistik Merkezler Hakkında Bir Analiz Çalışması”	2014

The overall findings from the content analysis of the literature were conducted as a preliminary step before semi-structured interviews and Fuzzy AHP. With the content analysis of the literature review areas to be interviewed were identified. Determined criterias and subcriterias from content analysis of the literature summarized in table 26 below.

Table 26: Determined criterias and subcriterias from content analysis of the literature

Determined criterias and subcriterias from content analysis of the literature	
Criteria	Subcriteria
1. Location	Being along the main routes
	Having connectivity to seaports, airport, rail accessibility
2. Infrastructure	Multimodality
	Warehouses
	Information technology
	Parking areas
	Vehicle repair and washing facilities
3. Activities&Services	Loading&unloading operations
	Customs services

	Filling stations
	Restaurants and cafes
	Banks and insurance companies
	VAL services e.g. storage, processing, consolidation, packaging, labelling, inspection, inventory management, maintenance and repair, reverse logistics, quality control
4. Management	Management should be a single and neutral legal body (preferably by a Public-Private-Partnership)
5. Market Conditions	Logistics service providers' proficiency Existing and potential business activities Labour competence
6. Regulatory	Low and simple tax system Limited bureaucracy Low charges
7. Establishment Problems	Constraints in infrastructure Lack of legislation Lack of capital and budget for infrastructure and facilities and ill-prepared contracts with investors. Different expectations of the public and private sectors The lack of government support Inefficient administrative procedures; inability to implement international agreements and national laws and procedures. Lack of the knowledge of roles and tasks and collaboration between the institutions of the public sector and state-owned companies. Inadequate human resources development Lack of professionalism and third-party logistics providers. Lack of promotion of logistics centres.

8. Benefits	Facilitate intermodality IT Solutions New transport flows potentiality Offering more additional services Increase in Value Added Services Cost sharing for companies Quality improvement Sharing Know-how Joint marketing possibility 3PL development in the region Horizontal Cooperation
9. Type of cooperations among the logistics companies located in the logistics centre	Operational cooperation e.g. “sharing operational information” Tactical cooperation e.g.. “servicing a market together” and “sharing logistic resources” Strategic cooperation e.g. “joint learning”, “joint development of innovative concepts” and “joint investments” Combined assets e.g. orders, logistics facilities, rolling stock, market power, supporting processes, expertise. Objectives e.g. cost reduction, growth, innovation, information and quick response, social relevance.

4.4. FINDINGS FROM INTERVIEWS

Semi-structured interviews were conducted following the content analysis of literature in order to understand the current situation in Turkey and to develop a basis for the Fuzzy AHP analysis. These interviews helped to develop some common points regarding the logistics centres' features in Turkey. Interviewer focused on the general outlook of the logistics centre formation in Turkey, the main developments and barriers in logistics centres and the role of logistics centres in horizontal collaboration level between logistics companies. Interviewees are the managers of the logistics centres and managers of logistics companies that located in a logistics centre. In addition, the interviews have been supported by a site visit to insure validity of the research. Some additional phone interviews as well as e-mail correspondence were done in order to fill the gaps. The findings will be shown under the two headings as Ankara Logistics Centre (owned and operated by private sector) and TCDD Logistics Centres (owned and operated by the state).

4.4.1. Ankara Logistics Centre

Ankara Logistics Centre is the first logistic centre that started operation in Turkey in early 2011. Logistics companies located in Ankara gathered under Ankara Group Carriers Logistics Investments and Akaryakıt Tic. Inc. in 2004 to launch the logistics centre. The facility has an area of 700 thousand square meters which includes 198 thousand square meters closed area. There are a total of 60 thousand m² consisting of 5 blocks rentable warehouses and bounded warehouses in the centre. The facility is planned to serve for 400 enterprises where 4 thousand people can work. With a total investment of \$ 100 million, the company has land expansion opportunity. There are two sections in the centre, namely, international and domestic transportation/logistics sections. The domestic section called "Ankara Domestic Transportation and Logistics Centre", domestic transportation and logistics companies in various districts of Ankara gathered and has purchased an area of 30,000 square meters in the centre and the

building for offices has been completed. Both domestic and international sections managed by separate management boards.

Ankara Logistics centre as a private sector investment did not receive any financial support or incentives from the state during the establishment and development. It is a logistics centre that is established in European standards and has become a model which visited by many institutions and organizations from various countries either public or private sector. In this model, the sector-related stakeholders cooperate; actually they are competitors but they gather to compete together. The managers of the centre is elected by the shareholders for 3 years at the general meeting. Managers do not receive any salary or fees, they work entirely voluntarily.

Figure 45: Ankara Logistics Centre



Source: <http://www.ulasimuzmani.com/>

Most of the products produced in Ankara are delivered to the final destination through the Ankara Logistics Centre. The centre creates added value for the shippers and logistics companies through the various actors (public institutions, customs units, associations and unions representatives, universities) that located in the centre. In addition to the added value the centre creates space, time and cost benefits within the companies' value chain. The institutions, associations and representatives that located in Ankara Logistics Centre are listed below;

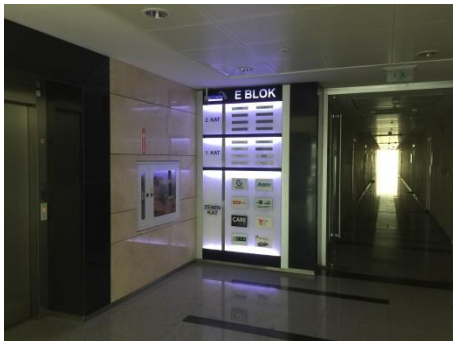
- Ankara Customs Directorate,
- Customs Laboratory Directorate,

- Accounting Office, Exporters' Unions,
- Customs Brokers Association,
- Foreign Trade Standardization,
- Provincial Directorate of Science and Industry,
- Turkish Standardization Institute (TSE),
- Ankara Chamber of Industry (ASO),
- Representatives of the Ankara Chamber of Commerce (ATO)
- Representatives of the International Transporters' Association (UND) and
- Atilim University Logistics Simulation and Applied Training Centre.

During the Ankara Logistics Centre visit in June 2017, logistics company managers operating internationally and logistics centre management (President, Vice president and the Director) have been interviewed and site visit has been carried on (see figure 46 below).

Figure 46: Site visit Ankara Logistics Centre in June 2017

Administrative and Offices Building at Ankara Logistics Centre



arehouses at Ankara Logistics Centre



Services at Ankara Logistics Centre





Services at Ankara Logistics Centre



The management of the companies operating in the international section and the board of directors of the international section has been interviewed. Face to face semi-structured interview type has been used. For this purpose, a specific set of questions were prepared and asked to each interviewee in the same style and order (app. 1). In this way it has been attempted to reduce the bias of the interviewer. Questions to be asked in the interview have been prepared as clearly and prominently

as possible so that they can be easily understood. Interview questions consist of open-ended questions that encourage elaboration, explanation, and not just the type of question that may cause short answers. To record the data, the method using recording device was adopted instead of taking notes. Thus, the functions of asking questions and listening were carried out more effectively and deficiencies such as missing notes and the length of the interview were prevented. All interviews were held 13-15 June 2017. Generally, an average of 45-60 minutes each recorded on the interview recorder. After being recorded on the recording device, the obtained data is deciphered and the answers given by the interviewers to the questions in the direction of the aim of the research were directly quoted and analyzed.

Since two different set of interview questions was directed -one set for the centre managers and one for the company managers-, the research findings were analyzed under two main categories as followed.

a) Views of the Ankara Logistics Centre's Managers

The president, vice president and the director of the logistics centre have been interviewed separately. Their answers and opinions to the questions asked are analyzed and grouped as follows, some of their answers are directly quoted as well.

Goals of establishing the Logistics Centre

Works started in 2004 to establish the logistics centre they aimed to bring the transporters together to create synergy and to increase the share of global freight forwarders in Ankara. They decided to build such a centre while they were considering what they could do to be faster and reduce the costs. They visited the centres in the world before the establishment and consulted to the experts to get their opinions. Initially they thought of a smaller centre overall as an individual space for each partner but that they realized that would not cut their costs or increase productivity. They understood that they could only get the efficiency by combining the areas where they buy the services in common such as warehouses, repair maintenance stations, fuel stations etc.

“Getting involved in the sector associations was led to the idea of establishing a Logistics centre”. They believe that Logistics centres will help to increase Turkey’s

logistics performance. They describe logistics centres as the fields that logistics requirements/needs are met, they provide logistics services onsite. They define the goals are as follows;

- Increasing the service quality, collaboration, solidarity and synergy between the shareholders.
- Reducing the costs.
- Quick response.
- Create a synergy.
- Increasing the global competitiveness of the logistics companies.

The reasons for the rapid increase in the number of logistics centres in Turkey and in the World

They particularly emphasize the reducing costs, the need for competitiveness especially for small companies, they especially need to gather to be competitive and so survive.

- “Widespreading of supply chain management approach; logistics is an integral part of all the stages from production to consumption”.
- “It is understood that logistics can increase competitiveness of the companies”.
- “Creates added value”.
- “Manufacturers expectations have been changed; they want to avoid inventory costs and work flexible; they order small amounts and be able to change when they want. There used to be only full truck loads but now manufacturers’ orders as much as they need it and when it is needed”.
- Diversity in production and supply sources.
- “As the importance of logistics increased, the importance of logistics centres increased”.

Ownership & Management of the Logistics Centre:

The centre is %100 private sector investment and managed by the board of members. Interviewees expressed the following issues regarding ownership and management features of the centre;

- Private partnership, shareholders are also the customers of the centre, but the centre is open for other logistics companies to operate in the centre
- Planned as cooperative enterprise with 45 transporters in 2002
- Converted to Joint Stock Company in 2004 when the project started
- There is no dominant share, the largest share is 5%.
- The Customs Ministry opened an Office for the first time it started to serve in a private land.
- The board of directors is chosen for 3 years, the management is entirely voluntary, no fees paid to the board of directors.
- Offices and warehouse are not for sale, they can only be hired. Both the partners and the outside companies pay the same rent.
- Public gave only legislation and support services;
- Public institutions opened representative offices; customs, industry and chamber of commerce e.g.
- Highway connection is provided by the public
- Railway connection is on the agenda
- There is military airport, they have applied for a permission to use it for cargo planes
- Logistics centres should be operated by a company from the sector.
“I do not think it is right to establish and manage logistics centres by the public because when the public is involved, things are slowing down. Public should support logistics centres by providing necessary services”.

Features of the Logistics Centre

The managers were asked what are the features of the Ankara logistics centre and what should be. “The most important features that Logistics Centres should have

in order to be efficient are Intermodality and integration with other logistics centres. Logistics centres should be established on land because the ports are already natural logistics centres. It should host road, railway and airway integration. Also provide integration with natural logistical centres (ports) and logistics centres abroad”.

- “Logistics centres should have ports, highways, railway and airway integration. Ankara logistics centre has no railway connection but feasibility studies were done and it is in process. Also negotiations started on the use of Kazan airport which is nearby the centre”.
- Established on an area of 700,000 m².
- There must be all organizations that regulate foreign trade, especially customs which Ankara Logistics centre already have.
- The centre contains;
 - Warehouses and bounded warehouses,
 - Banks, insurance companies
 - Social facilities; restaurant, market
 - Otoparks, vehicle repair facilities, filling station
 - Health and Safety facilities; central fire detection, extinguishing system and 24 hours security, all vehicles are recorded and also 112 emergency services are also available.
- “Logistics centres should be planned for need, should not remain idle. The final target should be delivering the Turkish products to international markets faster at less cost”.

Market Conditions in Which the Logistics Centre Is Located

Ankara Logistics Centre’s Managers stated that the centre is designed for the needs of Ankara and Central Anatolia market. Logistics companies operating in Ankara are usually small and medium enterprises but they are enthusiastic to compete with global companies. They emphasise that these SMEs should operate in the logistic centre to be able to compete globally, otherwise it is almost impossible. They argue that

the costs of logistics will only be reduced in this way, the quality will increase and the products will reach the final consumer more quickly.

“Logistics centres are actually a requirement that other logistics companies will take a little more time to understand. The sector needs to be made more aware of the logistics centres, sectoral associations can also help to increase market awareness”.

Legislations

Managers often indicated that “Related regulations should be made as soon as possible”. “If logistics is considered to be an inseparable part of all stages of consumption from production, it requires specialization in logistics, in which logistics centres can be considered as specialized industrial zones. Turkey also has no legislation for structuring logistic centres. We want this legislation to be included in the transportation and logistics action plan. The bases of logistics centre structuring must be regulated by law. These bases are;

- Concession rights
- Exclusivity
- Affiliations
- Integration
- Determination of relevant public institutions and their duties and relations with logistics centres.”

One of the managers stated it should be discussed that the legislation applied for Specialized Organized Industrial Zones may be applicable to logistics centres. As they are defined in Organized Industrial Zones (OIZ) Implementing Regulation as the Organized Industrial Zones in the same sector group and in the sub-sectors of this sector group and Organized Industrial Zones established for logistics purposes.

Advantages of the Logistics Centre

All managers involved in the interview have firstly mentioned the advantage of reducing costs. “The most important advantages for the Logistics companies are; logistics centres reduce the costs of logistics companies and so increase their competitiveness. In addition they improve their service quality and rapidness. Being

operated in the logistic centre allows them to interact and raise each other's standards. At the same time, companies are able to act together for common will”.

- They also explain how logistics centres reduces the costs of logistics companies. “Logistics centres reduce logistics companies’ costs as they combine the areas where logistics firms purchase services (warehouses, equipments e.g. forklifts, repair maintenance stations etc.) that reduce their costs, accelerate the processes and increase productivity”. In addition, if there is a problem can be intervened immediately as the offices are in the centre. As public institutions related to foreign trade is located within the logistics centre, all necessary information and documents can be obtained in the centre which also reduces the cost and shortens the duration.
- Other than reducing the costs they mentioned that Logistics centres increases the service quality as they shortening the durations.

“They also have advantages for the whole country such as creating added value, increasing employment and investments and providing competitive advantage”. “Thanks to the Logistics centre, trucks enter the city centre much less. Especially it is the case with the partial loads (LTL); they are moved from the logistics centre to the city centre with small vehicles”.

The collaboration level in Ankara logistics centre and the areas that loistics companies cooperate in the logistics centre

The question of the impact of logistics centres on collaborations; what has to be done and what is happening in practice are evaluated on a large scale. “Logistics companies need to cooperate to compete in global market and logistics centres provide a platform for these collaborations”. “Although it is necessary logistics companies to cooperate horizontally, it is a process of understanding that horizontal collaboration is a necessity, it will be more understood how important it is in time”. “Logistics centres effects positively as one of the needs that led to the establishment of logistics centres is to create synergy between logistics companies”.

According to the managers the logistics companies operate in the logistics centre are all cooperate and the areas that they coopeare are;

- Joint projects; If a company can not carry out a project alone, two or more company can carry the project in collaboration.
- Joint purchases; Vehicles, equipment, fuel, training, information systems
- Joint services; Common use of services they purchase such as repair and maintenance services, bank and insurance services, value added services.
- Joint use of infrastructure; warehouses, bonded warehouses, equipments
- Joint non-governmental organization
- Vehicle allocations
- Joint Pricing
- Market expansion; when there is a demand for the market served by the company it cooperates, company pass the business to that company. It is the most common form of collaboration.
- Combine the partial loads

They state that the most common area of collaboration is market expansion. They want to increase their collaboration level but they do not know how to solve the problem of trust. They want to increase their collaboration especially on the consolidation of partial loads and they believe that it is only possible through logistics centres. “Logistics companies in the logistics centre want and do cooperate but it is not at the desired level and it is not done systematically. Also it is controversial whether they are activities that increase competition or those that decrease the competition. In this sense the outcome of each collaboration must be evaluated separately”.

“Collaboration are not at desired level, the reason for that is the lack of trust and the ability to do collaborative work has not yet been established in our society”.

“Logistics centres help to increase collaboration between logistics firms. Companies are increasing their interactions because they are physically very close to each other, they can follow innovations made, encourage each other, exchange information, professionalism is growing”.

The most important problems in the establishment and management of logistics centres in Turkey

Managers have given various answers to the question of the problems encountered during the establishment and management of logistics centres. “First, industry needs to be more informed to increase awareness of the logistics companies. Then the public institutions must make the necessary arrangements by preparing of Transportation / Logistics Master Plan. The plan must include 3 important headings; Logistics centre legislation, investment regulation and Logistics education. Especially small companies need to be informed regarding logistics centres formation and their activities, the industry in Turkey needs to be trained in this regard. This task should be carried out mostly by sectoral associations. Logistics education should be increased at the undergraduate and graduate level; foreign language must be part of the logistics education and should be at a very good level. This would help to increase Turkey’s logistics performance index”

All in all the most important problems can be listed as follows;

- lack of legislations
- lack of investment regulations
- lack of logistics companies awareness
- lack logistics higher education
- The cost of establishing the logistics centre was high, financed by bank credit

b) Views of the Logistics Companies’ Managers operating in Ankara Logistics Centre

Out of 8 logistics companies operating in the Ankara Logistics Centre that operate internationally, 7 companies’s managers have been interviewed. These companies are also the partners of the centre and they all have been operating in the centre since it has been established (2011). As a result of the interviews conducted with the companies, their answers and opinions are analyzed and grouped as follows, some of their answers are directly quoted as well.

The reasons for choosing the Ankara Logistics centre (Features of the logistics centre)

They commonly emphasized the importance of location and the entegration of all the modes; “ Being located on the highway and close to the interstate highway tolls”, “The fact that the region is located outside the city and that vehicles do not have to enter the city centre”. “Everything we need is here alltogether”. They also mentioned the features below;

- The facility is safe and comfortable,
- Ensuring the competitive environment,
- Lease of warehouses and offices
- Public support; existence of public institutions especially the customs office
- Having warehouses, banks, insurance companies, customs, vehicle repair facilities, filling station, social facilities, branch of chamber of industry and chamber of commerce. “All the services and institutions we need are here, and we do not have to go into town. In this case our business is accelerating and our costs are falling”.
- Management of the centre should be comprmise of shareholders or tenant logistics companies.
- It has a decent environment and future goals.
- The centre should develop integration to the logistics centres abroad.

Advantages of the Logistics Centre

Managers pointed the advantages below;

- Provide cost advantage; transport and storage costs are decreasing in the centre; all related activities and institutions being in the same place reduce the costs.
- Increase service standarts; providing warehouse and bonded warehouse services and other value added services which are available in the logistics centre, import-export processes are accelerating e.g. the export car in the

centre is sealed in half an hour and the import car can be emptied in 1 hour and go to temporary storage.

- Increase security
- Increases interaction between the logistics companies; being in the same location help them to act together and they share issues and demonstrate the common will. “The logistics centre has created a more transparent environment for the sector. Everyone here knows each other; we have a trust based relationship”.

They also mentioned that logistics centres have advantages for the country as well;

- create added-value
- provide employment opportunity
- area of investment
- increase the competitive advantage
- increase the country’s logistics services
- create synergy in the sector

The Most Important Problems in the Logistics Centres in Turkey

The managers expressed the following views about the problems experienced in logistics centres;

- Lack of regulations; They think the logistics centre can be considered as specialized organized industrial zones for logistics centre’s regulation layout
- Lack of associations supports to integrate logistics companies into the centres
- Lack of railway connection of logistics centres
- High establishment costs

The collaboration level in Ankara logistics centre and the areas that loistics companies cooperate in the logistics centre

Managers stated that the collaborations they make usually start for the short term, but if the parties are satisfied with each other, they will work together again on a project basis. In such collaborations, they are first working with logistics companies that located in the logistics centre. They believe trust and social relations are very important in collaborations. Companies are avoiding collaborations because they are afraid of losing customers to their partners. Also if companies are selfish about sharing profits, it is getting harder to cooperate and continue. Managers have indicated that they cooperate with other logistics companies in the following areas;

- Vehicle allocations; if the request of the customer is not met, if there is not enough vehicle in hand, company as for a vehicle from its partner
- Joint projects; for big projects, two or more company can get the project in collaboration thus they reduce their risk.
- Pricing; freight, LTL consolidation, project pricing
- Market expansion; this is the most common type of collaboration area they prefer. When a customer asks for a market that they don't serve, they do not reject the customer, they cooperate with the companies that already serve that market. By this way they extend the market they serve.
- Warehousing; joint-use of warehouses in the logistics centre.
- Joint trainings; they get trainings jointly.
- Joint purchasing; suppliers make discounts or organize campaigns for the companies in the logistics centre e.g. on fuel and vehicle purchases.

They clearly mentioned that “Logistics centres increase the collaboration between logistics firms, being in the same location increases interaction between the logistics companies”. They think logistics centres increases the level of horizontal collaboration because companies know each other better and so they trust each other more. They influence each other. They also get advantage of discounted packages like from truck and fuel suppliers.

They think logistic companies operating in the logistics centres cooperate more but it not enough. To improve the horizontal collaboration between the logistics

companies great task falls to the associations, they should raise the awareness of the logistics companies. They mention the following reasons for avoiding from collaborations; fear of losing customers to the partner company that the customer cooperates with and the other party's selfishness about sharing earnings. All in all these reasons can be considered as trust issues.

The descriptive and systematic analysis method has been used to analyse the interviews. Böke (2010) recommended three methods in the analysis of qualitative research (Böke: 2010: 312, 313). **Descriptive analysis;** in the method of descriptive analysis, the data are transferred to the reader in the form of citations without modification, as obtained from the viewpoint. It is essential to transfer ideas of different people about the same questions as it is obtained. **Descriptive and systematic analysis;** in a descriptive and systematic analysis, the researcher establishes a method to more systematically determine the findings to be obtained. For example, the speech texts obtained after the interview are poured into the text, the answers based on the research format are classified and then interpreted. **Descriptive, systematic and data analysis;** in descriptive, systematic and data analysis, these two analysis methods are combined with data analysis. The data obtained from the interviews are converted into numerical data by the coding system and analyzed.

The interview questions had been determined according to the preliminary criterias which had already been identified by the content analysis of literature review. Then interviews were held at the Ankara Logistics Centre. The opinions of the interviewees were asked and the answers received were presented in the above section. Some of their answers are directly quoted as well in the related fields in quotation marks. The answers of the questions are classified in the same way as the questions which had been prepared according to the determined criterias from the literature review. And finally their answers have been classified as sub-criterias for the fuzzy AHP analysis. Table 27 below has been created by making a generalization on the main themes.

Table 27: Determined criterias and subcriterias from Ankara Logistics Centre interviews

Determined criterias and subcriterias from Ankara Logistics Centre interviews	
Criteria	Subcriteria
1. Location	• Connectivity to seaports, airport and rail accessibility • Proximity to industrial centres
2. Infrastructure	• Multimodality • Warehouses & Bonded warehouses
3. Activities&Services	• Loading&unloading operations • Customs services • Parking areas • Vehicle repair and washing facilities • Filling stations • Restaurants and cafes • Banks and insurance companies • Security
4. Ownership & Management	• Logistics centres should be managed by the companies from the sector • Government agencies should support by providing services
5. Market Conditions	• Logistics service providers' awareness • Existing and potential business activities • Collaboration and integration of other logistics centres
6. Regulatory	• Limited bureaucracy • Legislation regulation • Investment regulation • Logistics education

	• Determination of relevant public institutions and the duties of these institutions and arrangement of their relations with logistics centres
7. Establishment Problems	• Lack of legislations • Lack of investment regulations • Lack of logistics companies awareness
8. Benefits	• Cost reduction • Cost sharing, • Economies of scale, • Increasing the service quality • Know-how, • Create a synergy • Quick response • Increasing their global competitiveness • Increasing collaboration • Allowing companies to interact with each other more and raising each other's standards • Increasing to act together for common will, increase solidarity • Minimising the risks
9. Type of collaborations among the logistics companies in the logistics centre	• Project collaboration • Service collaboration • Vehicle allocation • Costing • Market expanding • Joint use of infrastructure, warehouses, bonded warehouses, equipments. • Collaboration on combining partial loads

4.4.2. TCDD Logistics Centres

Freight villages intend to be established in several locations in Turkey on behalf of Turkish State Railways (TCDD) to increase the share of rail transport by enabling freight shift from road to rail. In 2016, total cargo transported via rail amounted to 29 million tons and it is targeted that 76 million ton cargo to be transported by rail in 2023. TCDD aims to set 21 freight villages at different sizes. Eight of these logistics centres have been opened to operation by the end of 2017 and Kahramanmaraş Türkoğlu Logistics centre opened in 2019. Five of them are still being constructed and the rest are still in study / project or tender phase as they are listed in the table 28 below (TCDD, 2017: 40).

TCDD organizational structure has been restructured recently in the scope of the Law No. 6461 on the Liberalization of Railway Transportation in Turkey. TCDD Taşımacılık AŞ was established and started operation as an Affiliated Company to make train operations. With this arrangement, a new era has begun in the railway sector. In this context; TCDD will serve as a railway infrastructure operator and private companies obtaining authority from General Directorate of Railway Regulation of the Ministry will be able to operate their own trains along with TCDD Taşımacılık AŞ. This arrangement increased companies by encouraging third parties to perform transportation with their own wagons and by encouraging wagon leasing. In 2016 transportation activities are carried out in collaboration with 54 companies by 4,146 privately owned wagons carried 9.1 million ton which reached from 19.4 % in 2009 to 35 % in 2016 (TCDD, 2016: 104).

Table 28: Status of TCDD Logistics Centres

TCDD's Logistics Centers	
1- Istanbul (Halkalı) Logistics Center	Operating
2- İzmit (Köseköy) Logistics Center	Operating
3- Samsun (Gelemen) Logistics Center	Operating
4- Eskişehir (Hasanbey) Logistics Center	Operating
5- Balıkesir (Gökköy) Logistics Center	Operating
6- Uşak Logistics Center	Operating
7- Denizli (Kaklık) Logistics Center	Operating
8- Kahramanmaraş (Türkoğlu) Logistics Center	Operating
9- Erzurum (Palandöken) Logistics Center	Operating
10- Bilecik (Bozüyük) Logistics Center	under construction
11- Mersin (Yenice) Logistics Center	under construction
12- İzmir Kemalpaşa Logistics Village *	under construction
13- Konya (Kayacık) Logistics Center	under construction
14- Kars Logistics Center	under construction
15- Mardin Logistics Center	project, expropriation etc
16- Kayseri (Boğazköprü) Logistics Center	project, expropriation etc
17- Istanbul (Yeşilbayır) Logistics Center	project, expropriation etc
18- Habur (Şırnak) Logistics Center	project, expropriation etc
19- Sivas Logistics Center	project, expropriation etc
20- Bitlis (Tatvan) Logistics Center	project, expropriation etc
21- Karaman Logistics Center	project, expropriation etc

* Infrastructure General Directorate of Investments (AYGM)

Source: Pektaş, 2017: 64; UDH, 2017; Rail Turkey Tr, 2017; <http://www.tcdd.gov.tr/content/33>.

Samsun Gelemen, Uşak, Istanbul-Halkalı, Denizli-Kaklık, Eskişehir-Hasanbey, İzmit-Köseköy logistics centres had been opened to operate by at the end of 2014. Services related to train operation, train operators, maneuvering, weighing, etc. are provided by TCDD and loading-unloading and handling services are provided by the private sector. Handled load quantities in these centres are shown in table 29

below. Due to the electrification and signaling studies, road renewal and maintenance-repair works carried out in line with TCDD targets, some roads in the railway network in is turned off. This situation adversely affects the load traffic, and preventing the logistics centres to increase their load quantities to the desired levels (TCDD, 2015: 11).

Table 29: TCDD logistics centre handled load quantities

Tablo 5 Lojistik Merkez Yük Taşımaları					
Lojistik Merkezler	2010	2011	2012	2013	2014
Samsun (Gelemen)	880.201	899.581	1.336.242	1.327.485	1.288.107
İstanbul-Halkalı	1.084.587	991.112	791.810	493.933	12.964
İzmit (Köseköy)	648.541	500.826	460.118	13.388	121.949
Uşak	-	-	-	210.915	277.904
Denizli (Kaklık)	-	-	-	-	23.530
Eskişehir (Hasanbey)	-	-	-	-	184.648
Toplam	2.613.329	2.391.519	2.588.170	2.045.721	1.909.102

Source: TCDD, 2015: 11

Out of 8 Logistics Centres which are in operation, 6 of TCDD Logistics centres (Samsun Gelemen, İstanbul-Halkalı, İzmit-Köseköy, Uşak, Denizli-Kaklık and Eskişehir-Hasanbey) have been chosen to interview, because these logistics centres are the longest running TCDD logistics centres; three of them have been operating since 2010 and the others since 2014. The managers of the logistics centres have been contacted by phone and interview questions sent by e-mail in order to collect the data need for AHP method. Semi-structured interview type has been used; a specific set of questions were prepared and asked to each interviewee in the same style and order. Questions to be asked in the interview have been prepared as clearly and prominently as possible so that they can be easily understood. Interview questions consist of open-ended questions were sent by an e-mail and one of the managers sent written answers

by e-mail the others have been interviewed on the phone. In total four of them interviewed and all interviews were held June-August 2017.

Views of the TCDD Logistics Centre's Managers

Goals of establishing the Logistics Centre:

The interviewers emphasized the following objectives; “TCDD has planned 20 logistics centres to make Turkey a logistics base between Europe and Asia. When all of the planned 20 logistics centres into service, the Turkish logistics sector will be provided with an additional space of 35.6 million tons and an open space of 12.8 million m², stock area, container stock and handling area”.

“Logistics centres are also referred to as integrated centres. In another definition, it is defined as transfer centres. The purpose of the logistics centres is to provide timely delivery of products to the warehouses using different modes of transportation, lowering freight rates, delivering products without damage”.

“The main objectives of establishing logistic villages can be summarized as follows:

- Optimization of the logistics chain,
- Optimization of cargo vehicles,
- Optimization of warehouse use,
- Optimization of your workforce
- Minimization of total transport costs,
- Minimization of staff costs”.

The reasons for the rapid increase in the number of logistics centres in Turkey and in the World

The managers stated the following reasonings; “The logistics centres, which are considered as the base of modern transportation, land and sea transportation will be integrated and combined transportation will be a reality. We are proud to see that the logistics centres are now in service in many parts of our country”. “With the new investments the development of the industry has increased the importance of transportation and logistics. Logistics Centres will make a lot of contribution to the

development of regional industry. Industrial goods will be transported safely, fast and economically to the ports by trains”.

Ownership & Management of the Logistics Centre:

The managers have pointed the following features about the ownership and management of TCDD logistics centres;

- When the locations of TCDD Logistics Centres are determined; transportation potentials are taken into consideration, transportation possibilities of road-rail-air-sea-sea roads are investigated, and the proximity to OIZ and industrial areas is examined.
- First-stage railway investments are made in logistics centres and depots for railway transport are being built.
- The places of logistics centres are expropriated by TCDD or made to TCDD land. Logistic centres are included in the TCDD investment program and expenditures are made with appropriations.
- When the private sector wishes to invest in these logistics centres, leasing is done with tenders.
- There is no specific legislation related to logistics centres. With the law no. 5762 enacted on 09.05.2008, logistic centre projects can be done with the BOT model. To this end, the TCDD must possess the land.
- If ready and suitable land is available, it is easier to build a logistics centre by private sector. In this case, it is necessary to apply to TCDD.
- The main criterion for railway connections is not the railway line, but stationary railway is the basic criterion. On the other hand, the connection to the railway can only be done at the station terminal.

Features of the TCDD Logistics Centre

In choosing the location of the logistics centre, the region is taken into consideration such as the proximity to the organized industrial zones, the diversity of industrial activities, urbanization and planning decisions, regional industrial development plans. These centres offer services for road-rail connections, container

loading and unloading and storage areas, warehouses and warehouses, trains, and trains.

“Logistics centres should be on the main roads without entering the city traffic. It should be equipped with railway, road, port connection, environment friendly, and supply all kinds of logistics services”.

“The functional and physical characteristics of the logistics villages should be as follows;

- It should have at least 100 hectare area.
- It should be within or near a city but away from the settlement areas.
- There should be excellent accessibility by road and should have frequent railway connections and controlled entrances.
- It should have proximity or direct access to multiple transport facilities, ports and/or airports.
- In terms of design, it should have been planned, modern offices and buildings (depots) should be accommodated.
- It is necessary to have an infrastructure of advanced communication and information technology.

Market conditions in which the logistics centre is located

The managers stated the following views regarding the market conditions where TCDD logistics centres are established. “When choosing the location of logistics centres, generally 2 criteria are taken into account;

- To be linked to the organizing industrial zones.
- Areas where load potential is high”

“When logistics centre location preferences are made; transportation potential is taken into consideration, transportation possibilities of highway-railway-airway-maritime transportation are investigated and its proximity to OIZ and industrial areas is examined.”

Legislations

In accordance with the legislation of the European Union, in order to establish the legal and institutional framework of the railway sector "Law on the Liberalization of Railway Transport Turkey" issued on the dated May 1, 2013 with no. 6461. TCDD General Directorate which is a state organization that monopolizes the operation of the railway infrastructure and railway operations in Turkey transformed to the General Directorate of Railway Regulation; Infrastructure Operators (TCDD) and Train Operators (Republic of Turkey State Railways Transport Inc.), unless otherwise restructured. General Directorate of Railway Regulation was established with Decree Law No. 655. With this law the private sector has an increasing share in the production of railed systems. Railway Liberalization Law "and the new investment opportunities within the framework of this law, it is expected that new investors will come from abroad. With the liberalization of the sector, licensing studies for railway operators will begin. A railway operator who wishes to carry on railways shall obtain a license from the General Directorate of Railway Regulation by providing the necessary conditions. In addition, access to the infrastructure to be removed and charging within the scope of the regulation, TCDD, which is the infrastructure manager of railway operators, will be able to transport by paying the access fee to the infrastructure to be determined. In this context Authorization documents that can be given are as follows: Infrastructure operation, passenger train operation, freight train operation, logistics centre operation, station / station operation, transportation organizing, agency, brokerage, renting of railway vehicles, maintenance of railway vehicles.

Advantages of the Logistics Centre

Opinions of the managers interviewed have been directly quoted as follows; "Logistic centres contribute to the commercial potential and economic development of the region in which they are established, thereby contributing to the development of combined transport by increasing competition among companies operating in this region. Companies located in Logistics villages can benefit from the following advantages: optimum vehicle planning (especially truck-to-truck), warehouses, safe environment /environment for all activities, single-sided management and planning,

reduction in transportation, industrial and personnel costs, quality working environment and extensive support services”.

“When all the logistics centres starts operation will also provide additional employment of 10 thousand people with an annual contribution of 40 billion dollars to the logistics sector”. “Logistic centres are increasing block train application. International block trains transported 1.7 million tons of cargo in 2014, increasing by 28 percent compared to 2002”.

The collaboration level in TCDD logistics centre and the areas that loistics companies cooperate in the logistics centre

The interviewed managers mentioned the following collaboration areas that occur in the logistics centres.

“They may be in the form of anti-competition if they are not in collaboration. Foreign companies are supporting each other such as vehicles and equipment”.

“Logistics firms specialize in various regions of Europe and /or in different regions in the Middle East by cooperating with liaison offices or regional companies”.

“If competition is maintained by law (about how companies steal customers from each other), the rate of collaboration can increase”.

The most important problems in the establishment and management of logistics centres in Turkey

Railway transportation costs at short distances seem to be slightly higher than the road transportation costs. Spent 12 million liras has been spent in the framework of continued work since 2007. However, in the calculations, the railway carriage is more expensive than the highway, as the TCDD's charge rate is added to the cost of bringing the logistics centre. It has been determined that this inconvenience is due to the cost of carrying goods from factories in the organized industrial zone to the logistics centre, that is actually the cost of handling. When these costs put on the railway fee, at resent there is a difficulty competing with the highway price. Therefore, shipment from the logistics centres is not rantable and therefore transportation is carried out under capacity. TCDD Logistics Department is working to overcome this. It is expected that this trouble will be overcome in the long run and

the full capacity of the activities will be maintained. Project studies are currently being carried out to ensure that logistics centres and ports are double-decked.

TCDD Logistics Centres' Managers' interviews have been analysed in the same way as Ankara Logistics Centre interviews; the descriptive and systematic analysis method has been used, the interview questions were determined according to the preliminary criterias for AHP analysis, then interviews were held either by e-mail or phone. The answers of the questions are classified according to the determined criterias from the literature review. And finally their answers have been classified as sub-criterias for the AHP analysis to determine the KPI's for Logistics Centres are summarized in table 30 below.

Table 30: Determined criteria and sub-criterias from TCDD Logistics Centres' interviews

Determined criteria and sub-criterias from TCDD Logistics Centres' interviews	
Criteria	Subcriteria
1. Location	• Being on the main routes • Away from city traffic but close to cities • Proximity and/or connectivity to seaports, airport and rail terminal • Connected with the organized industrial zones • Areas with high load potential • Have a surface area of at least 100 hectares. • Land's ability to expand
2. Infrastructure	• Train admission and dispatch routes • Warehouses & Bonded warehouses (including air-conditioning warehouses and hazardous material warehouses) • Railway terminal • Loading & unloading areas

	• Telecommunications and Information services • Offices • Otoparks (Trucks, cars) • Open storage areas
3. Activities & Services	• Security • Offices • Loading&unloading operations • Customs services • Locomotive and wagon maintenance&repairs • Parking areas
4. Ownership & Management	• Operated by public-private partnership
5. Market Conditions	• Existence of manufacturing and potential business activities
6. Regulatory	• Logistics centres should be managed by General Directorate of Logistics established under the Ministry of Transport • Regional development plan
7. Establishment Problems	• Lack of legislations • Lack of Logistics and transportation sector education • Lack of qualified staff in the sector, • Inadequacy of railway infrastructure, handling facilities and equipment • Extension of the expropriation period of the land • In terms of competitiveness, the majority of logistics firms are in small-scale
8. Benefits	• Traffic flow optimization • Encourage and increase the combined transport, • Improvement of container loading and unloading activities

	• Reduction of truck and heavy truck circulation, increase of railway transport • Quick response to the needs of consumers, • Operating cost reduction • Having an important role in regional development • Increase in value-added activities related to logistics • Encourage and develop private sector train operations • Being environmental
9. Type of collaborations among the logistics companies in the logistics centre	• Vehicle and equipment collaboration • Regional collaboration

4.5. ANALYSIS OF QUALITATIVE RESEARCH FINDINGS

After literature review and interviews at Ankara Logistics Centre Management and with TCDD Logistics Centres' Managers; three different sets of sub-criterias with the same criterias for KPI's for Logistics Centres in Turkey have been obtained;

- from content analysis of the literature - table 26,
- from interviews Ankara Logistics Centre interviews - table 27
- from interviews TCDD Logistics Centre interviews - table 30.

The criterias had been determined from the literature review, interview questions had been prepared according those criterias and finally sub-criterias have been identified from the both literature and interviewers opinions. To finalise the set of criterias and sub-criterias the steps below have been followed;

- **Step 1:** Identifying the criterias and sub-criterias from the content analysis of the literature.
- **Step 2:** Analysing the interviews at Ankara Logistics centre, classifying the interviewees' opinions as sub-criterias
- **Step 3:** Analysing the interviews with TCDD Logistics Centres' Managers, classifying the interviewees' opinions as sub-criterias

- **Step 4:** Analysing the 3 different sets of criterias and sub-criterias, criterias had already been identified from the literature and the interview questions were prepared according to the criterias identified from the literature review. So 3 different subcriterias have been obtained (literature review, interviews at Ankara Logistics Centre, TCDD Logistics Centres' Managers). To finalise the set of criterias and subcriterias for fuzzy AHP analysis, all subcriterias gathered, repetitions removed from the list.
- **Step 5:** In order to check the credibility, clarity, applicability and to what extent they serve to the purpose of the research, the prepared set of criterias and sub-criterias presented to the views of two expert academicians, Prof Dr. Soner Esmer and Assoc. Prof. Dr. İsmail Bilge Çetin from Dokuz Eylül University Maritime Faculty. According to the recommendation of the academicians, necessary arrangements were made in the set of criterias and subcriterias.

Finally, with the views of the expert academicians, the set of criterias and subcriterias for logistics centres' key performance indicators have been determined. These criterias and its subcriterias are explained below and summarised in table 31 as Analysis of Qualitative Research Findings of the research.

Criteria A. Location: Refers to the area where the logistics centre is located. Logistics centres should be located where the services will be provided in an optimum way. The factors influence selecting the Logistics centre location is determined as subcriterias as listed below.

A1. Along the main routes

A2. Proximity and/or connectivity to seaports, airport and rail terminal

A3. Proximity and/or connectivity to organized industrial centres

Criteria B. Infrastructure: Refers to the infrastructure that logistics centre have. Essential infrastructure features for the logistics centres is determined as subcriterias as listed below.

B1. Multimodality (covering different transport modes and intermodal terminals enables modes interchange)

B2. Warehouses & Bonded warehouses

B3. Offices and social facilities (Restaurants, cafes, hotels etc.)

B4. Vehicle and equipment repair facilities

B5. Telecommunications and Information services

B6. Otoparks (Trucks, cars)

B7. Open storage areas

B8. Land's ability to expand

Criteria C. Activities & Services: Refers to the activities and services provided by the logistics centre. The activities and services that logistics centres have the most and should have are determined as subcriterias.

C1. Loading & unloading operations

C2. Customs services

C3. Filling stations

C4. Accommodation services, Restaurants and Cafes

C5. Banks and insurance services

C6. Value added services e.g. storage, processing, consolidation, packaging, inspection etc.

C7. Security

Criteria D. Ownership & Management: Refers to the ownership of the area and equipments and management model used to manage operations. The ownership&managements models are determined as subcriterias.

D1. Public-Private Partnership (Logistics centres should be managed by the companies from the sector).

D2. Owned and managed by private companies (Government agencies should support by providing services).

D3. Owned and managed by a public authority (allows open access for all interested parties)

Criteria E. Market Conditions: Refers to the characteristic of a market which a logistics centres is serving. Which market conditions should be included in logistics centres are determined as sub-criterias as below.

E1. Logistics service providers' proficiency

E2. Existing and potential business activities

E3. Labour competence

E4. Existing and integration of other logistics centres

Criteria F. Regulations: Refers to the rules employed in controlling, directing, or managing the logistics centres by the regulatory agencies. Subcriterias for regulations is listed as below.

F1. Logistics centres should be managed by General Directorate for Logistics established under the Ministry of Transport

F2. Regional logistics development plan should be set

F3. Incentive and financial assistance programs offered by the government

F4. Simple and efficient administration procedure for operating logistics centres

F5. Low and simple tax system

Criteria G. Benefits: Refers to the benefits/advantages that logistics centres provide to all its stakeholders. The benefits/advantages that logistics centres provide the most are determined as subcriterias.

G1. Encourage and increase the combined transport

G2. Operating cost reduction

G3. Increase service quality and responsiveness to the customers

G4. Increase in value-added activities related to logistics

G5. Increase collaboration between logistics companies

G6. Having an important role in regional/national development

G7. Being environmental (Decrease the accidents, congestions in roads, road maintenance costs and reduce pollution)

Criteria H. Collaborations: Refers to the collaborations' types between the logistics companies. The most the collaborations' types between the logistics companies are determined as subcriterias.

H1. Project collaborations (two or more company can get the project in collaboration).

H2. Market collaborations (LSPs cooperate for the markets they don't serve, in this way they can expand the market they serve).

H3. Joint use of infrastructure, warehouses, bonded warehouses, equipments.

H4. Joint purchasing of vehicle, equipment, fuel, training.

H5. Sharing information (Costing, know-how).

H6. Collaboration on combining partial loads.



Table 31: Analysis of Qualitative Research Findings; Key Performance Indicators for Logistic Centre

Goal	Determine the Key Performance Indicators For Logistic Centres							
Criteria	<u>A. Location</u>	<u>B. Infrastructure</u>	<u>C. Activities & Services</u>	<u>D. Ownership & Management</u>	<u>E. Market Conditions</u>	<u>F. Regulations</u>	<u>G. Benefits</u>	<u>H. Collaborations</u>
Subcriteria	A1. Along the main routes A2. Proximity and/or connectivity to seaports, airport and rail terminal A3. Proximity and/or connectivity to organized industrial centres	B1. Multimodality B2. Warehouses & Bonded warehouses B3. Offices and social facilities B4. Vehicle and equipment repair facilities B5. Telecommunications and Information services B6. Otoparks (Trucks, cars) B7. Open storage areas B8. Land's ability to expand	C1. Loading & unloading operations C2. Customs services C3. Filling stations C4. Accommodation service, Restaurants and cafes C5. Banks and insurance services C6. Value added services e.g. storage, processing, consolidation, packaging, inspection etc. C7. Security	D1. Public-Private Partnership (Logistics centres should be managed by the companies from the sector) D2. Owned and managed by private companies (Government agencies should support by providing services) D3. Owned and managed by a public authority (allows open access for all interested parties)	E1. Logistics service providers' proficiency E2. Existing and potential business activities E3. Labour competence E4. Existing and integration of other logistics centres	F1. Logistics centres should be managed by General Directorate for Logistics established under the Ministry of Transport F2. Regional logistics development plan should be set F3. Incentive and financial assistance programs offered by the government F4. Simple and efficient administration procedure for operating logistics centres F5. Low and simple tax system	G1. Encourage and increase the combined transport G2. Operating cost reduction G3. Increase service quality and responsiveness to the customers G4. Increase in value-added activities related to logistics G5. Increase collaboration between logistics companies G6. Having an important role in regional / national development G7. Being environmental	H1. Project collaborations H2. Market collaborations H3. Joint use of infrastructure, warehouses, bonded warehouses, equipments. H4. Joint purchasing of vehicle, equipment, fuel. H5. Sharing information (Costing, know-how, H6. collaboration on combining partial loads

4.6. FINDINGS FROM FUZZY AHP ANALYSIS

The fuzzy Analytical Hierarchy Process (AHP) has been used as the qualitative research method in this research. Literature review and interviews helped to obtain a deeper insight into the issue and to determine the criterias and subcriterias, but they cannot prioritise the criterias. To explain the importance weight of the criterias and subcriterias fuzzy AHP has been implemented.

AHP was first proposed by Myers and Alpert in 1968, and in 1977, it was developed as a model by Saaty to be used in the solution of decision-making problems (Yaralıoğlu, 2010: 42). The base of the AHP is the creation of a comparison matrix of decision criteria $A = (a_{ij})$ in dimension " $n \times n$ " at each step of the decision hierarchy. " A " is an inverse and positive matrix with $a_{ij} = 1 / a_{ji}$, $a_{ij} > 0$ (Harker, 1987: 1). When resolving the decision making problem using AHP, 3 steps are followed as "decomposition, comparative evaluation and synthesis of priorities" and the final decision is made according to the composite composition. These are also the basic principles of the AHP method (Saaty, 1987: 1).

The main point of decision making in decision making techniques is how to measure and rank decision options according to purpose and criteria. In cases where subjective criteria exist, it is possible to make an evaluation with the analytic hierarchy process (Saaty, 1996: 8). The analytic hierarchy process is a method that allows determining and representing the criteria of a problem in a hierarchy. It is a logical process in which the problem is divided into smaller pieces and the solutions of the criteria and options are searched by binary comparisons (Saat, 2000: 151). There are three stages of the analytical hierarchy process method; Formation of the hierarchy, Binary comparative evaluation, Calculation of priorities (weighted scores) (Saaty, 1994b: 337).

In this research fuzzy AHP method is used to prioritise key performance indicators for logistic centres. The traditional AHP is criticized by scholars because it does not consider the uncertainty associated with the mapping of human judgment to a number by natural language; the ranking of the AHP method is rather indefinite; and

the subjective judgment by perception, evaluation, improvement and selection based on preference of decision-makers have great influence on the AHP results (Sun, 2010: 7746). The pairwise formulation of the AHP consists of absolute numbers, but the choices of decision makers may not be that certain in many cases (Kilinci and Onal, 2011 cited by Balci and et al, 2018: 298,). To overcome this problem, fuzzy logic accompanies AHP to obtain detailed decisions of decision-makers (Ayağ and Özdemir, 2006 cited by Balci and et al, 2018: 298,). The fuzzy AHP enables researchers to address uncertain and ambiguous information (Chan et al., 2008 cited by Balci and et al, 2018: 298).

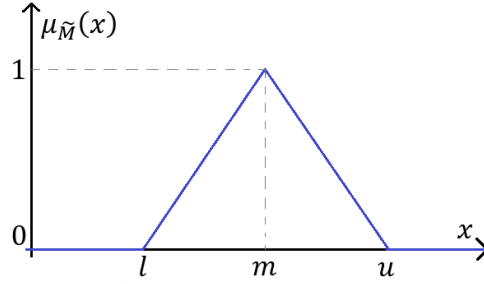
This research adopted Chang's (1996) extent analysis method for the fuzzy AHP. Many Fuzzy AHP methods have been proposed by numerous authors and Chang's approach is considered to be easier than other approaches for the fuzzy AHP (Balci and et al, 2018; Wang et al., 2014). Chang (1996) proposed a new approach for fuzzy AHP using triangular fuzzy numbers in comparisons and used the extended analysis method in comparisons. Triangular fuzzy numbers are a special variant of fuzzy numbers defined by three real numbers. They are expressed as (l, m, u) . The parameters l , m , and u respectively indicate the smallest possible value, the most likely value and the greatest possible value, respectively. The representation of the number of triangular fuzzy $\tilde{M}$ is given in Figure 47 (Kahraman et al., 2004: 174). Chia-Chi Sun (2010) developed a model integrating fuzzy AHP and fuzzy Topsis methods and he defined fundamental fuzzy AHP definitions are as follows (Sun 2010; 7746);

The membership function $\mu_{\tilde{M}}(x): \mathbb{R} \rightarrow [0,1]$ of a fuzzy number $\tilde{M}$ is defined by

$$\mu_{\tilde{M}}(x) = \begin{cases} \frac{x-l}{m-l}, & l \leq x \leq m \\ \frac{u-x}{u-m}, & m \leq x \leq u \\ 0, & otherwise \end{cases}$$

The membership function of the triangular fuzzy number is also shown in figure 47 below.

Figure 47: Number of triangular fuzzy $\tilde{M}$



The operational laws of fuzzy numbers $\tilde{M}_i = (l_i, m_i, u_i)$ and $\tilde{M}_j = (l_j, m_j, u_j)$ defined as follows (Sun, 2010: 7747);

Addition of the fuzzy number $\oplus$

$$\tilde{M}_i \oplus \tilde{M}_j = (l_i + l_j, m_i + m_j, u_i + u_j)$$

Multiplication of the fuzzy number $\otimes$

$$\tilde{M}_i \otimes \tilde{M}_j = (l_i \cdot l_j, m_i \cdot m_j, u_i \cdot u_j)$$

Subtraction of the fuzzy number $\ominus$

$$\tilde{M}_i \ominus \tilde{M}_j = (l_i - l_j, m_i - m_j, u_i - u_j)$$

Division of the fuzzy number $\oslash$

$$\tilde{M}_i \oslash \tilde{M}_j = \left(\frac{l_i}{l_j}, \frac{m_i}{m_j}, \frac{u_i}{u_j} \right)$$

Reciprocal of a fuzzy number

$$\tilde{M}_i^{-1} = \left(\frac{1}{u_i}, \frac{1}{m_i}, \frac{1}{l_i} \right)$$

How fuzzy AHP has been carried in this study briefly explained in the following sections.

Step1. Definitions: Firstly the criterias were determined; 8 Criterias and their subcriterias were determined by analysing of qualitative research findings (table 31)

then a questionnaire form (appendix ...) is prepared for pairwise comparison matrices among all the criteria in the dimensions of the hierarchy system. The nine level linguistic terms below (table 32) is used for comparison.

Table 32: Membership function of linguistic scale

Fuzzy Number	Linguistic	Scale of fuzzy number
$\tilde{9}$	Perfect	(8,9,10)
$\tilde{8}$	Absulate	(7,8,9)
$\tilde{7}$	Very good	(6,7,8)
$\tilde{6}$	Fairly good	(5,6,7)
$\tilde{5}$	Good	(4,5,6)
$\tilde{4}$	Preferable	(3,4,5)
$\tilde{3}$	Not bad	(2,3,4)
$\tilde{2}$	Weak advantage	(1,2,3)
$\tilde{1}$	Equal	(1,1,1)

Source: Sun, 2010: 7746

Step 2. Contruct pairwise comparison matrices; comparisons matrix Linguistic terms assigned to the pairwise comparisons by asking which is the more important of each two dimensions, as following matrix $\tilde{A}$ (Sun, 2010: 7747).

$$\tilde{A} = \begin{bmatrix} \tilde{a}_{11} & \tilde{a}_{12} & \cdots & \tilde{a}_{1n} \\ \tilde{a}_{21} & \tilde{a}_{22} & \cdots & \tilde{a}_{2n} \\ \vdots & \vdots & \ddots & \vdots \\ \tilde{a}_{n1} & \tilde{a}_{n2} & \cdots & \tilde{a}_{nn} \end{bmatrix} = \begin{bmatrix} 1 & \tilde{a}_{12} & \cdots & \tilde{a}_{1n} \\ 1/\tilde{a}_{12} & 1 & \cdots & \tilde{a}_{2n} \\ \vdots & \vdots & \ddots & \vdots \\ 1/\tilde{a}_{1n} & 1/\tilde{a}_{12} & \cdots & 1 \end{bmatrix}$$

where

$$\tilde{a}_{ij} = \begin{cases} \tilde{1}, \tilde{2}, \dots, \tilde{8} \text{ or } \tilde{9} & , \quad i \text{ is relative importance to } j \\ \tilde{1}^{-1}, \tilde{2}^{-1}, \dots, \tilde{8}^{-1} \text{ or } \tilde{9}^{-1} & , \quad j \text{ is relative importance to } i \\ 1 & , \quad i = j \end{cases}$$

Step 3. Calculating geometric means; Using geometric mean technique to define the fuzzy geometric mean and fuzzy weights of each criterion. The geometric mean technique for calculating the weights w_i is extended to $\tilde{\mathbf{A}}$. By using fuzzy pairwise comparison matrix $\tilde{\mathbf{A}} = [\tilde{a}_{ij}]$, geometric mean of each row has been calculated as follows (Buckley, 1985; 237).

$$\tilde{r}_i = \left(\prod_{j=1}^n \tilde{a}_{ij} \right)^{1/n} = (\tilde{a}_{i1} \otimes \tilde{a}_{i2} \otimes \dots \otimes \tilde{a}_{in})^{1/n}$$

and

$$\tilde{w}_i = \tilde{r}_i \otimes (\tilde{r}_1 \oplus \tilde{r}_2 \oplus \dots \oplus \tilde{r}_n)^{-1}$$

where $\tilde{a}_{in}$ is fuzzy comparison value of criterion i to criterion n , thus, $\tilde{r}_i$ is geometric mean of fuzzy comparison value of criterion i to each criterion, $\tilde{w}_i$ is the fuzzy weight of the i th criterion, can be indicated by a TFN, $\tilde{w}_i = (l_{\tilde{w}_i}, m_{\tilde{w}_i}, u_{\tilde{w}_i})$. The $l_{\tilde{w}_i}$, $m_{\tilde{w}_i}$ and $u_{\tilde{w}_i}$ stand for the lower, middle and upper values of the fuzzy weight of the i th criterion.

Step 4. Converting fuzzy numbers to nonfuzzy numbers; The result of the fuzzy synthetic decision reached by each criteria is a fuzzy number. Therefore, it is necessary that a nonfuzzy ranking method for fuzzy numbers be employed for comparison of each criteria. In other words, the procedure of defuzzification is to locate the Best Nonfuzzy Performance value (BNP). Methods of such defuzzified fuzzy ranking generally include mean of maximal (MOM), centre of area (COA), and α -cut. To utilize the COA method to find out the BNP is a simple and practical method, and there

is no need to bring in the preferences of any evaluators, so it is used in this study. The BNP value of the fuzzy number r_i can be found by the following equation:

$$BNP_i = \frac{(u_{\tilde{w}_i} - l_{\tilde{w}_i}) + (m_{\tilde{w}_i} - l_{\tilde{w}_i})}{3} + l_{\tilde{w}_i}, \quad i = 1, 2, \dots, n$$

According to the value of the derived BNP for each of the criteria, the ranking of the criteria can then proceed.

The AHP survey carried on April-November 2018. Survey was sent to 20 experts listed below, 18 response have been received which were divided into 4 groups as in the table 33 below.

- President of the LODER (Logistics Association) Prof. Dr. Mehmet Tanyaş,
- UTIKAD (Association of International Forwarding and Logistics Service Providers) Board Member, Dr. Kayıhan Ö. Turan
- Chief Inspector of Customs and Trade Ministry, Dr. Levent Özkardeş
- Former UND (Association of International Forwarders) Aegean Regional Coordinator, Doç. Dr. Ulviye Sanılı Aydın
- Petkim Packaging and Warehouses Supervisor Harun Çetin,
- MOS (Manisa Organized Industrial Zone) Logistics Centre Manager Arda Erman,
- Ankara Logistics Centre Managers and Board Members, Erhan Gündüz and Av. Hakan Bezginli,
- TCDD Halkalı Logistics Centre Manager Hasan Yetim,
- Syron Tires Board Member Dr. Haluk Cezayirlioğlu,
- Bosch Thermotechnology Manisa Plant Logistics Manager Fatih Sezen,
- Syngenta Turkey Production Manager Tayfun Çavuşoğlu,
- Gap Marketing Inc. Foreign Trade and Logistics Manager Fatih Kemal Barış,

- Managing Director of Bertan Logistics Industry And Foreign Trade Mehmet Yavuz Kankavi,
- OMSAN Logistics General Manager Doç. Dr. Hakan Keskin,
- OMSAN Logistics Strategy Manager Evren Bingöl,
- Business Development Manager of MLA Lojistik Ticaret A.Ş Halit Kaya,
- Operations Manager of KC Logistics Ferruh Peker,

Table 33: Fuzzy AHP Survey Sampling Groups and Number of Respondents

Fuzzy AHP survey samplings groups	No. of Surveyor	No. of Respondents
Logistics centres managers	5	5
Logistics service providers	5	5
Logistics service buyers	5	4
Institutions	4	4
Total	20	18

After calculations, the results of fuzzy AHP have been demonstrated in several tables below. Comparison of main criterias and subcriterias are shown in individual tables and each table also includes overall total results and each respondents groups' results. Tables are prepared for comparision of;

- comparision of the Main criterias (table 34),
- comparision of the Location subcriterias (table 35)
- comparision of the Infrustructure subcriterias (table 36),
- comparision of the Activities and Services subcriterias (table 37),
- comparision of the Ownership and Management subcriterias (table 38),
- comparision of the Market Conditions subcriterias (table 39),
- comparision of the Regulations subcriterias (table 40),
- the Benefit subcriterias (table 41),
- the Collaborations subcriterias (table 42).

Firstly, **Main Criterias Comparison** results including different judgements of the four respondents groups on the rankings of KPI's for Logistics centres have been shown in table 34 below. According to final rankings of KPI's for Logistics centres;

- “**Location**” (22%) seems to be the most important criteria followed by “**Market conditions**” (20%) for Overall Respondents with a very small difference among 8 subcriterias.
- “**Regulations**” and “**Ownership and Management**” have received the lowest priority from overall respondents among the eight criterias.
- “**Infrastructure**”, “**Activities and Services**”, “**Ownership and Management**” criterias have received modest importance.
- “**Location**” and “**Market Conditions**” are the most important criterias for Logistics Centre Managers and Logistics Service Buyers’ results similar to overall results.
- “**Location**” ranks first with 36,7% by for Logistics Service Buyers. They think “location” is far more important criteria than others.
- “**Benefits**” is remarkably more important for Institutions than other groups as they ranked in 1st place with the weight of 25%.
- “**Regulations**” is again remarkably more important for Institutions than other groups as they ranked in 3rd where other groups ranked it in 7th or 8th.
- “**Collaborations**” is more important for Logistics Service Buyers and Logistics Service Providers but they are not as important as for other groups.
- “**Ownership and Management**” have received least priority from all groups.
- The fact that “**Legislation**” is more important for associations, and “**Collaborations**” are much less important for Logistics Centre Managers than others.

Table 34: Comparison of Main Criterias

Main Criteria	Overall					Logistics Centre Managers					Logistics Service Providers					Logistics Service Buyers					Instutions				
	Weights			BNP	Rank	Weights			BNP	Rank	Weights			BNP	Rank	Weights			BNP	Rank	Weights			BNP	Rank
Location	0,146	0,210	0,297	0,218	1	0,163	0,230	0,317	0,237	1	0,077	0,111	0,158	0,115	4	0,231	0,352	0,517	0,367	1	0,126	0,184	0,263	0,191	2
Infrastructure	0,071	0,100	0,142	0,105	5	0,080	0,110	0,154	0,115	4	0,077	0,108	0,151	0,112	6	0,068	0,098	0,145	0,104	4	0,022	0,031	0,046	0,033	6
Activities and Services	0,086	0,121	0,170	0,126	4	0,075	0,103	0,145	0,108	5	0,076	0,109	0,156	0,114	5	0,062	0,087	0,124	0,091	6	0,085	0,116	0,159	0,120	4
Ownership and Management	0,038	0,053	0,078	0,057	8	0,056	0,076	0,107	0,080	6	0,032	0,046	0,068	0,049	8	0,044	0,062	0,093	0,066	7	0,021	0,029	0,044	0,031	7
Market Conditions	0,136	0,195	0,275	0,202	2	0,145	0,205	0,285	0,211	2	0,174	0,248	0,352	0,258	1	0,115	0,167	0,242	0,174	2	0,129	0,183	0,260	0,191	2
Regulations	0,045	0,063	0,091	0,067	7	0,031	0,042	0,059	0,044	8	0,063	0,089	0,129	0,094	7	0,027	0,038	0,057	0,041	8	0,085	0,119	0,170	0,125	3
Benefits	0,112	0,161	0,230	0,168	3	0,116	0,164	0,232	0,171	3	0,119	0,174	0,253	0,182	2	0,064	0,094	0,143	0,100	5	0,168	0,239	0,341	0,249	1
Collaborations	0,068	0,097	0,140	0,101	6	0,051	0,070	0,098	0,073	7	0,079	0,115	0,168	0,121	3	0,070	0,101	0,149	0,107	3	0,067	0,098	0,141	0,102	5

Secondly, **Subcriterias Of Location Comparision** results have been shown in table 35. As shown in table 35 below;

- For Overall Respondents and for Logistics Service Providers “**Proximity and/or connectivity to seaports, airport and rail terminal**” is the most important subcriteria of Location.
- Where Logistics centre managers and Institutions believe “**Proximity and/or connectivity to organized industrial centres**” is the most important subcriteria.
- Unlike the other groups Logistics Service Buyers think that being “**Along the main routes**” is the most important criteria
- It is worth to noting that “**Proximity and/or connectivity to seaports, airport and rail terminal**” is much more important for Logistic service providers than other groups as it takes first place with a weight of 60,5%.

Table 36 below demonstrate the comparison of Infrastructure subcriterias prioritisation by all groups. According to results;

- “**Multimodality**” and “**Warehouses and Bonded Warehouses**” have received the highest priorities among Infrastructure subcriterias for overall respondents and most of other groups.
- Where “**Vehicle and equipment repair facilities**” and “**Otoparks**” seems to be the least important subcriterias for all the groups.
- Remarkably, Logistics service providers much more values subcriteria of “**Telecommunications and Information Services**” than other groups as it is in the first place for them with a weight of %28,3.
- Logistics Service Buyers and Institutions place much more importance “**Multimodality**” than others with higher weights.
- “**Warehouses and Bonded Warehouses**” seems to be less important for Logistics Service Providers, they ranked it as 4th where it is in 1st or 2nd place for other groups.
- Other than that the groups are mostly agree with the priorities of the Infrastructure subcriterias.

Table 35: Comparison of Location Subcriterias

Location Subcriterias	Overall					Logistics Centre Managers					Logistics Service Providers					Logistics Service Buyers					Institutions				
	Weights			BNP	Rank	Weights			BNP	Rank	Weights			BNP	Rank	Weights			BNP	Rank	Weights			BNP	Rank
Along the main routes	0,295	0,370	0,465	0,377	2	0,113	0,103	0,616	0,277	2	0,202	0,256	0,323	0,260	2	0,401	0,518	0,668	0,529	1	0,163	0,144	0,308	0,205	3
Proximity and/or connectivity to seaports, airport and rail terminal	0,354	0,461	0,592	0,469	1	0,144	0,128	0,308	0,193	3	0,472	0,596	0,747	0,605	1	0,244	0,339	0,461	0,348	2	0,112	0,095	0,616	0,274	2
Proximity and/or connectivity to organized industrial centres	0,135	0,169	0,218	0,174	3	0,053	0,047	0,924	0,342	1	0,118	0,149	0,193	0,153	3	0,107	0,143	0,200	0,150	3	0,049	0,041	0,924	0,338	1

Table 36: Comparison of Infrastructure Subcriteria

Infrastructure Subcriteria	Overall					Logistics Centre Managers					Logistics Service Providers					Logistics Service Buyers					Instution				
	Weight			NFW	Rank	Weights			BNP	Rank	Weights			BNP	Rank	Weights			BNP	Rank	Weights			BNP	Rank
Multimodality	0,202	0,275	0,370	0,283	1	0,166	0,221	0,292	0,226	2	0,119	0,166	0,230	0,172	2	0,301	0,403	0,534	0,413	1	0,273	0,362	0,474	0,370	1
Warehouses & Bonded warehouses	0,165	0,223	0,301	0,230	2	0,235	0,309	0,405	0,316	1	0,087	0,121	0,168	0,126	4	0,182	0,244	0,327	0,251	2	0,158	0,207	0,272	0,212	2
Offices and social facilities	0,039	0,054	0,074	0,056	6	0,028	0,037	0,050	0,039	7	0,042	0,061	0,088	0,064	7	0,034	0,045	0,060	0,047	6	0,042	0,058	0,080	0,060	6
Vehicle and equipment repair facilities	0,032	0,044	0,062	0,046	8	0,026	0,035	0,048	0,036	8	0,048	0,068	0,099	0,072	6	0,024	0,031	0,042	0,032	7	0,023	0,032	0,045	0,033	7
Telecommunications and Information services	0,072	0,100	0,140	0,104	5	0,050	0,067	0,093	0,070	5	0,193	0,274	0,383	0,283	1	0,037	0,053	0,076	0,055	5	0,042	0,058	0,080	0,060	6
Otoparks	0,039	0,053	0,075	0,055	7	0,045	0,060	0,083	0,063	6	0,041	0,059	0,087	0,063	8	0,020	0,027	0,037	0,028	8	0,043	0,059	0,083	0,062	5
Open storage areas	0,089	0,126	0,177	0,131	3	0,104	0,145	0,199	0,149	3	0,083	0,119	0,171	0,124	5	0,075	0,108	0,155	0,112	3	0,073	0,102	0,140	0,105	4
Land's ability to expand	0,090	0,125	0,174	0,130	4	0,091	0,125	0,171	0,129	4	0,091	0,132	0,192	0,138	3	0,066	0,090	0,123	0,093	4	0,092	0,123	0,165	0,127	3

Table 37 below demonstrates comparison of Activities and Services Subcriterias' prioritisations.

- All the groups except Logistics Service Providers believe that “**Loading and Unloading Operations**” and “**Customs Services**” are the most important subcriterias with having very high weights among the Activities and Services subcriterias.
- Logistics Service providers considers “**Value Added Services**” and “**Security**” as the most important subcriterias differently from other groups,
- Contrarily, all the groups agree with the least important subcriterias which are “**Accommodation, Restaurants and Cafes**” and “**Filling Stations**”.
- Logistics Service Buyer values “**Customs Services**” more than other as it has 40% weight alone, where it ranked in 4th by Logistics Service Providers.

As can be seen in following table 38 below regarding Ownership and Management Subcriterias prioritisations;

- Overall respondents and the groups except Logistics Service Providers prefers “**Public-Private Partnership**” model for Logistics centres with very high weights (60%, 52%, 71%, 74%).
- It is worth to note that “**Public-Private Partnership**” has very high weights compared two other criterias, especially for Logistics Service Buyers and Institutions seem to be it is the very best solution (71%, 74%).
- Logistics Services Providers prefers “**Owned and Managed by Private Companies**” (45%) criteria for Logistics Centres' ownership and management model, but there is very small difference with the “**Public-Private Partnership**” criteria (44%).
- Also “**Owned and Managed by a Public Authority**” is evaluated as the least important criteria by all the groups.

Table 37: Comparison of Activities and Services Subcriterias

Activities and Services Subcriterias	Overall					Logistics Centre Managers					Logistics Service Providers					Logistics Service Buyers					Instution				
	Weights			BNP	Rank	Weights			BNP	Rank	Weights			BNP	Rank	Weights			BNP	Rank	Weights			BNP	Rank
Loading and unloading operations	0,188	0,260	0,358	0,268	1	0,258	0,353	0,479	0,364	1	0,130	0,185	0,260	0,192	3	0,137	0,201	0,296	0,211	2	0,207	0,282	0,380	0,290	1
Customs Services	0,179	0,247	0,337	0,255	2	0,201	0,278	0,382	0,287	2	0,103	0,142	0,195	0,147	4	0,275	0,392	0,547	0,404	1	0,214	0,285	0,375	0,291	2
Filling Stations	0,028	0,039	0,055	0,041	7	0,026	0,035	0,050	0,037	6	0,043	0,060	0,086	0,063	7	0,018	0,026	0,038	0,027	7	0,020	0,027	0,038	0,028	7
Accommodation, restaurants and cafes	0,030	0,042	0,059	0,044	6	0,025	0,034	0,046	0,035	7	0,047	0,067	0,095	0,070	6	0,031	0,044	0,065	0,046	5	0,029	0,039	0,055	0,041	6
Banks and insurance services	0,043	0,059	0,082	0,061	5	0,029	0,039	0,053	0,040	5	0,051	0,070	0,097	0,073	5	0,030	0,042	0,061	0,044	6	0,042	0,056	0,075	0,058	5
Value added services	0,139	0,189	0,259	0,196	3	0,091	0,124	0,172	0,129	4	0,184	0,250	0,339	0,258	1	0,126	0,174	0,244	0,181	3	0,137	0,180	0,241	0,186	3
Security	0,117	0,164	0,230	0,170	4	0,099	0,137	0,190	0,142	3	0,165	0,226	0,311	0,234	2	0,082	0,122	0,182	0,129	4	0,096	0,131	0,180	0,135	4

Table 38: Comparison of Ownership and Management Subcriterias

Ownership and Management Subcriterias	Overall					Logistics Centre Managers					Logistics Service Providers					Logistics Service Buyers					Instution				
	Weights			BNP	Rank	Weights			BNP	Rank	Weights			BNP	Rank	Weights			BNP	Rank	Weights			BNP	Rank
Public-Private Partnership	0,453	0,585	0,746	0,595	1	0,404	0,511	0,638	0,518	1	0,338	0,430	0,541	0,436	2	0,494	0,686	0,936	0,705	1	0,555	0,723	0,934	0,737	1
Owned and Managed by Private Companies	0,236	0,314	0,420	0,323	2	0,292	0,375	0,485	0,384	2	0,341	0,442	0,577	0,453	1	0,156	0,228	0,339	0,241	2	0,153	0,208	0,286	0,215	2
Owned and Managed by a Public Authority	0,080	0,101	0,135	0,105	3	0,092	0,114	0,146	0,117	3	0,100	0,128	0,166	0,131	3	0,064	0,086	0,125	0,092	3	0,054	0,069	0,094	0,072	3

Regarding the ranking of the Market Conditions Subcriterias table 39 shows the different groups preferences;

- The most respondents evaluated “**Existing and Potential Business Activities**” (44%) criteria as the most important criteria, followed by the “**Logistics Service Providers’ Proficiency**” (32%).
- “**Existing and Integration of other Logistics Centres**” (14%) and the criteria “**Labour Competence**” (11%) evaluated as the least important criteria.
- Logistics Service Providers preferences differs slightly from other groups as they put the “**Logistics Service Providers’ Proficiency**” (37%) at the first rank and “**Existing and Potential Business Activities**” (33%) the second, there is very little difference between their weights. They also give more importance to “**Labour Competence**” than other groups.

Following table 40 demonstrates comparison of Regulation subcriterias prioritisations, the points below distinguish;

- “**Incentive and Financial Assistance Programs Offered by the Government**” has been ranked as the most important criteria among regulation subcriterias by the overall respondents.
- Actually “**Low and Simple Tax System**” has been ranked at the first level by three groups and its weight is slightly lower than “Incentive and Financial Assistance Programs Offered by the Government”.
- Other highlights is the all groups agree that “**Logistics centres should be managed by General Directorate for Logistics established under the Ministry of Transport**” is the least important criteria.
- Institutions weights are remarkable as they gave importance two criterias “**Incentive and Financial Assistance Programs Offered by the Government**” and “**Low and Simple Tax System**” which are weighted 75% in total.

Table 39: Comparison of Market Conditions Subcriterias

Market Conditions Subcriterias	Overall					Logistics Centre Managers					Logistics Service Providers					Logistics Service Buyers					Instutions				
	Weights			BNP	Rank	Weights			BNP	Rank	Weights			BNP	Rank	Weights			BNP	Rank	Weights			BNP	Rank
Logistics Service Providers' Proficiency	0,249	0,317	0,401	0,322	2	0,250	0,326	0,416	0,331	2	0,291	0,369	0,462	0,374	1	0,272	0,361	0,469	0,367	2	0,164	0,210	0,268	0,214	2
Existing and Potential Business Activities	0,339	0,433	0,551	0,441	1	0,299	0,384	0,498	0,394	1	0,259	0,327	0,414	0,333	2	0,338	0,432	0,554	0,442	1	0,405	0,514	0,646	0,521	1
Labour Competence	0,089	0,112	0,142	0,114	4	0,094	0,117	0,147	0,119	4	0,129	0,163	0,206	0,166	3	0,068	0,086	0,109	0,088	4	0,086	0,106	0,131	0,108	4
Existing and Integration of other Logistics Centres	0,109	0,138	0,177	0,142	3	0,134	0,173	0,226	0,178	3	0,113	0,141	0,182	0,145	4	0,095	0,121	0,159	0,125	3	0,137	0,171	0,218	0,175	3

Table 40: Comparison of Regulation Subcriterias

Regulations Subcriterias	Overall					Logistics Centre Managers					Logistics Service Providers					Logistics Service Buyers					Instution				
	Weights			BNP	Rank	Weights			BNP	Rank	Weights			BNP	Rank	Weights			BNP	Rank	Weights			BNP	Rank
Logistics centres should be managed by General Directorate for Logistics established under the Ministry of Transport	0,038	0,050	0,070	0,053	5	0,040	0,053	0,073	0,055	5	0,037	0,051	0,075	0,054	5	0,031	0,043	0,062	0,045	5	0,026	0,033	0,045	0,035	5
Regional logistics development plan should be set	0,153	0,203	0,270	0,208	3	0,208	0,275	0,361	0,282	2	0,096	0,135	0,198	0,143	4	0,115	0,156	0,215	0,162	4	0,103	0,135	0,177	0,139	3
Incentive and financial assistance programs offered by the government	0,222	0,297	0,400	0,306	1	0,184	0,248	0,336	0,256	3	0,199	0,287	0,420	0,302	2	0,203	0,284	0,405	0,298	2	0,314	0,417	0,559	0,430	1
Simple and efficient administration procedure for operating logistics centres	0,132	0,178	0,243	0,184	4	0,105	0,138	0,184	0,142	4	0,145	0,211	0,311	0,222	3	0,128	0,181	0,257	0,188	3	0,077	0,102	0,138	0,106	4
Low and simple tax system	0,199	0,271	0,363	0,278	2	0,212	0,286	0,382	0,293	1	0,213	0,316	0,449	0,326	1	0,230	0,336	0,473	0,347	1	0,226	0,312	0,420	0,319	2

When the results of Benefits Subcriterias comparison analyzed, the most opinion differences between the groups has been witnessed at Benefits subcriterias (table 41). Following points observed;

- Overall results demonstrate that the most important benefit of logistics centres is **“Increase service quality and responsiveness”** followed by **“Operating cost reduction”**, they weighted 42% in total among 7 subcriterias.
- **“Increase service quality and responsiveness”** and **“Operating cost reduction”** are important subcriterias for all groups but especially for Logistics Service Buyers with the total weights of 62%.
- The least important Benefits subcriterias are **“Being Environmental”** and **“Increase collaborations between logistics companies”**.
- Institutions’ opinions are quite similar to overall results while others showed diversity.
- Logistic Centre Managers think that the most important benefit is **“Having an important role in regional/national development”** while Logistics Service Poviders think **“Increase in value-added activities related to logistics”** and finally Logistics Service Buyers considers **“Operating cost reduction”** as the most important benefit of Logistics centres.
- The biggest difference is observed at **“Increase in value-added activities related to logistics”**, it is the most impotant benefit for Logistics Service Providers but it is in 6th important subcriteria for Logistics Centre Managers and at the 5th place for other groups.

Table 41: Comparison of Benefits Subcriterias

Benefits' Subcriterias	Overall					Logistics Centre Managers					Logistics Service Providers					Logistics Service Buyers					Instution				
	Weights			BNP	Rank	Weights			BNP	Rank	Weights			BNP	Rank	Weights			BNP	Rank	Weights			BNP	Rank
Encourage and increase the combined transport	0,089	0,123	0,170	0,128	4	0,096	0,130	0,176	0,134	5	0,071	0,100	0,141	0,104	6	0,095	0,140	0,209	0,148	3	0,085	0,113	0,151	0,116	4
Operating cost reduction	0,146	0,202	0,277	0,209	2	0,102	0,140	0,194	0,145	4	0,123	0,168	0,230	0,173	2	0,211	0,308	0,445	0,321	1	0,223	0,301	0,402	0,309	1
Increase service quality and responsiveness	0,156	0,213	0,285	0,218	1	0,133	0,180	0,238	0,183	2	0,122	0,167	0,227	0,172	3	0,202	0,292	0,413	0,302	2	0,161	0,217	0,291	0,223	2
Increase in value-added activities related to logistics	0,085	0,115	0,156	0,118	5	0,074	0,099	0,132	0,101	6	0,131	0,176	0,235	0,181	1	0,040	0,057	0,082	0,060	5	0,064	0,084	0,111	0,086	5
Increase cooperation between logistics companies	0,053	0,071	0,096	0,074	7	0,062	0,082	0,111	0,085	7	0,058	0,078	0,106	0,081	7	0,037	0,050	0,072	0,053	6	0,036	0,047	0,063	0,049	7
Having an important role in regional/national development	0,122	0,172	0,241	0,178	3	0,151	0,210	0,291	0,217	1	0,117	0,162	0,226	0,168	4	0,073	0,110	0,166	0,116	4	0,132	0,177	0,238	0,182	3
Being Ebvironmental	0,080	0,105	0,140	0,108	6	0,123	0,161	0,211	0,165	3	0,112	0,149	0,199	0,153	5	0,032	0,043	0,060	0,045	7	0,049	0,061	0,078	0,063	6

Comparison of Collaboration subcriteria's priorities has been shown in following table 42. There are 6 type of horizontal collaborations determined and their importance compared by the respondents. According to results;

- Most preferred type of collaboration is “**Collaboration on combining partial loads**” and “**Market Collaborations**” has the second highest importance. They weight 53% in total.
- “**Sharing information**” and “**Project Collaborations**” have the lowest importance among six criteria.
- Noticeably three groups (Logistics centre managers, Logistics service buyers and Institutions) and overall results are considerably close but Logistics service providers' ranking differs from others.
- Logistics Service Providers ranked “**Market Collaborations**” and “**Project Collaborations**” as the most important collaboration types with total weight 45%. They ranked the “**Joint purchasing of vehicle, equipment, fuel etc.**” as the least important.
- Logistics Service Buyers gave more importance on the “**Collaborations on Combining Partial Loads**” subcriteria as it is alone weighted 40% by them.
- Logistics Service Providers prefers “**Project Collaborations**” more than other groups as it is at 2nd place where it is at 5th or 6th place for other groups.
- Institutions believe “**Collaboration on combining partial loads**” and “**Market Collaborations**” are the most important horizontal collaborations types as they weighted 64%.

Table 42: Comparison of Collaboration Subcriterias

Collaborations Subcriterias	Overall					Logistics Centre Managers					Logistics Service Providers					Logistics Service Buyers					Instution				
	Weights			BNP	Rank	Weights			BNP	Rank	Weights			BNP	Rank	Weights			BNP	Rank	Weights			BNP	Rank
Project cooperations	0,064	0,089	0,123	0,092	6	0,073	0,104	0,147	0,108	5	0,134	0,183	0,251	0,189	2	0,044	0,061	0,087	0,064	6	0,057	0,078	0,107	0,081	5
Market Cooperations	0,159	0,227	0,321	0,236	2	0,123	0,176	0,250	0,183	2	0,179	0,253	0,356	0,263	1	0,149	0,227	0,344	0,240	2	0,200	0,278	0,384	0,288	2
Joint use of infrastructure, warehouses, bonded warehouses, equipments	0,129	0,180	0,253	0,187	3	0,112	0,154	0,214	0,160	4	0,104	0,145	0,203	0,151	5	0,119	0,169	0,245	0,178	3	0,087	0,115	0,156	0,119	3
Joint purchasing of vehicle, equipment, fuel etc.	0,086	0,117	0,162	0,122	4	0,121	0,168	0,234	0,174	3	0,068	0,094	0,134	0,099	6	0,063	0,085	0,123	0,090	4	0,048	0,064	0,087	0,066	6
Sharing information	0,081	0,112	0,157	0,117	5	0,055	0,077	0,111	0,081	6	0,111	0,156	0,218	0,162	4	0,051	0,072	0,102	0,075	5	0,084	0,114	0,156	0,118	4
Cooperation on combining partial loads	0,193	0,275	0,387	0,285	1	0,215	0,322	0,474	0,337	1	0,120	0,168	0,236	0,175	3	0,258	0,386	0,561	0,401	1	0,254	0,352	0,479	0,362	1

CONCLUSION

Companies must manage its vertical and horizontal business relationships. These vertical and horizontal business relationships forms networks of the companies. Network Based Relationship Marketing approach deals with the management of these relationships between business actors both customers and other stakeholders. The main concern is how to coordinate activities with different stakeholders and control critical resources through relationships with them. Logistics centres are the example of a specific type of industrial clusters which are the most popular form of industrial networks. Clusters concept is more than a geographic proximity that emphasizes relationships and social ties between the actors in the cluster population. Clusters facilitate networked collaborations as they help the personal interaction which develops frequent communication that can arise diverse networks in clusters; from short term project collaboration to cluster organisations and long term networking arrangements. In other words Clusters are formed by the vertical and horizontal relationships among the companies.

Logistics is multidisciplinary research field that researchers involved from various scientific areas; management and organization, marketing, industrial engineering, production management, economics etc. In parallel with the concepts of supply chain management, 3PL, intermodality and sustainable transportation, the logistics centre concept has been developed. But the concept and scope of the logistic centre is still a matter of discussion. They vary in size, in their features from country to country. They are considered to be the nodal points in global supply chains. It has various benefits for different groups of stakeholders; manufacturing companies, Logistics service providers, the region they are located and the environment and it is considered to be a necessity for sustainable transportation.

According to the previous researches strategic alliances is going to be one of the future trends in the logistics sector. The most important reason for that is expanding volume of e-commerce, increasing demand for more sophisticated warehousing and

distribution facilities. Key clusters and physical infrastructure is also considered to be another future trend in logistics sector.

Collaborations take place between two or more independent companies in two ways; vertical and horizontal collaborations. Vertical collaborations occur between the companies operating at the different levels of supply chain and horizontal collaborations occur between the companies at the same level in the market or supply chain. In other words horizontal collaboration can occur among competitors or unrelated companies. These collaborations can be formal or informal to share risk and costs, increase investments, pool know-how, to raise product variety and quality, initiate innovation faster. Horizontal collaborations is seen and spread among firms in various industries, in various forms such as strategic alliances, R&D agreements and production agreements. It is considered a current method to increase competitiveness of the companies but it is not as common in the logistic sector as in the maritime and aviation sector. In the maritime industry, shipowners and ports used to compete each other but today the chains they belong to compete. Therefore, actors in the maritime industry are trying to be part of a chain through vertical and horizontal alliances. Especially in the liner shipping, the sector witnesses horizontal collaborations agreements such as vessel sharing contracts, strategic alliances, capacity balancing contracts etc.

Even though horizontal collaboration is not very common in logistics industry, it is accepted that collaborations are necessary for economies of scale, economies of scope and for intermodal transportation development. Without collaborations between LSPs it is impossible to improve intermodality. For instance, joint route planning is an example for economies of scale and if corporated companies serving different markets, they both extend their market size by cooperations which is an example of economies of scope. By horizontal collaborations logistics companies can reduce their costs by joint route planning and joint purchasing, also they increase their customer services by extending their market share, they can have higher R&D level, learn from each other experiences, share risks and investments and finally they can increase capacity utilisation by exchanging loads and equipments, making central planning, sharing

distribution centres. Increasing efficiency of road transport also helps to decrease negative effects of increasing road transport.

Although there are remarkable benefits of horizontal collaboration, most of horizontal collaboration attempts doesn't last long as it is difficult process to establish and manage, especially if it is formed between the competitors. There are some instruments that facilitate the management of this process; information sharing, evaluating achievements of each partner, setting up joint goals and gain sharing, relationship management and contract, using information technology and geographic proximity. Logistics centres, as a specific type of industrial cluster, allow the competitors to have most of collaboration instruments they need for the management of the process of horizontal collaboration.

Logistic centre formations have started in the world in 1970's and in Turkey in 2000's. In Turkey, both government and the private sector has initiated logistics centres projects in this 20 years and there are some projects are still in progress. TCDD Logistics centres are mostly involved with the consolidation and deconsolidation of incoming and outgoing freight by the railway they serve. So they should be considered more like Intermodal Terminals rather than a Logistics Centres. Just like United Nations Economic and Social Council defined Intermodal Terminals connect at least two transport modes, which usually are road and rail and they are less complex than logistics centres. When the TCDD logistics centre are planning; the logistics potential of the region is taken into account, the land-rail-air-maritime transportation possibilities and its proximity to the OIZ and industrial areas are analysed. In the logistics centres, the first stage railway investments are made and the warehouses for rail transport are formed. The lands of the logistic centres are expropriated by TCDD or are made to TCDD land. Logistics centres are included in the TCDD investment program and expenditures are made through appropriations. When the private sector wants to invest on these logistics centres, leasing transactions are made with the tender. There is no specific legislation on logistics centres.

In June 2017, Ankara Logistics Centre, that is the first logistics centre in Turkey started operation, visited for interviews. Ankara Logistics centre began its operations

in Turkey in 2011. Field visits and interviews were made by the managers of the companies operating in the internationally and the logistics centre management (President, Vice President and Director) and the board. The face-to-face semi-structured interview type was used. For this purpose, a specific set of questions was prepared and each participant was asked questions in the same style and order. The managers were asked questions regarding the characteristics of the logistics centres, the establishment and management of the Ankara logistics centre and the questions about horizontal collaboration. According to their answers a list of key performance indicators for logistics centres have been conducted and their perspectives about horizontal collaborations and their current practises have been asked in detail. The managers stated that the logistics companies operating in the logistics centres collaborate more but the collaboration is not done sistematically and sufficiently so it is not at the desired level, usually for short term on a project basis. The emphasized main reason for that is “trust”; especially about losing own customers and doubt about not sharing earnings fairly. In particular, they mention that logistics service providers want to increase their collaboration in the consolidation of partial loads and this can only be possible with logistics centres. Logistics centres help to increase collaboration among logistics companies; being located in the same area increase the interactions between them; they encourage each other, exchange information and experinces, they develop social relations which especially helps to build trust. Logistics centres creates more transparent environment, everyone knows each other. Logistics companies also want to increase their collaboration level in order to compete with large companies and to grow in international markets.

The AHP survey carried on April-November 2018 to prioritize the already determined key performance indicators from the content annalysis of literature and interviews. 18 response from experts received, these experts are from different stakeholders of logistics centres so the calculations have been made for the whole group of 18 experts and for 4 groups of them seperately. As 18 experts divided into 4 groups, they are; logistics service providers group (5 experts), logistics centre management group (5 experts), logistics service buyers (4 experts), Institutions (4

experts). When the calculations finished the results have been summarised in tables comparing the opinion of whole group and the 4 different groups' opinions for the main criterias and their subcriterias. Different judgements of the respondents groups on the selected criterias' ranking have been witnessed.

Both qualitative and quantitative methods have been followed to achieve the aim of the study that is "To identify and prioritize key performance indicators in the scope of horizontal collaborations for logistic centres". The following tables show the analysis of qualitative and quantitative research results; table 43 shows qualitative research findings which is **Key Performance Indicators for Logistic Centres** and table 44 shows quantitative research findings which is **Prioritized Key Performance Indicators For Logistic Centre**. Both of tables summarises the results of the thesis.

Table 43: Key Performance Indicators for Logistic Centres

Goal		Determine the Key Performance Indicators For Logistic Centres							
Criteria	Subcriteria	<u>A. Location</u>	<u>B. Infrastructure</u>	<u>C. Activities & Services</u>	<u>D. Ownership & Management</u>	<u>E. Market Conditions</u>	<u>F. Regulations</u>	<u>G. Benefits</u>	<u>H. Horizontal Collaborations</u>
		A1. Along the main routes A2. Proximity and/or connectivity to seaports, airport and rail terminal A3. Proximity and/or connectivity to organized industrial centres	B1. Multimodality B2. Warehouses & Bonded warehouses B3. Offices and social facilities B4. Vehicle and equipment repair facilities B5. Telecommunications and Information services B6. Otoparks (Trucks, cars) B7. Open storage areas B8. Land’s ability to expand	C1. Loading & unloading operations C2. Customs services C3. Filling stations C4. Accommodation service, Restaurants and cafes C5. Banks and insurance services C6. Value added services e.g. storage, processing, consolidation, packaging, inspection etc. C7. Security	D1. Public-Private Partnership (Logistics centres should be managed by the companies from the sector) D2. Owned and managed by private companies (Government agencies should support by providing services) D3. Owned and managed by a public authority (allows open access for all interested parties)	E1. Logistics service providers’ proficiency E2. Existing and potential business activities E3. Labour competence E4. Existing and integration of other logistics centres	F1. Logistics centres should be managed by General Directorate for Logistics established under the Ministry of Transport F2. Regional logistics development plan should be set F3. Incentive and financial assistance programs offered by the government F4. Simple and efficient administration procedure for operating logistics centres F5. Low and simple tax system	G1. Encourage and increase the combined transport G2. Operating cost reduction G3. Increase service quality and responsiveness to the customers G4. Increase in value-added activities related to logistics G5. Increase collaboration between logistics companies G6. Having an important role in regional / national development G7. Being environmental	H1. Project collaborations H2. Market collaborations H3. Joint use of infrastructure, warehouses, bonded warehouses, equipments. H4. Joint purchasing of vehicle, equipment, fuel. H5. Sharing information (Costing, know-how, H6. collaboration on combining partial loads

Table 44: Prioritized Key Performance Indicators For Logistic Centre

PRIORITY							
HIGH							LOW
A. Location (21%)	E. Market Conditions (20%)	G. Benefits (16%)	C. Activities & Services (12%)	B. Infrastructure (10%)	H. Horizontal Collaborations (10%)	F.Regulations (6%)	D.Ownership & Management (5%)
A2. Proximity and/or connectivity to seaports, airport and rail terminal (46%) A1. Along the main routes (37%) A3. Proximity and/or connectivity to organized industrial centres (17%)	E2. Existing and potential business activities (43%) E1. Logistics service providers' proficiency (32%) E4. Existing and integration of other logistics centres (14%) E3. Labour competence (11%)	G3. Increase service quality and responsiveness to the customers (21%) G2. Operating cost reduction (20%) G6. Having an important role in regional / national development (17%) G1. Encourage and increase the combined transport (12%) G4. Increase in value-added activities related to logistics (12%) G5. Increase collaboration between logistics companies (11%) G7. Being environmental (Decrease the accidents, congestions in roads, road maintenance costs and reduce pollution) (7%)	C1. Loading & unloading operations (26%) C2. Customs services (25%) C6. Value added services e.g. storage, processing, packaging, inspection etc. (19%) C7. Security (16%) C5. Banks and insurance services (6%) C3. Filling stations (4%) C4. Accommodation services, Restaurants and cafes (4%)	B1. Multimodality (28%) B2. Warehouses & Bonded warehouses (22%) B7. Open storage areas. (12%) B8. Land's ability to expand (12%) B5. Telecommunications and Information services (10%) B6. Otoparks (Trucks, cars) (6%) B3. Offices and social facilities (5%) B4. Vehicle and equipment repair facilities (5%)	H6. Collaboration on combining partial loads (28%) H2. Market collaborations (23%) H3. Joint use of infrastructure, warehouses, bonded warehouses, equipments. (18%) H4. Joint purchasing of vehicle, equipment, fuel (12%) H5. Sharing information (Costing, know-how etc) (11%) H1. Project collaborations (9%)	F3. Incentive and financial assistance programs offered by the government (30%) F5. Low and simple tax system (27%) F2. Regional Logistics Development plan should be set (20%) F4. Simple and efficient administration procedure for operating logistics centres (18%) F1. Logistics centres should be managed by General Directorate for Logistics established under the Ministry of Transport (5%)	D1. Public-Private Partnership (Logistics centres should be managed by the companies from the sector) (59%) D2. Owned and managed by private companies (Government agencies should support by providing services) (31%) D3. Owned and managed by a public authority (allows open access for all interested parties) (10%)

a. Discussion

Companies work in a complex network of relationships and traditional markets are being replaced by networks. They must consider its vertical and horizontal relationships with all the parties they interact when developing a marketing plan and create a marketing networks. Within these networks companies collaborate vertically or horizontally and Logistics centres as a specialized industrial clusters are outcome of these collaborations.

The content analysis showed Horizontal collaborations is a new and powerful approach that arises among the companies operating at the same level(s). Companies in different industries are involved in a wide range of collaboration activities formed in various types of interfirm alliances such as R&D agreements, joint ventures, collaborative manufacturing, complex co-marketing arrangements, production agreements including subcontracting and specialisation agreements, purchasing agreements, commercialisation agreements, standardisation agreements including standard contracts, and information exchange. Horizontal collaborations have a variety of benefits to companies such as cost optimisation, share risk, increase investments, pool know-how, enhance product quality and variety and launch innovation faster.

Although there are many benefits, it is difficult to create horizontal collaborations and ensure it for long-term. It is the case for Logistics companies as well. Being operated in Logistics centres help and increase their horizontal collaborations levels, they admit that they have been collaborating more since they have been in a logistics centre. They understand the importance of horizontal collaborations and want to make more collaboration. At the moment they make collaborations but they are not systematic, they are usually short term collaborations, usually on project basis. The most important reason for this is that companies mainly do not trust each other; companies concern that they will experience problems in losing their customers, fair share of risks, costs and gains in the long-term horizontal collaboration. They admit that they want to make more collaboration but they don't make any effort for it and basically developing collaborations not ranked at first on their agenda.

To overcome these problems there are facilitators to form and manage horizontal collaborations such as information sharing, relationship and contract management, physical proximity and using information technologies. Logistics centre formations can provide these factors. Logistic companies acknowledge that the companies involved in the logistics centres are collaborating more, working closely help them to increase interactions between them and build trust. Also some type of horizontal collaborations can easily be carried out in logistics centres such as the joint use of infrastructure and services, combining partial loads and sharing information. Information technology, which is another factor that facilitates horizontal collaboration, has not been used sufficiently for horizontal collaboration process by logistics companies. They can develop more systematic and long-term horizontal collaborations with the use of information technologies.

As a result, Horizontal collaborations and logistics centres are drivers and facilitators of each other. Their objectives and benefits overlap such as reducing logistics costs, improving logistics service quality, encouraging and facilitating intermodality, and reducing the environmental damages caused by logistics. To make systematic, long term collaborations logistic companies awareness needs to be increased about logistic centre formations and horizontal collaborations importance.

The results of content analysis of literature and interviews revealed that there are 8 main criterias with their subcriterias can be considered as key performance indicators for logistics centre. The main criterias are; Location, Infrastructure, Activities&Services, Ownership&Management, Market Conditions, Regulations, Benefits and Horizontal Collaborations. These criterias directly effect the performance of logistics centres. To understand stakeholder's preference about the determined key performance indicators fuzzy AHP method has been used. Group of 18 experts from different group of stakeholders were asked to compare main criterias within themselves and subcriterias within themselves. The surveys' results analysed for the whole group of 18 and they were divided in 4 four groups; Logistics Centre Managers (5), Logistics Service Providers (5), Logistics Service Buyers (4) and Institutions (4). By this, different stakeholder groups preferences can be compared for main criterias and subcriterias of them.

The results of this research indicates that;

- Horizontal collaborations and logistics centres are drivers and facilitators of each other. Logistics service providers make more horizontal collaborations but they are not systematic and for long term.
- Logistics centre formation in Turkey are behind the developments in the world in terms both quality and quantity;
 - There are 240 logistic centres in EU most them on routes of TEN-T. 48% of these centres are located in Germany (35), Spain (33), France (26) and Italy (21). The largest logistics centre in Germany has 600 hectares (GVZ Leipzig), the average of logistics centres size 175 ha, they are all Public Private Partnerships and all logistics centres have railway connections. In Asia from China to Dubai, there are many logistics centre, their distinguished features are advanced intermodality, ease of customs procedures, intensive use of information technology. In US all logistics clusters are linked by intermodal infrastructure.
 - The scales of the TCDD Logistics Centre are small (average of 50 ha) and work as more like an intermodal transfer terminal. In general, activities and services like customs clearance, closed warehouse areas, offices, repair maintenance areas etc. are below expectations. Ankara Logistics centre has 70 hectares, it has most of the characteristics expected from the logistics centre and ability to expand but one of the most important criteria is missing that is railway connection. Manisa MOS Logistics centre has 32 hectares. It is located in the organized industrial zone, there is a port connection by rail but in terms activities and services it serves as more intermodal transfer terminals just like TCDD logistics centres.
- Logistics companies especially small and medium sized ones need to be informed and increase their awareness about both logistics centres and horizontal collaborations. The institutions can make more effort for that and public authorities can make tax favors and incentives to promote logistics

centres. Otherwise logistics sector in Turkey cannot compete internationally, intermodality and transit trade cannot be improved in the country.

- The fuzzy AHP results revealed that there are difference opinions between the respondents groups in terms of Logistics centres key performance indicators' prioritisation. The comparisons can ben seen in tables 34-42. The most important differences that attract attention are disccussed below.
- For overall group “Location” and “Market Conditions” weights 42% out of 8 criteria. This is not surprising as Location selection of the logistics centre is one of the most studied area in literature. Both crierias are the criterias must be considered during the establishment of the logistics centre, stakeholder are aware of that these criteria cannot be changed or improved over the time. Horizontal collaborations received modest importance from the overall groups that is in parallel with the interviews. Improving Horizontal collaborations are not in the first place in the agenda of the stakeholders. Just like in the maritime industry, logistics companies should be more involved with sistematic and long term horiozontal collaborations to be competitive.
- “Regulations” and “Ownership and Management” criterias have the lowest importance for the whole group. These criterias depend more on the strategies to be determined by the state authorities regarding the logistics centre formations in the country.
- Institutions put “Benefits” in the first place, as a non-governmental organization, they seem to be more interested in total benefits for different actors in the society.
- Logistics Service Providers and Logistics Service Buyers gave more importance “Horizontal Collaborations” criteria than other groups, it is in 3rd rank for them. In fact, they are actually the parties involved in collaborations, they acknowledge the importance of the criteria where Logistics Centre Managers are not aware enough of their role in maintaining horizontal collaborations.

- “Location” interestingly less important for Logistics service providers than other groups. Logistics Service Providers believe “Market Conditions”, “Benefits” and “Horizontal Collaborations” are more important criterias than “Location”. “Market Conditions” are top priority for Logistics Service Providers, they think logistics centre located in appropriate market conditions such as existing potential business activities, logistics service providers proficiency, labour comperence, more important for them.
- Regarding the comparision of “Location” subcriterias Logistics Centre Managers and Instutions thinks “Proximity and/or connectivity to organized industrial centres” more important than others, on the other hand, Logistics Service Buyers believe “Along the main routes” is most important Location’s subcriteria with very high weight 52,9%. Logistics Service Providers consider “Proximity and/or connectivity to seaports, airport and rail terminal” with a significant weight of 60,5%. Intermodality will be highly required for attracting logistics service providers which is currently a serious handicap for the industry. While Logistics Centre Managers and Institutions paying more attention to logistics centre being close to load/existing and potential customers, Logistics Service Buyers expect logistics centre being easily accessible.
- “Multimodality” as a Infrustructure subcriteria is a must for logistics centre as it has received high rates from all the groups. “Warehouses and Bonded Warehuses” are in the 2nd rank, problems in customs proceses like cost of customs and blockages in customs constitutes one of the bottleneck of Logistics sector in Turkey. Especially bonded warehouses in logistics centr can be an effective way to help reducing problems in the customs process.
- Remarkably, “Telecommunications and Information Services” is the most important infrustructure subcriteria for Logistics service providers. 3pl and 4pl companies strongly believe importance of techonology, this expectation should be take into account by logistics centre’s management.
- “Loading and Unloading Operations” and “Customs Services” are the most important subcriterias among the Activities and Services logistics centres provide. They are the most basic activities, other complementary activities

and services have lower importance for all the groups, except Logistics Service Providers considers “Value Added Services” and “Security” as the most important activities and services should be provided. Value added services getting more and more important in logistics, LSP’s should offer VAL services to meet the diverse needs of customers and to be competitive, logistics centres allow the cost of these services to be reduced.

- Public-Private Partnership for Logistics centres is the most preferred ownership and management model for logistics centres. Logistics Services Providers prefers “Owned and Managed by Private Companies” criteria for Logistics Centres’ ownership and management model. All groups against of public governance in logistics centres. Public support needed in the establishment phase for financing and intermodal infrastructure investments, then private sector management is preferred.
- Prioritisation of Regulations subcriteria are mostly agreed by all groups. management of logistics centres by a central management under the Ministry of Transport strongly objected, they expect government to promote logistics centres by Incentive and financial assistance and low and simple tax system offered by the government.
- Although Logistics service providers believe that they can create difference through Value added services to attract customers, logistics centre management doesn’t seem to be as much as aware of this expectation. Even though in the interviews both Logistics centre managers and LSP’s Managers admitted that being operated in a logistics centre increase horizontal collaborations, according to prioritisation of Benefits Subcriteria Logistics centre’s role in increasing horizontal collaboration has not been taken into account much by any groups.
- Respondents convinced that logistics centres reduce operating costs and increase service quality. Majority of stakeholder believe “Collaboration On Combining Partial Loads” is the most important collaborations type. Followed by “Market Collaborations”. These collaborations types has top priority for the stakeholders.

- Logistics Service Buyers are customers of Logistics Service Providers and they are both customers of Logistics centres. Institutions mostly representative of LSP's, in this case logistics centre managements and public authorities should pay attention on preferences of these 3 groups; Logistics service buyers, Logistics service providers and institutions.



b. Limitations of the research

The research has some limitation. Benchmarking of the logistics centres in Turkey and different part of World would be valuable but due to financial and physical constraints it wouldn't be possible, example of some the logistics centre formations in the different continents have been searched from the literature, reports, institutions. Another limitation is the formation of logistics centres are respectively a new progress in Turkey. So there is not many facility truly operating as "logistics centre". Although TCDD has 9 logistics centres in operation, they are operating more like intermodal terminals.

Future researches may test the determined and prioritised Key Performance Indicators for logistics centres in this research on the advanced logistics centres in the world whether advanced/successful logistics centres' features are in compliance with the key performance criteria prioritized in this study. Future studies may also concentrate on how Logistics service providers make more strategical and sistematic horizontal collaborations and how logistics centres maintain/improve the horizontal collaborations among Logistics service providers.

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APPENDICES

APPENDIX 1. Interview questions' forms

Table A1. Interview Question Form for Logistic Companies operating in Logistics Centres

	DOKUZ EYLÜL ÜNİVERSİTESİ SOSYAL BİLİMLER ENSTİTÜSÜ DENİZCİLİK İŞLETMELERİ YÖNETİMİ ANABİLİM DALI DENİZCİLİK İŞLETMELERİ YÖNETİMİ DOKTORA PROGRAMI
TEZ KONUSU	<i>Lojistik Sektöründe Yatay İşbirlikleri ve Lojistik Merkezler; Lojistik Merkezler İçin Anahtar Performans Göstergelerinin Belirlenmesi</i>
TEZİN AMACI	1. Türkiye’de ve Dünya’da Lojistik Merkezlerin gelişimini incelemek, 2. Lojistik firmalar arasında yatay işbirliklerinin gerekliliğini ve uygulamalarını açıklamak 3. Lojistik merkezlerin, lojistik firmalar arasındaki işbirliklerine etkisini analiz etmek 4. Lojistik Merkezlerin Anahtar Performans Göstergelerinin belirlenmesi ve önceliklendirilmesi

MÜLAKAT

TARİHİ	
YERİ	
GÖRÜŞMECİNİN ADI SOYADI	
GÖRÜŞMECİNİN ÜNVANI	
ŞİRKET ADI	
ŞİRKETİN KURULUŞ TARİHİ	
FİLO BÜYÜKLÜĞÜ	

MÜLAKAT SORULARI

1. Uluslararası Taşımacılık yapıyor musunuz?
2. Taşımacılık dışında diğer hangi lojistik faaliyetleri (depolama, gümrükleme, multimodal taşımacılık, proje lojistiği, diğer katma değerli hizmetler v.s.) gerçekleştiriyorsunuz?
3. Kaç yıldır lojistik merkez içinde faaliyet gösteriyorsunuz?
4. Lojistik Merkez içinde yer almak istemenizin sebepleri nelerdir?
5. Lojistik merkez içinde yer almanın avantajları nelerdir?
6. Lojistik merkez içinde yer almanın dezavantajı var mıdır? Varsa açıkla mısınız?
7. Lojistik merkezde şu anda olmayan ama olmasını istediğiniz özellikler var mı? Varsa açıkla mısınız?
8. Diğer lojistik firmaları ile işbirliği yapıyor musunuz?

*Cevabınız evet ise, 9, 10, 11, 12, 13, 14. soruları cevaplamısınız.

*Cevabınız hayır ise, 15. soruyu cevaplamısınız.

9. İşbirliği yapmanızın sebepleri nelerdir?
10. Bu işbirliklerinin süresi nedir?
11. İşbirliği yaptığınız alanlar hangileridir?
12. İşbirliklerinin olumlu ve varsa olumsuz sonuçlarından bahsedermisiniz?
13. Lojistik merkez içinde yer almadan önce yine diğer lojistik firmalarla işbirliği yapıyor muydunuz? Hangi alanlarda?
14. Lojistik merkez içinde yer almak diğer lojistik firmalarla olan işbirliğinizi arttırdı mı? Neden?
15. İşbirliği yapmıyor olmamanızın nedenleri nelerdir?

Table A2. Interview Question Form for Logistic Centre Management

	DOKUZ EYLÜL ÜNİVERSİTESİ SOSYAL BİLİMLER ENSTİTÜSÜ DENİZCİLİK İŞLETMELERİ YÖNETİMİ ANABİLİM DALI DENİZCİLİK İŞLETMELERİ YÖNETİMİ DOKTORA PROGRAMI
TEZ KONUSU	<i>Lojistik Sektöründe Yatay İşbirlikleri ve Lojistik Merkezler; Lojistik Merkezler İçin Anahtar Performans Göstergelerinin Belirlenmesi</i>
TEZİN AMACI	5. Türkiye’de ve Dünya’da Lojistik Merkezlerin gelişimini incelemek, 6. Lojistik firmalar arasında yatay işbirliklerinin gerekliliğini ve uygulamalarını açıklamak 7. Lojistik merkezlerin, lojistik firmalar arasındaki işbirliklerine etkisini analiz etmek 8. Lojistik Merkezlerin Anahtar Performans Göstergelerinin belirlenmesi ve önceliklendirilmesi

MÜLAKAT

TARİH	
YER	
GÖRÜŞMECİNİN ADI SOYADI	
GÖRÜŞMECİNİN ÜNVANI	

MÜLAKAT SORULARI

1. Lojistik merkez ne zaman kuruldu?
2. Lojistik Merkezin amacı ve özellikleri nelerdir?
3. Türkiye’de ve Dünya’da lojistik merkezlerin sayılarının hızla artmasının nedenleri nelerdir?
4. Lojistik Merkezlerin verimli olabilmesi için hangi özelliklere sahip olması gerekir?
5. Türkiye’de Lojistik merkezlerin kurulmasında ve yönetiminde karşılaşılan en önemli sorunlar hangileridir?
6. Lojistik merkez de kaç tane lojistik firması faaliyet gösteriyor?
7. Sizce Lojistik firmalarının lojistik merkez içinde faaliyet göstermek istemelerinin en önemli sebep/sebepleri nelerdir?
8. Sizce lojistik firmaları kendi aralarında işbirliği yapmalı mı?
9. Lojistik firmalarının kendi aralarında işbirliği yapmaları gerektiğini düşünüyorsanız, sizce nasıl işbirliği yapılabilir?

10. Lojistik merkezde yer alan lojistik firmalar kendi aralarında işbirliği yapıyorlar mı?
Yapıyorlar ise, hangi alanlarda nasıl işbirliği yapıyorlar?
11. Lojistik firmalar işbirliği yapmıyorsa, yapmamalarının nedenleri sizce nelerdir?
12. Sizce Lojistik merkez içinde faaliyet göstermek, lojistik firmalarının daha fazla işbirlikleri geliştirmelerine neden olur mu?
13. Sizce Lojistik merkez yönetimi lojistik firmalar arasında işbirliklerinin gelişmesine yardımcı olabilir mi? Evet ise, uygulamada bunu nasıl yapabilirler?



Table A3. Interview Question Form for Logistic Centre Management

	DOKUZ EYLÜL ÜNİVERSİTESİ SOSYAL BİLİMLER ENSTİTÜSÜ DENİZCİLİK İŞLETMELERİ YÖNETİMİ ANABİLİM DALI DENİZCİLİK İŞLETMELERİ YÖNETİMİ DOKTORA PROGRAMI
TEZ KONUSU	<i>Lojistik Sektöründe Yatay İşbirlikleri ve Lojistik Merkezler; Lojistik Merkezler İçin Anahtar Performans Göstergelerinin Belirlenmesi</i>
TEZİN AMACI	1. Türkiye’de ve Dünya’da Lojistik Merkezlerin gelişimini incelemek, 2. Lojistik firmalar arasında yatay işbirliklerinin gerekliliğini ve uygulamalarını açıklamak 3. Lojistik merkezlerin, lojistik firmalar arasındaki işbirliklerine etkisini analiz etmek 4. Lojistik Merkezlerin Anahtar Performans Göstergelerinin belirlenmesi ve önceliklendirilmesi

MÜLAKAT

TARİH	3.7.2017
YER	Halkalı Lojistik Müdürlüğü
GÖRÜŞMECİNİN ADI SOYADI	Hasan YETİM
GÖRÜŞMECİNİN ÜNVANI	Halkalı Lojistik Müdürü

MÜLAKAT SORULARI

1. Halkalı Lojistik Merkezi ne zaman kuruldu?
2. Halkalı Lojistik Merkezinin amacı ve özellikleri nelerdir?
3. Türkiye’de ve Dünya’da lojistik merkezlerin sayılarının hızla artmasının nedenleri nelerdir?
4. Lojistik Merkezlerin verimli olabilmesi için hangi özelliklere sahip olması gerekir?
5. Türkiye’de Lojistik merkezlerin kurulmasında ve yönetiminde karşılaşılan en önemli sorunlar hangileridir?
6. Halkalı Lojistik Merkez’in de kaç tane lojistik firması faaliyet gösteriyor?
7. Sizce Lojistik firmalarının lojistik merkez içinde faaliyet göstermek istemelerinin en önemli sebep/sebepleri nelerdir?

8. Lojistik merkezde yer alan lojistik firmalar kendi aralarında işbirliği yapıyorlar mı? Yapıyorlar ise, hangi alanlarda nasıl işbirliği yapıyorlar?
9. Lojistik firmalar işbirliği yapmıyorsa, yapmamalarının nedenleri sizce nelerdir?
10. Sizce Lojistik merkez içinde faaliyet göstermek, lojistik firmalarının daha fazla işbirlikleri geliştirmelerine neden olur mu?



APPENDIX 2. AHP Survey Form

Bu çalışma, Dokuz Eylül Üniversitesi, Sosyal Bilimler Enstitüsü, Denizcilik İşletmeleri Yönetimi Anabilim Dalı, “Denizcilik İşletmeleri Yönetimi” doktora programı **“Lojistik Merkezlerin Gelişimi Ve Lojistik Sektöründe Yatay İşbirlikleri; Türkiye’de Etkili Lojistik Merkezler İçin Anahtar Performans Göstergeleri”** isimli tezde kullanılmak üzere hazırlanmıştır. Çalışmanın amacı Türkiye’de ve Dünya’da Lojistik Merkezlerin gelişimini incelemek, Lojistik firmalar arasında yatay işbirliklerinin gerekliliğini ve uygulamalarını açıklamak ve Lojistik merkezlerin, lojistik firmalar arasındaki işbirliklerine etkisini analiz etmek ve sonuçta Türkiye’deki lojistik merkezler için anahtar performans göstergelerini belirlemektir. **Türkiye’de etkin lojistik merkezler için anahtar performans göstergeleri uzmanlarla yapılan mülakatlar sonucunda belirlenmiş ve aşağıdaki tabloda gösterilmiştir. Bu göstergelerin önceliklendirilmesi ve önem farklılıklarını ortaya koymak amacıyla, bir karar verme yöntemi olarak Analitik Hiyerarşi Proses (AHP) yöntemi kullanılmasına karar verilmiştir. Bu yöntemde, belirlenen kriterlerin birbirlerine göre sahip oldukları önem değerlerine göre birebir karşılaştırılmaları yapılmaktadır.**

Yanıtlarınızın doğruluğu, araştırmanın sağlıklı ve başarılı sonuçlar vermesi açısından önemli olup, sonuçlar bireysel ve kurum bazında değil, genel olarak değerlendirilecektir. **Yanıtlarınız tamamen gizli kalacak ve elde edilen genel değerlendirme sonuçları yalnızca bilimsel platformlarda sunulacaktır.**

Aşağıda istenilen değerlendirme yöntemi ve kriterler hakkında genel bilgiler verilmiştir. Katkılarınız için teşekkür ederiz.

Öğr. Gör. Didem Çavuşoğlu

Doç. Dr. Yusuf ZORBA

Hedef	Türkiye'de Etkin Lojistik Merkezler İçin Kilit Performans Göstergelerinin Önceliklendirilmesi							
Kriterler	A. <u>Konum</u>	B. <u>Altyapı</u>	C. <u>Faaliyetler ve Hizmetler</u>	D. <u>Mülkiyet ve Yönetim</u>	E. <u>Pazar Kosulları</u>	F. <u>Mevzuat</u>	G. <u>Faydaları</u>	H. <u>Yatay İşbirlikleri</u>
Alt Kriterler	A1. Ana güzergahlar üzerinde olmak A2. Liman, havaalanı ve demiryolu terminaline yakınlık ve / veya bağlantısı olmak A3. Organize sanayi merkezlerine yakınlık ve / veya bağlantısı olmak	B1. Çok modluluk B2. Depo ve antrepolar B3. Ofisler ve sosyal tesisler B4. Araç ve ekipman tamir ve bakım tesisleri B5. Telekomunikasyon ve bilgi sistemleri B6. Otoparklar B7. Açık depolama alanları B8. Arazinin genişleme kabiliyetinin olması	C1. Yükleme ve boşaltma faaliyetleri C2. Gümrük Hizmetleri C3. Yakıt istasyonları C4. Konaklama hizmeti, Restoran ve Kafeler C5. Bankalar ve Sigorta hizmetleri C6. Katma değerli hizmetler (Paketleme, konsolidasyon, montaj, tamir bakım, kalite kontrol...) C.7 Güvenlik	D1. Kamu-Özel Ortaklığı (Lojistik merkezler sektörden şirketler tarafından yönetilmeli) D2. Özel şirketler tarafından sahip olunan ve yönetilen (Devlet kurumları hizmet sunarak destek olmalı; gümrük, sanayi ve ticaret odası ofislerinin açılması, karayolu ve demiryolu bağlantısının sağlanması vb.) D3. Bir kamu otoritesi tarafından sahip olunan ve yönetilen (ilgili tüm taraflara açık erişimi sağlar)	E1. Lojistik hizmet sağlayıcılarının yeterliliği E2. Mevcut ve potansiyel ticari faaliyetler E3. İşgücü yeterliliği E 4. Mevcut ve diğer lojistik merkezlerin varlığı ve entegrasyonu	F1. Lojistik merkezleri Ulaştırma Bakanlığı bünyesinde kurulan Lojistik Genel Müdürlüğü tarafından yönetilmelidir. F2. Bölgesel lojistik kalkınma planı belirlenmelidir F3. Devlet tarafından teşvik ve mali yardım programları hazırlanmalı F4. Lojistik merkezleri işletmek için basit ve etkili yönetim prosedürü oluşturulmalı F5. Düşük ve basit vergi sistemi	G1. Kombine taşımacılığı özendirir ve artırır G2. İşletme maliyetlerini düşürür G3. Müşteri hizmet kalitesini ve yanıt hızını artırır G4. Lojistikle ilgili katma değerli faaliyetlerde artış sağlar G5. Lojistik firmaları arasındaki işbirliğini artırır G6. Bölgesel ve ulusal kalkınmaya katkı sağlar G7. Çevreseldir (Kazaları azaltır, yollarda tıkanıklık, yol bakım maliyetleri ve kirliliği azaltır vb.)	G1. Proje işbirlikleri (Büyük projeleri birlikte gerçekleştirmek) G2. Pazar işbirlikleri (Farklı pazarlara hizmet eden şirketlerin işbirliği yaparak pazarlarını genişletmeleri) G3. Altyapı, ambarlar, antrepolar ve ekipmanların müşterek kullanımı. G4. Ortak satın alma (Araclar, ekipmanlar, yakıt, eğitim, bilişim sistemleri vb.) G5. Bilgi paylaşma (Maliyet hesaplama, know-how vb.) G6. Parsiyel yüklerin birleştirilmesinde işbirliği

PUANLANDIRMA

Anket formu iki kısımdan oluşmaktadır. Birinci kısımda kriterlerin birbirleri ile ikili karşılaştırmaları ve birbirlerine göre önem derecelerinin puanlandırılması istenmiştir. Anketin ikinci kısmında ise her kriterin altında yer alan alt kriterlerin birbirlerine göre ikili karşılaştırmaları ve önem derecelerinin puanlandırılması istenmiştir. Puanlandırmada aşağıdaki hususlar göz önünde bulundurulmalıdır:

- Bir kriter diğerine göre **aşırı derecede önemli** ise **9 puan**
- Bir kriter diğerine göre **çok önemli** ise **7 puan**
- Bir kriter diğerine göre **önemli** ise **5 puan**
- Bir kriter diğerine göre **az önemli** ise **3 puan**
- İki kriter eşit derecede **önemli** ise **1 puan**
- 2, 4, 6 ve 8 birbirine komşu iki yargı arasındaki ara önem derecesini ifade eder, bu nedenle karşılaştırma formuna dâhil edilmemiştir.

Örnek: Karşılaştırma formunda kriterlerin karşılaştırılması ve önem derecelerinin gösterilmesi

BİRİNCİ KISIM Kriterleri Karşılaştırma Formu						
HANGİ KRİTER DAHA ÖNEMLİ?		ÖNEM DERECEŚİ				
Kriterler	Kriterler	Eşit	Az önemli	Önemli	Çok önemli	Aşırı derecede önemli
Altyapıya göre Konum daha önemli	Faaliyetler ve Hizmetler Mevzuata göre daha önemli	1	3	5	7	9
X Konum	Altyapı				X	
Mevzuat	X Faaliyetler ve Hizmetler		X			
Pazar Koşulları	Mülkiyet ve Yönetim	X				

Açıklama:

1.satırda: Konum kriteri Altyapı kriteri ile karşılaştırılmış, Konum kriteri Altyapı kriterine göre daha önemli ve önem seviyesi olarak da “**çok önemli**” (7) seviyesinde değerlendirilmiştir.

2.satırda: Mevzuat kriteri Faaliyetler ve Hizmetler kriteri ile karşılaştırılmış, Faaliyetler ve Hizmetler kriteri Mevzuat kriterine göre daha önemli ve önem seviyesi olarak da “**az önemli**” seviyesinde değerlendirilmiştir

3.satırda: Pazar Koşulları kriteri Mülkiyet ve Yönetim kriteri ile karşılaştırılmış, Pazar Koşulları kriteri ve Mülkiyet ve Yönetim kriteri “**eşit derecede önemli**” (1) olarak değerlendirilmiştir. İki kriterin önemi birbirine eşit ise sadece “1” işaretlenir.

BİRİNCİ KISIM						
Kriterleri Karşılaştırma Formu						
Hangi Kriter Daha Önemli?				Önem Derecesi		
Kriterler		Kriterler		Eşit	Az önemli	Önemli
				1	3	5
				7	9	Aşırı derecede
Konum		Altyapı				
Konum		Faaliyetler ve Hizmetler				
Konum		Mülkiyet ve Yönetim				
Konum		Pazar Koşulları				
Konum		Mevzuat				
Konum		Faydaları				
Konum		Yatay İşbirlikleri				
Altyapı		Faaliyetler ve Hizmetler				
Altyapı		Mülkiyet ve Yönetim				
Altyapı		Pazar Koşulları				
Altyapı		Mevzuat				
Altyapı		Faydaları				

	Altyapı		Yatay İşbirlikler					
	Faaliyetler ve Hizmetler		Mülkiyet ve Yönetim					
	Faaliyetler ve Hizmetler		Pazar Koşulları					
	Faaliyetler ve Hizmetler		Mevzuat					
	Faaliyetler ve Hizmetler		Faydaları					
	Faaliyetler ve Hizmetler		Yatay İşbirlikleri					
	Mülkiyet ve Yönetim		Pazar Koşulları					
	Mülkiyet ve Yönetim		Mevzuat					
	Mülkiyet ve Yönetim		Faydaları					
	Mülkiyet ve Yönetim		Yatay İşbirlikleri					
	Pazar Koşulları		Mevzuat					
	Pazar Koşulları		Faydaları					
	Pazar Koşulları		Yatay İşbirlikleri					
	Mevzuat		Faydaları					
	Mevzuat		İşbirlikleri					
	Faydaları		İşbirlikleri					

İKİNCİ KISIM
Alt Kriterleri Karşılaştırma Formu

KONUM Kriteri Alt Kriterlerinin Karşılaştırılması

Hangi Kriter Daha Önemli?		Önem Derecesi				
Kriterler	Kriterler	Eşit	Az önemli	Önemli	Çok önemli	Aşırı derecede ..
		1	3	5	7	9
Ana güzergahlar üzerinde olmak	Liman, havaalanı ve demiryolu terminaline yakınlık ve / veya bağlantısı olmak					
Ana güzergahlar üzerinde olmak	Organize sanayi merkezlerine yakınlık ve / veya bağlantısı olmak					
Liman, havaalanı ve demiryolu terminaline yakınlık ve / veya bağlantısı olmak	Organize sanayi merkezlerine yakınlık ve / veya bağlantısı olmak					

İKİNCİ KISIM

Alt Kriterleri Karşılaştırma Formu

ALTYAPI Kriteri Alt Kriterlerinin Karşılaştırılması

Hangi Kriter Daha Önemli?		Önem Derecesi				
Kriterler	Kriterler	Eşit	Az önemli	Önemli	Çok önemli	Aşırı derecede önemli
		1	3	5	7	9
Çok modluluk	Depo ve antrepolar					
Çok modluluk	Ofisler ve sosyal tesisler					
Çok modluluk	Araç ve ekipman tamir ve bakım tesisleri					
Çok modluluk	Telekomunikasyon ve bilgi sistemleri					
Çok modluluk	Otoparklar					
Çok modluluk	Açık depolama alanları					
Çok modluluk	Arazinin genişleme kabiliyetinin olması					
Depo ve antrepolar	Ofisler ve sosyal tesisler					
Depo ve antrepolar	Araç ve ekipman tamir ve bakım tesisleri					
Depo ve antrepolar	Telekomunikasyon ve bilgi sistemleri					
Depo ve antrepolar	Otoparklar					
Depo ve antrepolar	Açık depolama alanları					
Depo ve antrepolar	Arazinin genişleme kabiliyetinin olması					
Ofisler ve sosyal tesisler	Araç ve ekipman tamir ve bakım tesisleri					
Ofisler ve sosyal tesisler	Telekomunikasyon ve bilgi sistemleri					
Ofisler ve sosyal tesisler	Otoparklar					
Ofisler ve sosyal tesisler	Açık depolama alanları					
Ofisler ve sosyal tesisler	Arazinin genişleme kabiliyetinin olması					
Araç ve ekipman tamir ve bakım tesisleri	Telekomunikasyon ve bilgi sistemleri					
Araç ve ekipman tamir ve bakım tesisleri	Otoparklar					

Araç ve ekipman tamir ve bakım tesisleri	Açık depolama alanları								
Araç ve ekipman tamir ve bakım tesisleri	Arazinin genişleme kabiliyetinin olması								
Telekomunikasyon ve bilgi sistemleri	Otoparklar								
Telekomunikasyon ve bilgi sistemleri	Açık depolama alanları								
Telekomunikasyon ve bilgi sistemleri	Arazinin genişleme kabiliyetinin olması								
Otoparklar	Açık depolama alanları								
Otoparklar	Arazinin genişleme kabiliyetinin olması								
Açık depolama alanları	Arazinin genişleme kabiliyetinin olması								



İKİNCİ KISIM
Alt Kriterleri Karşılaştırma Formu

FAALİYETLER VE HİZMETLER Kriteri Alt Kriterlerinin Karşılaştırılması

Hangi Kriter Daha Önemli?		Önem Derecesi				
Kriterler	Kriterler	Eşit	Az önemli	Önemli	Çok önemli	Aşırı derecede önemli
		1	3	5	7	9
Yükleme ve boşaltma faaliyetleri	Gümrük Hizmetleri					
Yükleme ve boşaltma faaliyetleri	Yakıt istasyonları					
Yükleme ve boşaltma faaliyetleri	Konaklama hizmeti, Restoran ve Kafeler					
Yükleme ve boşaltma faaliyetleri	Bankalar ve Sigorta hizmetleri					
Yükleme ve boşaltma faaliyetleri	Katma değerli hizmetler (Paketleme, konsolidasyon, montaj, tamir bakım, kalite kontrol...)					
Yükleme ve boşaltma faaliyetleri	Güvenlik					
Gümrük Hizmetleri	Yakıt istasyonları					
Gümrük Hizmetleri	Konaklama hizmeti, Restoran ve Kafeler					
Gümrük Hizmetleri	Bankalar ve Sigorta hizmetleri					
Gümrük Hizmetleri	Katma değerli hizmetler (Paketleme, konsolidasyon, montaj, tamir bakım, kalite kontrol...)					
Gümrük Hizmetleri	Güvenlik					
Yakıt istasyonları	Konaklama hizmeti, Restoran ve Kafeler					
Yakıt istasyonları	Bankalar ve Sigorta hizmetleri					
Yakıt istasyonları	Katma değerli hizmetler (Paketleme, konsolidasyon, montaj, tamir bakım, kalite kontrol...)					
Yakıt istasyonları	Güvenlik					
Konaklama hizmeti, Restoran ve Kafeler	Bankalar ve Sigorta hizmetleri					
Konaklama hizmeti, Restoran ve Kafeler	Katma değerli hizmetler (Paketleme, konsolidasyon, montaj, tamir bakım, kalite kontrol...)					

Konaklama hizmeti, Restoran ve Kafeler	Güvenlik								
Bankalar ve Sigorta hizmetleri	Katma değerli hizmetler (Paketleme, konsolidasyon, montaj, tamir bakım, kalite kontrol...)								
Bankalar ve Sigorta hizmetleri	Güvenlik								
Katma değerli hizmetler (Paketleme, konsolidasyon, montaj, tamir bakım, kalite kontrol...)	Güvenlik								



İKİNCİ KISIM
Alt Kriterleri Karşılaştırma Formu

MÜLKİYET VE YÖNETİM Kriteri Alt Kriterlerinin Karşılaştırılması

Hangi Kriter Daha Önemli?		Önem Derecesi				
Kriterler	Kriterler	Eşit	Az önemli	Önemli	Çok önemli	Aşırı derecede önemli
		1	3	5	7	9
Kamu-Özel Ortaklığı (Lojistik merkezler sektörden şirketler tarafından yönetilmeli)	Özel şirketler tarafından sahip olunan ve yönetilen (Devlet kurumları hizmet sunarak destek olmalı; gümrük, sanayi ve ticaret odası ofislerinin açılması, karayolu ve demiryolu bağlantısının sağlanması vb.)					
Kamu-Özel Ortaklığı (Lojistik merkezler sektörden şirketler tarafından yönetilmeli)	Bir kamu otoritesi tarafından sahip olunan ve yönetilen (ilgili tüm taraflara açık erişimi sağlar)					
Özel şirketler tarafından sahip olunan ve yönetilen (Devlet kurumları hizmet sunarak destek olmalı; gümrük, sanayi ve ticaret odası ofislerinin açılması, karayolu ve demiryolu bağlantısının sağlanması vb.)	Bir kamu otoritesi tarafından sahip olunan ve yönetilen (ilgili tüm taraflara açık erişimi sağlar)					

İKİNCİ KISIM
Alt Kriterleri Karşılaştırma Formu

PAZAR KOŞULLARI Kriteri Alt Kriterlerinin Karşılaştırılması

Hangi Kriter Daha Önemli?		Önem Derecesi				
Kriterler	Kriterler	Eşit	Az önemli	Önemli	Çok önemli	Aşırı derecede ..
		1	3	5	7	9
Lojistik hizmet sağlayıcılarının yeterliliği	Mevcut ve potansiyel ticari faaliyetler					
Lojistik hizmet sağlayıcılarının yeterliliği	İşgücü yeterliliği					
Lojistik hizmet sağlayıcılarının yeterliliği	Mevcut ve diğer lojistik merkezlerin varlığı ve entegrasyonu					
Mevcut ve potansiyel ticari faaliyetler	İşgücü yeterliliği					
Mevcut ve potansiyel ticari faaliyetler	Mevcut ve diğer lojistik merkezlerin varlığı ve entegrasyonu					
İşgücü yeterliliği	Mevcut ve diğer lojistik merkezlerin varlığı ve entegrasyonu					

KİNCİ KISIM
Alt Kriterleri Karşılaştırma Formu

MEVZUAT Kriteri Alt Kriterlerinin Karşılaştırılması

Hangi Kriter Daha Önemli?		Önem Derecesi				
Kriterler	Kriterler	Eşit	Az önemli	Önemli	Çok önemli	Aşırı derecede ..
		1	3	5	7	9
Lojistik merkezleri Ulaştırma Bakanlığı bünyesinde kurulan Lojistik Genel Müdürlüğü tarafından yönetilmelidir.	Bölgesel lojistik kalkınma planı belirlenmelidir					
Lojistik merkezleri Ulaştırma Bakanlığı bünyesinde kurulan Lojistik Genel Müdürlüğü tarafından yönetilmelidir.	Devlet tarafından teşvik ve mali yardım programları hazırlanmalı					
Lojistik merkezleri Ulaştırma Bakanlığı bünyesinde kurulan Lojistik Genel Müdürlüğü tarafından yönetilmelidir.	Lojistik merkezleri işletmek için basit ve etkili yönetim prosedürü oluşturulmalı					
Lojistik merkezleri Ulaştırma Bakanlığı bünyesinde kurulan Lojistik Genel Müdürlüğü tarafından yönetilmelidir.	Düşük ve basit vergi sistemi					
Bölgesel lojistik kalkınma planı belirlenmelidir	Devlet tarafından teşvik ve mali yardım programları hazırlanmalı					
Bölgesel lojistik kalkınma planı belirlenmelidir	Lojistik merkezleri işletmek için basit ve etkili yönetim prosedürü oluşturulmalı					
Bölgesel lojistik kalkınma planı belirlenmelidir	Düşük ve basit vergi sistemi					
Devlet tarafından teşvik ve mali yardım programları hazırlanmalı	Lojistik merkezleri işletmek için basit ve etkili yönetim prosedürü oluşturulmalı					
Devlet tarafından teşvik ve mali yardım programları hazırlanmalı	Düşük ve basit vergi sistemi					
Lojistik merkezleri işletmek için basit ve etkili yönetim prosedürü oluşturulmalı	Düşük ve basit vergi sistemi					

İKİNCİ KISIM
Alt Kriterleri Karşılaştırma Formu

FAYDALARI Kriteri Alt Kriterlerinin Karşılaştırılması

Hangi Kriter Daha Önemli?		Önem Derecesi				
Kriterler	Kriterler	Eşit	Az önemli	Önemli	Çok önemli	Aşırı derecede ..
		1	3	5	7	9
Kombine taşımacılığı özendirir ve artırır	İşletme maliyetlerini düşürür					
Kombine taşımacılığı özendirir ve artırır	Müşteri hizmet kalitesini ve yanıt hızını artırır					
Kombine taşımacılığı özendirir ve artırır	Lojistikle ilgili katma değerli faaliyetlerde artış sağlar					
Kombine taşımacılığı özendirir ve artırır	Lojistik firmaları arasındaki işbirliğini artırır					
Kombine taşımacılığı özendirir ve artırır	Bölgesel ve ulusal kalkınmaya katkı sağlar					
Kombine taşımacılığı özendirir ve artırır	Çevreseldir (Kazaları azaltır, yollarda tıkanıklık, yol bakım maliyetleri ve kirliliği azaltır vb.)					
İşletme maliyetlerini düşürür	Müşteri hizmet kalitesini ve yanıt hızını artırır					
İşletme maliyetlerini düşürür	Lojistikle ilgili katma değerli faaliyetlerde artış sağlar					
İşletme maliyetlerini düşürür	Lojistik firmaları arasındaki işbirliğini artırır					
İşletme maliyetlerini düşürür	Bölgesel ve ulusal kalkınmaya katkı sağlar					
İşletme maliyetlerini düşürür	Çevreseldir (Kazaları azaltır, yollarda tıkanıklık, yol bakım maliyetleri ve kirliliği azaltır vb.)					
Müşteri hizmet kalitesini ve yanıt hızını artırır	Lojistikle ilgili katma değerli faaliyetlerde artış sağlar					
Müşteri hizmet kalitesini ve yanıt hızını artırır	Lojistik firmaları arasındaki işbirliğini artırır					
Müşteri hizmet kalitesini ve yanıt hızını artırır	Bölgesel ve ulusal kalkınmaya katkı sağlar					
Müşteri hizmet kalitesini ve yanıt hızını artırır	Çevreseldir (Kazaları azaltır, yollarda tıkanıklık, yol bakım maliyetleri ve kirliliği azaltır vb.)					
Lojistikle ilgili katma değerli faaliyetlerde artış sağlar	Lojistik firmaları arasındaki işbirliğini artırır					
Lojistikle ilgili katma değerli faaliyetlerde artış sağlar	Bölgesel ve ulusal kalkınmaya katkı sağlar					

Lojistikle ilgili katma değerli faaliyetlerde artış sağlar	Çevreseldir (Kazaları azaltır, yollarda tıkanıklık, yol bakım maliyetleri ve kirliliği azaltır vb.)					
Lojistik firmaları arasındaki işbirliğini artırır	Bölgesel ve ulusal kalkınmaya katkı sağlar					
Lojistik firmaları arasındaki işbirliğini artırır	Çevreseldir (Kazaları azaltır, yollarda tıkanıklık, yol bakım maliyetleri ve kirliliği azaltır vb.)					
Bölgesel ve ulusal kalkınmaya katkı sağlar	Çevreseldir (Kazaları azaltır, yollarda tıkanıklık, yol bakım maliyetleri ve kirliliği azaltır vb.)					



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Alt Kriterleri Karşılaştırma Formu

MEVZUAT Kriteri Alt Kriterlerinin Karşılaştırılması

Hangi Kriter Daha Önemli?		Önem Derecesi				
Kriterler	Kriterler	Eşit	Az önemli	Önemli	Çok önemli	Aşırı derecede ..
		1	3	5	7	9
Lojistik merkezleri Ulaştırma Bakanlığı bünyesinde kurulan Lojistik Genel Müdürlüğü tarafından yönetilmelidir.	Bölgesel lojistik kalkınma planı belirlenmelidir					
Lojistik merkezleri Ulaştırma Bakanlığı bünyesinde kurulan Lojistik Genel Müdürlüğü tarafından yönetilmelidir.	Devlet tarafından teşvik ve mali yardım programları hazırlanmalı					
Lojistik merkezleri Ulaştırma Bakanlığı bünyesinde kurulan Lojistik Genel Müdürlüğü tarafından yönetilmelidir.	Lojistik merkezleri işletmek için basit ve etkili yönetim prosedürü oluşturulmalı					
Lojistik merkezleri Ulaştırma Bakanlığı bünyesinde kurulan Lojistik Genel Müdürlüğü tarafından yönetilmelidir.	Düşük ve basit vergi sistemi					
Bölgesel lojistik kalkınma planı belirlenmelidir	Devlet tarafından teşvik ve mali yardım programları hazırlanmalı					
Bölgesel lojistik kalkınma planı belirlenmelidir	Lojistik merkezleri işletmek için basit ve etkili yönetim prosedürü oluşturulmalı					
Bölgesel lojistik kalkınma planı belirlenmelidir	Düşük ve basit vergi sistemi					
Devlet tarafından teşvik ve mali yardım programları hazırlanmalı	Lojistik merkezleri işletmek için basit ve etkili yönetim prosedürü oluşturulmalı					
Devlet tarafından teşvik ve mali yardım programları hazırlanmalı	Düşük ve basit vergi sistemi					
Lojistik merkezleri işletmek için basit ve etkili yönetim prosedürü oluşturulmalı	Düşük ve basit vergi sistemi					

İKİNCİ KISIM
Alt Kriterleri Karşılaştırma Formu

FAYDALARI Kriteri Alt Kriterlerinin Karşılaştırılması

Hangi Kriter Daha Önemli?		Önem Derecesi				
Kriterler	Kriterler	Eşit	Az önemli	Önemli	Çok önemli	Aşırı derecede
		1	3	5	7	9
Kombine taşımacılığı özendirir ve artırır	İşletme maliyetlerini düşürür					
Kombine taşımacılığı özendirir ve artırır	Müşteri hizmet kalitesini ve yanıt hızını artırır					
Kombine taşımacılığı özendirir ve artırır	Lojistikle ilgili katma değerli faaliyetlerde artış sağlar					
Kombine taşımacılığı özendirir ve artırır	Lojistik firmaları arasındaki işbirliğini artırır					
Kombine taşımacılığı özendirir ve artırır	Bölgesel ve ulusal kalkınmaya katkı sağlar					
Kombine taşımacılığı özendirir ve artırır	Çevreseldir (Kazaları azaltır, yollarda tıkanıklık, yol bakım maliyetleri ve kirliliği azaltır vb.)					
İşletme maliyetlerini düşürür	Müşteri hizmet kalitesini ve yanıt hızını artırır					
İşletme maliyetlerini düşürür	Lojistikle ilgili katma değerli faaliyetlerde artış sağlar					
İşletme maliyetlerini düşürür	Lojistik firmaları arasındaki işbirliğini artırır					
İşletme maliyetlerini düşürür	Bölgesel ve ulusal kalkınmaya katkı sağlar					
İşletme maliyetlerini düşürür	Çevreseldir (Kazaları azaltır, yollarda tıkanıklık, yol bakım maliyetleri ve kirliliği azaltır vb.)					
Müşteri hizmet kalitesini ve yanıt hızını artırır	Lojistikle ilgili katma değerli faaliyetlerde artış sağlar					
Müşteri hizmet kalitesini ve yanıt hızını artırır	Lojistik firmaları arasındaki işbirliğini artırır					
Müşteri hizmet kalitesini ve yanıt hızını artırır	Bölgesel ve ulusal kalkınmaya katkı sağlar					
Müşteri hizmet kalitesini ve yanıt hızını artırır	Çevreseldir (Kazaları azaltır, yollarda tıkanıklık, yol bakım maliyetleri ve kirliliği azaltır vb.)					
Lojistikle ilgili katma değerli faaliyetlerde artış sağlar	Lojistik firmaları arasındaki işbirliğini artırır					
Lojistikle ilgili katma değerli faaliyetlerde artış sağlar	Bölgesel ve ulusal kalkınmaya katkı sağlar					

Lojistikle ilgili katma değerli faaliyetlerde artış sağlar	Çevreseldir (Kazaları azaltır, yollarda tıkanıklık, yol bakım maliyetleri ve kirliliği azaltır vb.)								
Lojistik firmaları arasındaki işbirliğini artırır	Bölgesel ve ulusal kalkınmaya katkı sağlar								
Lojistik firmaları arasındaki işbirliğini artırır	Çevreseldir (Kazaları azaltır, yollarda tıkanıklık, yol bakım maliyetleri ve kirliliği azaltır vb.)								
Bölgesel ve ulusal kalkınmaya katkı sağlar	Çevreseldir (Kazaları azaltır, yollarda tıkanıklık, yol bakım maliyetleri ve kirliliği azaltır vb.)								



İKİNCİ KISIM
Alt Kriterleri Karşılaştırma Formu

YATAY İŞBİRLİKLERİ Kriteri Alt Kriterlerinin Karşılaştırılması

Hangi Kriter Daha Önemli?		Önem Derecesi				
Kriterler	Kriterler	Eşit	Az önemli	Önemli	Çok önemli	Aşırı derecede ..
		1	3	5	7	9
Proje işbirlikleri (Büyük projeleri birlikte gerçekleştirmek)	Pazar işbirlikleri (Farklı pazarlara hizmet eden şirketlerin işbirliği yaparak pazarlarını genişletmeleri)					
Proje işbirlikleri (Büyük projeleri birlikte gerçekleştirmek)	Altyapı, ambarlar, antrepolar ve ekipmanların müşterek kullanımı.					
Proje işbirlikleri (Büyük projeleri birlikte gerçekleştirmek)	Ortak satın alma (Araclar, ekipmanlar, yakıt, eğitim, bilişim sistemleri vb.)					
Proje işbirlikleri (Büyük projeleri birlikte gerçekleştirmek)	Bilgi paylaşma (Maliyet hesaplama, know-how vb.)					
Proje işbirlikleri (Büyük projeleri birlikte gerçekleştirmek)	Parsiyel yüklerin birleştirilmesinde işbirliği					
Pazar işbirlikleri (Farklı pazarlara hizmet eden şirketlerin işbirliği yaparak pazarlarını genişletmeleri)	Altyapı, ambarlar, antrepolar ve ekipmanların müşterek kullanımı.					
Pazar işbirlikleri (Farklı pazarlara hizmet eden şirketlerin işbirliği yaparak pazarlarını genişletmeleri)	Ortak satın alma (Araclar, ekipmanlar, yakıt, eğitim, bilişim sistemleri vb.)					
Pazar işbirlikleri (Farklı pazarlara hizmet eden şirketlerin işbirliği yaparak pazarlarını genişletmeleri)	Bilgi paylaşma (Maliyet hesaplama, know-how vb.)					
Pazar işbirlikleri (Farklı pazarlara hizmet eden şirketlerin işbirliği yaparak pazarlarını genişletmeleri)	Parsiyel yüklerin birleştirilmesinde işbirliği					
Altyapı, ambarlar, antrepolar ve ekipmanların müşterek kullanımı.	Ortak satın alma (Araclar, ekipmanlar, yakıt, eğitim, bilişim sistemleri vb.)					

Altyapı, ambarlar, antrepolar ve ekipmanların müşterek kullanımı.	Bilgi paylaşma (Maliyet hesaplama, know-how vb.)					
Altyapı, ambarlar, antrepolar ve ekipmanların müşterek kullanımı.	Parsiyel yüklerin birleştirilmesinde işbirliği					
Ortak satın alma (Araclar, ekipmanlar, yakıt, eğitim, bilişim sistemleri vb.)	Bilgi paylaşma (Maliyet hesaplama, know-how vb.)					
Ortak satın alma (Araclar, ekipmanlar, yakıt, eğitim, bilişim sistemleri vb.)	Parsiyel yüklerin birleştirilmesinde işbirliği					
Bilgi paylaşma (Maliyet hesaplama, know-how vb.)	Parsiyel yüklerin birleştirilmesinde işbirliği					

