

**DOKUZ EYLÜL UNIVERSITY
GRADUATE SCHOOL OF SOCIAL SCIENCES
DEPARTMENT OF MARITIME BUSINESS ADMINISTRATION
MARITIME BUSINESS ADMINISTRATION PROGRAM
MASTER'S THESIS**

**A RESEARCH ON CONTAINER PORT COMPETITION AND
FREIGHT FORWARDERS' PORT SELECTION IN CONTESTABLE
HINTERLANDS**

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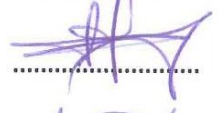
İZMİR-2016

MASTER THESIS/PROJECT
APPROVAL PAGE

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Defence Date : 15.02.2016
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DECLARATION

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.../.../.....

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ABSTRACT
Master's Thesis
A Research on Container Port Competition and Freight Forwarders' Port
Selection in Contestable Hinterland
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Competition between ports has been escalating rapidly because of improvements in hinterland connections, privatization of ports and increasing expectation of customers. Furthermore, hinterland of ports has been becoming more contestable in recent years. Understanding the needs and wants of port users in contestable hinterlands is critical for ports. Thus, the main aim of this study is to investigate port selection criteria of port users and develop a model for measuring selection criteria of port users in contestable hinterlands. A survey study is performed on freight forwarders who work with shippers located in cities of Ankara, Kütahya and Eskişehir where an absolute contestability occurs. Total 7 main constructs comprising 32 criteria are determined for port selection in contestable hinterlands. The validity of the model was ensured by performing confirmatory factor analysis. The main constructs are "port location and hinterland connection", "port physical and technical infrastructure and superstructure", "port management and administration", "service quality of port", "port efficiency and productivity", "port tariff and costs", and "number and frequency of shipping lines calling at port".

In the study, the top five most important port selection criteria of freight forwarders were determined as congestion at port, road connection of port, quick response to users' problems, performance of port about cargo loss and damage and reliability of services given by port. On the other hand, the 5 least important port selection criteria are reefer cargo warehousing capacity of port, railway connection of port, green port applications, feature of port operating company and corporate social responsibility of port. The results of the study

are expected to be useful for ports competing in contestable hinterlands and for academicians who study on shipping and port issue.

Keywords: Container Port Competition, Hinterland, Port Selection, Contestable Hinterland, Turkey



ÖZET

Yüksek Lisans Tezi

Rekabete Açık Hinterlandlarda Konteyner Liman Rekabeti ve Taşıma İşleri

Komisyoncularının Liman Seçimi Üzerine Bir Araştırma

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Denizcilik İşletmeleri Yönetimi Programı

Limanlar arasındaki rekabet, gerek hinterland bağlantılarındaki, gerek liman özelleştirmelerindeki, gerekse de müşterilerin beklentilerindeki artış nedeniyle hızlı bir şekilde artmaktadır. Ayrıca, liman hinterlandları son yıllarda giderek daha da rekabete açık bir hal almaya başlamıştır. Bu rekabete açık hinterlandlardaki kullanıcıların ihtiyaç ve isteklerinin anlaşılması limanlar için oldukça önemlidir. Bu nedenle, bu çalışmanın amacı, rekabete açık hinterlandlardaki liman kullanıcılarının liman seçim kriterlerini araştırmak ve bu liman kullanıcılarının seçim kriterlerini ölçen bir model geliştirmektir. Bu bağlamda, Ankara, Eskişehir ve Kütahya şehirlerinde iş yapan taşıtanların çalıştığı taşıma işleri komisyoncularına yönelik bir anket çalışması yapılmıştır. Rekabete açık hinterlandlarda liman seçimini belirleyen toplamda 32 kriteri 7 ana çatı altında toplanmıştır. Bu 7 temel çatı şu şekildedir: "Limanın konumu ve hinterland bağlantıları", "limanın fiziki ve teknik altyapısı ile üstyapısı", "liman idare ve yönetim şekli", "liman hizmet kalitesi", "liman etkinliği ve verimliliği", "liman tarife ve masrafları" ve son olarak "limana uğrayan hatların sayısı ve sefer sıklığı". Doğrulayıcı faktör analizi kullanılarak yapılan çalışmanın geçerliliğinden emin olunmuştur.

Bu çalışmada, limanda yaşanan sıkışıklık, limanın karayolu bağlantısı, limanın müşterilerin sorunlarına hızlı çözüm üretmesi, limanın yük hasar ve kaybına ilişkin performansı ve limanın güvenilir hizmet sunması en önemli beş kriter olarak saptanmıştır. Diğer yandan, en az önemli görülen beş kriter ise; limanın soğutmalı yük depolama kapasitesi, limanın demir yolu bağlantısı, yeşil liman uygulamaları, limanı işleten şirketin özellikleri ve limanın kurumsal sosyal sorumluluk projeleri olarak karşımıza çıkmıştır. Bu çalışmanın

sonuçlarının rekabete açık hinterlandlarda birbiriyle çekişen limanlar için ve deniz taşımacılığı ve liman konusu üzerinde çalışma yapan akademisyenler için faydalı olması beklenmektedir.

Anahtar Kelimeler: Konteyner Liman Rekabeti, Hinterlant, Liman Seçimi, Rekabete Açık Hinterlant, Türkiye



**A RESEARCH ON CONTAINER PORT COMPETITION AND SHIPPERS' PORT
SELECTION IN CONTESTABLE HINTERLAND**

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LIST OF ABBREVIATIONS

ANOVA	Analysis of Variance
AVE	Average Variance Extracted
CFA	Confirmatory Factor Analysis
CIF	Cost, Insurance and Freight
CRA	Charles River Association
CSR	Corporate Social Responsibility
CT	Container Terminal
CY	Container Yard
DC	Distribution Center
EDI	Electronic Data Interchange
EU	European Union
FOB	Free On Board
FTZ	Free Trade Zone
GHG	Greenhouse Gas
GNP	Gross National Product
GPO	Global Port Operator
GPS	Global Positioning System
IMEAK DTO	Istanbul and Marmara, Ege, Akdeniz and Karadeniz Regions' Chamber of Maritime Trade
ISO	International Organization for Standardization
LSP	Logistics Service Provider
MIS	Management Information System
OBC	Overhead Bridge Crane
OECD	Organization for Economic Co-operation and Development
OSB	Organized Industrial Zone
PEST	Political, Economic, Social and Technological Analysis
PPA	Product Portfolio Analysis
RFID	Radio Frequency Identification
RMG	Rail-Mounted Gantry
RTG	Rubber-Tyred Gantry
SC	Straddle Carrier
SCM	Supply Chain Management

SWOT	Strengths, Weaknesses, Opportunities and Threats
TCDD	Turkish State Railways
TDİ	Turkey Maritime Organization
THC	Terminal Handling Charges
TOC	Terminal Operating Company
TÜİK	Turkish Statistics Institute
TURKLİM	Port Operators Association of Turkey
VTS	Vessel Tracking System
UHD	Turkish Ministry of Transportation, Communication and Maritime (UBAK is previous name of the Ministry)
UNCTAD	United Nations Conference on Trade and Development
UNECE	United Nations Economic Commission for Europe

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INTRODUCTION

The role of ports has been getting more important in logistics system where ports create significant value for their users (Robinson, 2002). Containerization has also made ports an important part of supply chain system as well as integrated with distribution centers in the hinterlands. The increasing global trade has triggered the demand for container based shipments. Moreover, development of transshipment container handling due to rising hub and spoke systems has significantly increased the number of containers handled at ports (Notteboom, 2004).

In parallel with rapidly increasing demand for container handling at ports, competition between ports has also become fiercer to gain more share from the growing pie of container transportation. One of the important factors that trigger competition between container ports is the participation of private firms in port business that increased significantly through privatization practices of governments in recent years (Baird, 2002). Increasing expectation of global shippers due to their requirements for improving their supply chain systems also affect the competition between ports. Besides, thanks to improvement in land transport connections and increasing number of container terminals in different regions, captive hinterlands are becoming contestable. In contestable hinterlands, port users have different port alternatives to choose between. (De Langen, 2007). Ports strive for gaining more shares not only from transshipment containers, but also from contestable hinterlands.

Port industry has been rapidly increasing and becoming more competitive in Turkey as well thanks to developing foreign trade and privatization of ports. In such a competitive environment, ports need to understand needs and wants of port users to improve their services. As ports have started competing each other in contestable hinterlands, understanding port selection criteria of port users in contestable hinterlands is essential for ports. Thus, the purpose of this study is to investigate port selection criteria of port users at a contestable hinterland. A survey study is conducted with freight forwarders who work with shippers located in Ankara-Eskişehir-Kütahya region. This region is considered to be quite contestable in terms of port competition. Port users in this region may prefer to work with the container terminals located in Marmara Region, in İzmir and Mersin. The competition has become even fiercer recently due to privatization of Mersin, Derince and Bandırma Ports and newly built private container terminals both in İzmir and Marmara regions.

Thus, investigating the selection criteria of port users in this region can help selection criteria of port users in contestable hinterlands.

This study contains four chapters. In the first chapter, the port marketing activities and port competition are defined. These marketing activities are set in accordance with competition level. The degree of competition is determined through port competitiveness factors. The factors are basically used for generating competitive strategies.

The second chapter emphasizes the port hinterland concept. The factors that affect port hinterland and types of hinterland are comprehensively examined. Some of the port investment decisions shape within the hinterland estimation. In analyzing their hinterland ports adopt their marketing tools according to whether the hinterland is captive or contestable. The supply chain integration of port and its impacts on port competition are revealed by virtue of term contestability. At the end of this chapter the importance of geographical location, accessibility and logistical infrastructure of ports are revealed.

The third chapter focuses on overall port selection criteria provided by a wide literature review. The titles are collected from the earlier studies, and most frequently mentioned criteria are determined as the main titles. On the other hand the adoptability of these main titles to the Turkish shippers is taken into account. These selection criteria and their sub-titles are touched in depth.

In chapter four, research methodology of the study is revealed. Data sampling, data collection and data analysis are explained; and then confirmatory factor analysis and its results is shown after reliability and validity of the study.

The last chapter involves results and findings of the research. The respondents' profiles are presented. A set of criteria of port selection and perception of container shippers are projected within this chapter.

In the conclusion, the results of the research are explained and recommendations for future are provided. The limitations of the study are also explicated in this part.

CHAPTER ONE

PORT COMPETITION AND COMPETITIVENESS FACTORS FOR PORTS

1.1 CONCEPT OF PORT COMPETITION

A market is an area that includes many suppliers under competition of replaceable products and services. The initial aim of market definition is to allow distinguishing market shares, and ports, as a relevant market, produces restraint on competition (CRA, 2002: 22; CRA, 2004: 14). For ports under fierce competition, marketing is really important, and these marketing activities consist of market research and marketing implementation (UNCTAD, 1995: 1). The demand for maritime transportation and its components are derived demand of world trade (Stopford, 2009: 81; Bichou, 2009: 2).

The effective market competition comes with market power when market condition is unpredictable. Market power is referred to keep prices above competitive level, or marginal cost of supplying good and services. (Bichou, 2009: 215). Traditionally, competition can be defined as striving to gain what other actors to gain at the same time. After 1980's the more liberalized transportation industry, acceleration of containerized cargoes, and the enhancement in shipping activities has strikingly led world ports to compete each other (Bichou, 2009: 205; De Langen, 2007: 1). Thereby port privatization, globalization process, deregulation of transportation and logistics industry, and evolution of shipping and handling technologies (Bichou, 2009: 205), the globalized international trade and outsourcing have enlarged container usage. The growing ship size and mass transportation in a single shipment have caused to diminish the number of ship that is called on; hence causing intensive port competition and emerging significance of transshipment in determining the competitive position of ports (Ng, 2009: 11). Moreover, port services are needed to be integrated to global supply chain, and hereby the extent of port competition has conducted the port authorities to yield transforming into Terminal Operating Companies (TOCs) which is an important factor in hinterland transport on behalf of shipping lines services; because supply chain integration of ports required door-to-door services, hereby efficient hinterland transportation become important in assessing competitive positions of TOCs (De Langen, 2007: 1-2).

Port competitiveness in modern-day depends on to be unified into global supply chain. Port competition may be intra-port that is competition between ports in a distinct geographical line or inter-port which different ports compete to capture the hinterland (Bichou, 2009: 207; Talley, 2009: 140). Because ports are now contestable market with a series of competing ports and shipping intermediaries (Bichou, 2009: 205) governments can support competitive environment when risk of monopoly occur. In this type of huge investment required market barriers to entry and some other restrictions should be shed in support of free competition and deregulation. Even though another important factor in existing competition is to increase profitability with increasing market demand, revenue, and decreasing variable costs or expenses (Cullinane and Taley, 2006: 26), port competition no longer is only cost oriented, but also faster, qualified, efficient and cost-effective service are needed to obtain competitive advantage (Bichou, 2009: 206-207). The competitive strength of ports is basically determined by the element of production such as labor, capital, technology, and energy. On the other hand competition between ports is also influenced by location, infrastructure, industrialization degree, port performance and government policy (Meersman et al., 2010: 217).

Ports, today, try to expand both the berth capacity and water depth to accommodate larger vessel to take advantage on intercontinental transportation as a hub (Anderson et al., 2008: 5). The biggest difficulty is to attract highest number of customers on potential market. Market power of a port can be assessed with such factor especially with market shares that can be enlarged with some marketing strategies; after all the potential competitors and buyers' financial and institutional strength threat the existing competition; and the level of competition has a great effect on determining market power and accordingly market shares. In transportation industry, consolidation allows the companies to grow market shares (OECD, 2011: 10-11; Coto - Millán et al., 2010: 5-6).

The mergers and acquisitions are the other strategies to augment potential market. An alliance aims profit maximization with service differentiation and cost efficiency; in other word allying ports must switch the work load to higher profitable ones (Wang et al., 2012: 403). The mergers, acquisitions and joint ventures are the other co-operative agreements that enable the terminal to procure better results and to abolish some market-based entry barriers (Vanelslander, 2005: 103-104). These alliances can realize both horizontal and vertical integration with vital importance on port competition. The horizontal integration diminishes the number of competitors in

the market; hence the market power may become monopolized as a great risk for competition. Otherwise when the merger firms are not operating in the same region, the alliance gives the firm to easily overcome entry barriers. On the contrary, vertical integration does not threat port competition. However vertical relations can create some problems in supply chain (OECD, 2009: 9-10).

The level of potential competition affects the market power of a port. The threat of new entrants restrains the existing ports to modify their strategies (OECD, 2011: 39; Heaver et al., 2001: 296-298).

Table 1: Entry Barriers in Seaports

Category	Entry Barrier	Explanation
Economic	• Structural cost advantage of the incumbent	• Incumbent enjoys a better location in the seaport. • Minimum efficient scale in the seaport is large compared with size. • Incumbent benefiting from accumulated public investments.
	• High switching costs	• Carriers need capital expenditure to switch port facilities. • Services bundling by incumbents increases switching costs.
	• Required investments in networks	• Reciprocity in partnerships leads to switching costs. • De novo firms need time, capital, and knowledge to join sophisticated spatial and functional networks.
Legal and Institutional	• Entry conditions / permissions	• Restricted entrance - for historical, ideological, commercial reasons. • Subjective entrance (allowing for discrimination) controlled by port authorities that are both regulators and operators.
	• Exclusive connections	• Regulation serves the benefits of politician, bureaucrats and / or existing firms that can extract excessive rents.
Location	• Unavailability of land for entrants	• Natural, environmental, and capital barriers constrain port capacity protecting incumbents.

Source: De Langen and Pallis, 2007: 432

Table 1 explains the main categories of entry barriers in seaports. These three categories consist of economic barriers, legal and institutional barriers, and

location barriers. The table also shows the types of entry barriers and explanations of these barriers.

The entry barriers of ports are broadly divided into three categories: economic, regulatory and geographic barriers. Cost advantages and switching cost are main economic barriers. Also regulators or authorities may restrict the entry magnitude particularly regarding intra-port entry. Land and maritime access and layout play crucial role on geographical barriers. These barriers can habitually limit port capacity and market entry. Alongside these difficulties, contestability of port that strongly forces the competitive level of prices is triggered with low entry barriers (De Langen and Pallis, 2007: 428-438; OECD, 2011: 39-41). The economy perspective says a competitive market is free of entry and exit barriers. Despite the port industry has turned to an open market, the unique characteristic of port sector has invisible barriers that is high investment cost and fixed cost; but then lower entry barriers first raise contestability, second develop level of intra-port competition, and the last expedite new technology and business model implementations (De Langen and Pallis, 2007: 427; Vanelslander, 2005: 115; OECD, 2011: 10; CRA, 2002: 53).

Port business in Turkey has been witnessing dramatic developments in recent years. The number of containers handled at ports in Turkey has significantly increased in last 10 years as shown in below Table 2.

Table 2: Number of Containers Handled at Ports in Turkey

Year	Loading*	Discharging**	Transit	Total
2003	1.273.566	1.219.184	-	2.492.750
2004	1.513.985	1.423.582	176.288	3.113.855
2005	1.596.505	1.541.282	174.421	3.312.208
2006	1.824.391	1.848.741	184.921	3.858.052
2007	2.185.359	2.251.170	145.739	4.582.267
2008	2.461.164	2.514.851	115.606	5.091.621
2009	2.202.442	2.189.458	12.542	4.404.442
2010	2.410.865	2.458.351	874.239	5.743.455
2011	2.845.227	2.921.108	757.171	6.523.506
2012	3.116.027	3.178.001	898.368	7.192.396
2013	3.440.242	3.469.876	989.815	7.899.333

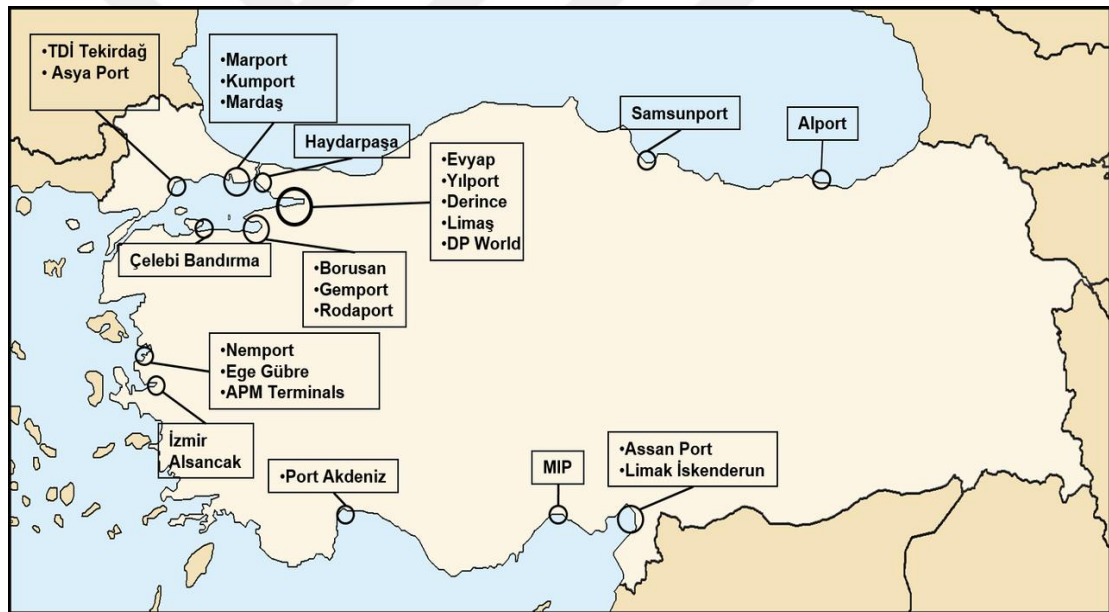
*, **Includes international and cabotage shipments.

Source: UBAK (2013)

The development is quite obvious in the Table 2 that the total number of containers handled increased from 2.492.750 in 2003 to 7.899.333 in 2013. The port industry has also become more competitive in Turkey thanks to privatization activities of government for ports, newly built container terminals by private enterprises especially by global port operators. For instance, majority of the ports operated by Turkish State Railways (TCDD) were privatized. Ports in Mersin, Iskenderun, Bandırma, Samsun and Derince were privatized. Port of Izmir was also attempted to be privatized but legal issues and economic crisis in 2008 led to cancellation of privatization. Figure 1 shows the container terminals in Turkey.

New container terminals were also built such as TCE EGE, Nempport, APM Terminals, and Asya Port etc. that increased the competition. The users of container terminals in Turkey have different alternatives for their shipment.

Figure 1: Container Terminals in Turkey



Source: Lecture Note. (2013). Post Graduate Courses.

1.2 FORMS OF PORT COMPETITION

The earlier competition was between different ports called as inter - port competition; meantime in intra - port competition terminals compete within a certain port. On the other hand there is also competition between port ranges (Bichou, 2009: 207; Talley, 2009: 140). Bichou (2009: 207) defines that;

"Today ports face growing competition both inside and outside the port sector, resulting in different forms and levels of competition."

1.2.1 Inter-Port Competition

Port markets were monopolistic or oligopolistic before invention of container by reason of geographical locations and accessibility, and inter - port competition had a little effect (Chang and Lee, 2005: 1). Inter-port competition is a straight competition between ports locating and competing for the same hinterland. The competition between transport systems integrated to the port, multiport, transshipment and feeder port usage pressurize inter-port competition as indirect competition items (Bichou, 2009: 207).

The macro influencers such as economic, political, organizational etc. influence competition among ports (Dussán, 2012: 18) but then micro factors those have a direct effect on port clusters and ranges can be listed as; port performance, port prices, service quality, port tradition, port accessibility and availability of infrastructure and location, industrialization level, government assistance, and user preferences. However strategic planning and decisions of actors in supply chain also determine competitive position of ports (Talley, 2009: 140; Dussán, 2012: 18; Bichou, 2009: 207); above all else port performance is vital on inter-port competition (Dussán, 2012: 18).

1.2.2 Intra-Port Competition

Today's port concept includes many different terminal operators that severally perform for similar traffic type. Intra-port form of competition occurs when two or more terminals belong to different companies. Port users have more than one alternative for berthing and terminal usage; together with multiple operators may compete in service supplying within same terminal. Intra-port as the structural separation of terminals is to compete under the same conditions with specialized services. This kind of intra-port competition can be realized in stevedoring, warehousing and forwarding. The numerous advantages of intra-port competition are to not to allow monopolistic and pricing and promote service specialization and diversity and port innovation (OECD, 2011: 14; Bichou, 2009: 207; Talley, 2009: 141).

There are two main statements for intra-port competition, first it anticipates rent seeking of service providers, and second one its aids arise from regional economics. Even though intra-port competition brings qualitative and relatively lower prices for user, it also have some negative sides namely duplication of facilities, and generation of pollution and congestion (De Langen and Pallis, 2007: 3-8).

1.2.3 Competition between Port Ranges

Although there are several approach for port competition, Meersman et al. (2010) suggest that:

"Where ports are seen to compete with one another at different levels: within a country, for goods flows and for investment in additional infrastructure; within a cluster, for a common hinterland; and increasingly between port ranges, for investments and traffic, particularly from areas where the spheres of influences of port ranges overlap" (Meersman et al, 2010: 211).

Also, location, infrastructure, industrialization degree, policy effects, port efficiency and productivity as the regional factors influence competition between port range (Meersman et al, 2010: 217)..

1.3 COMPETITIVE STRATEGIES OF PORT

In today's world, port facility is a living place because port plays a dynamic role in market change. This change obliges ports to discern the determinants of port competition and to establish competitive strategies (Shaheen and Abd El-All, 2014: 115).

According to Porter (2000), there are five cornerstones of competition. These are called as five forces of competition: the threat of new entrants, the bargaining power of customers, the bargaining power of suppliers, the threat of substitute products or services, and rivalry between competitors. To create a strategic plan companies must understand how their firm is influenced from these items. Herrera (1999) briefly explains the five forces in port industry.

- *Threat of entry:* New rivals are willing to expand their market share, and therefore they deliver new capacity and new sources into sector; but the fate

of new entrants depends on barriers to entry and reaction of current competitors.

- *Threat of substitution* : Ship-owners and shippers may select any other ports within same range without any geographical advantage among others.
- *Bargaining power of customers*: In past years ports did not mind all about this concept. However with the increasing competition conduct the ports to invest in order to satisfy demands.
- *Bargaining power of suppliers*: Ports are aware of the danger that relatively new concepts like transshipment, hub or mother vessels can have on their market shares since, small ports without a hinterland, with no strong harbor history and with a comparatively small investment, are catching big shares in the container industry just like transshipment ports.
- *Rivalry between competitors* : Even if competition is high in the port industry, in regional level it is fiercer. At the local level in a few ports, terminal operators are trying to join forces to be attractive. On the other hand, ports are investing in new facilities for leasing to new terminal operators in order to increase the internal competition, creating as a result, an increase in the quality of services and tariff reduction.

1.3.1 Generic Competitive Strategies of Port

There are three generic competitive strategies (Porter, 1985: 10). Tanvar (2013) clearly explains the generic competitive strategies as;

"Generic strategies can help the organization to cope with the five competitive forces in the industry and do better than other organization in the industry. Generic strategies include 'overall cost leadership', 'differentiation', and 'focus'. Generally firms pursue only one of the above generic strategies. However some firms make an effort to pursue only one of the above generic strategies"

1.3.1.1 Overall Cost Leadership

The cost leadership means to seek for producing goods and services with relatively lower cost than industry. The cost advantage depends on the structure of industry such as exploiting economies of scale, proprietary technology, prejudiced

access to raw materials and other factors. All source of cost advantage must be made profit from. When a sustainable overall cost leadership occurs, the firm performs above average of sector (Porter, 1985: 11-12).

This strategy requires a fast-growing establishment of efficient-scale facilities in pursuit of cost reduction. However, quality of service, safety and other factors must not be forgotten. The main advantage of this strategy is that lower costs protect companies against the bargaining power of customers. They can take advantage of economies of scale and the lower cost gives a certain security against the threat of substitutes (Herrera, 1999: 12-13). Being a low-cost producer in the industry is aimed in this strategy. In continuing the overall cost leadership, a firm must check all cost driver to develop under - pricing tactics. Examples of cost leadership in ports include proximity to cargo sources and destinations, proximity to transport routes, integration with other transport modes, economies of scale, fast turn - around, and low tariffs and port dues (Bichou, 2009: 208-209).

The operational costs of a terminal may be decreased to provide lower cost services. This situation occurs after achievement of following factors (Shaheen and Abd El-All, 2014: 115-116):

- Reduction of operational costs
- Decreasing labour costs
- Increase the labour productivity to the maximum
- Optimization and utilization of assets fixed and the potential
- Facilities and modes with low-cost
- Treatment preferential to older clients
- Pricing services flexible

1.3.1.2 Differentiation Strategies

Base of this competitive strategy is to conceive a unique product or service that is different than other competitors. It may be obtained via customer service, technology, prestige, quality, etc. Within this strategy cost is also considered as second factor. The company is positioned on a great degree in the market through differentiation (Herrera, 1999: 13).

A company pursues to be single in its sector in terms of perception of customers. This differentiation strategy is awarded by uniqueness with an exclusive price (Porter, 1985: 13). The principle of differentiation is to create an absolute

distinction from competitors. The brand image, prestige, quality and reliability, customized products etc. are involved to acquire competitive advantage. Some implementations of the strategy in port industry embody services to special cargo and vessels, dedicated terminals, quality assurance programs, and value-added logistics activities (Bichou, 2009: 209). Within the port industry the main services that can be differentiated are location, facilities, services, and performance (Shaheen and Abd El-All, 2014: 115-116):

1.3.1.3 Focus Strategies

The focus strategy is to determine a segment in the sector, and to adopt their services to this segment exclusively. There are two types of focus; cost focus that is to serve to target segment with cost advantage and differentiation focus that is to seek differentiation for target group (Porter, 1985: 14).

The focus strategy is a new concept in port industry. The niche market is key element of focus strategy of ports. Some ports have become willing to serve a specific customer. By means of customer focus, operating costs reduce and number of captive customers increases under favour of know-how culture. There are also some market risks for the strategy; for instance, competitors can also focus for the same segment, or seasonal fluctuations may be occurred because focus strategy has lack of loyalty (Bichou, 2009: 209).

1.3.2 Strategic Positioning of Port

A firm tries to obtain higher competitive advantage thereby positioning in the market. Strategic positioning can be driven by conducting several activities or by conducting same activities in dissimilar ways. The competitive dynamics and strategic positioning of a firm can be analyzed with (Bichou, 2009: 209-215):

- *SWOT analysis*: Competitive strategy may be established by analyzing company's internal capabilities, and externalities such as market conditions, micro and macro environment etc.
- *Porter's five force model*: The generic competitive strategy model evaluates competitive concentration and attractiveness of a company based on five forces with two vertical and three horizontal. Bargaining power of suppliers

and customers are two vertical items, and threat of entry and substitution and rivalry between competitors are horizontal items.

- *PEST analysis*: The political, economic, social and technological analysis recognizes the external factors that impacts strategic competition level of a company.
- *PPA*: The product portfolio analysis associates the measurement of market share, growth rates and diversification. Boston-consulting group is the most famous one. It is also called the growth - share matrix.

1.4 FACTORS AFFECTING COMPETITIVENESS IN PORT INDUSTRY

Competitiveness factor of a port is directly related with its technical and cost efficiency, and throughput level. The size of port traffic is also important in terms of market share, diversification and development (Talley, 2009: 143-145). Globalization of trade and supply chain activities and effects of rising countries of last century have constituted trade-offs between cost and service quality on port competition. After all, not only port location and port tariffs are important but also the terms efficiency, reliability, quality of infrastructure, variety of port services, frequency of shipping services, and integration to routes have become in question in competition (Bichou, 2009: 206).

1.4.1 Network and Transportation Activities

Ports as the modal transfer point of goods can utilize from sea and land access. For certain ports the link between marine and inland transportation modes provides accessibility advantage while minimizing transit time and total transportation cost (Fleming and Baird, 1999: 390; Carbone and Martino, 2003: 305). The sub-networks of transportation system influence the accessibility (Talley, 2009: 2-3). Inland transport modes must be well integrated into port facility; for instance a direct access to main roads and railways is the definite aid for a port. The convergence of inland transportation modes must be operated expeditiously (Fleming and Baird, 1999: 390; Stopford, 2009: 81).

The logistics chain as the combination of different service types from production to consumption (Bichou, 2009: 239) also includes ports that are gateways for global trade and organize materials and information flows. Ports can

acquire strategic position by adding value to cargo they serve. In adding value, the ports are assumed as the part of a group of organizations where different logistics operators perform activities in providing value for the ultimate customers (Carbone and Martino, 2003: 305-306; Alderton, 2005: 147-148; Wang, et al., 2007: 29). The acceleration of intermodality has had a great impact on evolution of liner shipping and container terminals as the part of logistics systems. With the intermodality, seaports are required to have physical accessibility and well-organized information flows. Afterwards the port competitiveness is ascertained with co-ordination of the supply chain and connections of port to the supply chain (Alderton, 2005: 87; Carbone and Martino, 2003: 305-306)

1.4.2 Operational and Financial Performance

Ports measure their performance by comparing the actual cargo throughput and maximum cargo handling capacity. The performance indicators are other tools to assess port performance. If financial aim of a port is willing to maximize profit, ports would choose values as the indicator. On the other hand if a port's actual handling scores match to optimum level over time, the operational performance is considered as enhanced (Talley, 2009: 136; Talley, 2007: 500). The economic and functional objective of the port is first technically efficient optimum throughput, second cost efficient optimum throughput, the last effectiveness of optimum throughput (Talley, 2007: 500).

The operational performance can be evaluated with factor productivity indicators that focus sea side of port such as ship-to-shore loading/unloading activities, and with physical indicators such as turnaround time, ship waiting time, berth occupancy rate etc. The financial performance of port can also be appraised by measuring technical efficiency, cost efficiency and total effectiveness of port in comparison with realized handling performance of port. The single port approach can also be used as well as performance indicators. This approach involves the comparison of port standards that can be technically efficient standards, cost efficient standards or effectiveness standards and actual values; and in conclusion the values must meet financial objective of the port (Bichou and Gray, 2004: 48-49; Talley, 2007: 500).

The relation of performance and competitiveness are related with technical capacity. However both shippers and shipping lines require reliable service that

means port performance can be adapted with shipping lines, service quality that means handling and storage must be performed without any overage, wastage or damage, adaptability that means quick response to user's needs and problems, and low cost (Fourgeaud, 2000: 1).

1.4.3 Price Competition in Port Industry

Port tariffs are the price related to service and equipment provided by the port. The prices charged by a container vessel may contain both shipping services such as pilotage, dockage, wharfage, vessel overtime etc., and cargo services such as handling, stevedoring, crane usage etc. (Frankel, 1987: 57; Talley, 2009: 110-112). Tariffs are arranged in accordance with port's objectives relevant with financial, economic and operational performance, market share, and growth of the port. Tariff must be adopted up to a policy decision; but these policies have a little impact on some shipment because alternative sources exist. The tariff policies are set up correlatively with technological changes, level of competition, and changes in deep sea transportation industry (Frankel, 1987: 57-61).

Changes in ship size and technology influence port tariffs. The bigger ships need longer berth and deeper channels, technologically adopted equipments and systems. All these innovations are financed with revenues from fees. The intermodal integrity and competition also have a particular effect indirectly on port tariffs. The competition has been triggered by quick growth in number and size of world fleets. The port objectives, port operations, port finance systems, and port management are the direct determinant of port charges (Frankel, 1987: 61-65).

Some ports still pursue that only effective pricing policy is the reflection of the service pricing. This involves cost of service, value of service, benefit of service to community, and various indirect benefits. The incentive pricing supports productivity of port and public resources; increases marginal ability to pay at acquired benefit pricing; and encourages enlargement, technical developments and new facilities (Fleming and Baird, 1999: 390; Frankel, 1987: 70).

Ports have fixed and variable costs. These costs differ in accordance with port output level, but in brief these are the elements of fixed resources of port such as infrastructure and buildings, equipment and vehicle and maintenance, interest and depreciation, insurance, and salaries of permanent labour. The variable costs of port involve salaries of temporary work force, energy and utility expenses, taxes,

general costs and related costs (Talley, 2009: 98-99; Bichou, 2009: 83-87). However in long term, all costs of a terminal can be assumed as variable. In fact, the long term total costs are the sum of combination of the long run cost and long run marginal cost that are incurred while providing services and facilities (Talley, 2009: 98-102).

A port operator's throughput must exceed the breakeven point to be cost efficient. In other word when a port serves with a minimum cost, port called as cost efficient, or else is inefficient. In order to be cost efficient, port technical efficiency is needed. The technical inefficiency brings additional throughput; furthermore this outbuildings occur on the same resources and with same price. Therefore technical efficiency of port diminishes cost per unit (Talley, 2009: 97). The port costing allows port operator to control costs, operation and resource allocation. However port cost items must be determined (Bichou, 2009: 83). Total costs of a given service of a port, first, are needed to appoint port's financial status. Second, the reasonableness of the port can be appraised with these costs. Third, these items influence decision-making mechanism of ports. There are also several motives for determining port marginal cost. First, cost per unit can be compared with specific prices of the port services. Second, marginal cost of the service can be used in establishment of rate structure (Talley, 2009: 103-106).

The cost structure of ports and port charges are also affected by the industrial changes such as privatization and commercialization. The changes have reformed port prices level and structure as well as efficiency of shipping with regard to berth access and service quality. These prices must be capable to compete, but the prices must not be as equal as tariff, they may be negotiable. However the operating objective of a port has influences on port prices as well as the value of the cargo is; as an objective, port may pursue profit maximization while the other one may contribute economic development (Cullinane and Talley, 2006: 25-26; Bichou, 2009: 121; Talley, 2009: 112). There are three different port pricing strategies to cover port costs: Cost-Based Pricing (that involves Marginal Cost Pricing, Average Cost Pricing, Multi-Part Tariff Pricing) (Bichou, 2009: 121-124); Congestion Pricing (Bichou, 2009: 124-125; Talley, 2009: 116-118); and Strategic Pricing (Bichou, 2009: 125). There is a dilemma when competition is in topic, so the managers must either decide to serve in lower prices or to provide differentiated service. Yet today's port users, especially shipping lines, do not only mind the price levels (Kent and Ashar, 2001: 28-37; NG, 2006: 235).

1.4.4. Service Attributes of the Port

Service quality has been studied by significant number of academicians. The original model of service quality dimensions developed by Parasuraman, Zeithaml and Berry are tangibility, reliability, responsiveness, competency, courtesy, credibility, safety, access, communication and comprehension of the user. However, this model has been restricted into five basic categories. These are tangibility, reliability, responsiveness, assurance that covers competency, courtesy, credibility and safety, and the last dimension is empathy that indeed contains access, communication and comprehension of the user (Pena et al., 2013: 1228-1229).

Table 3: Service Quality Dimensions

Service Quality Dimensions	Description
Tangibility	The physical appearance of current equipment, communication materials, personnel and location where the service is performed
Reliability	Preciseness, trust, and abiding
Responsiveness	Providing service rapid and in time, and readiness and cooperativeness
Competence	Having appropriate information and competency to provide service
Courtesy	Respect, intelligence, politeness, and befriend
Credibility	Honesty and persuasiveness
Security	Avoiding risk and danger; and assuring the safety
Access	Convenience of accessibility and transportation
Communication	Establishing effective communication, speaking customer's language, and listening the customer
Comprehension of the Customers	Trying to understand the customers and their needs

Source: Bulgan and Gürdal, 2005: 246

Port organization is complex and has many sub divisions, but the customer notes a unique service and value. According to ISO series, customer expectations such as efficiency, timeliness and security must be covered to provide high - grade service (Pantouvakis, 2006: 405-406). Port services that are supplied for a payment to port users cover all port activities from waterway access to land area in a port

system. These services may involve technical and nautical pilotage, towage and mooring, handling operations and passenger services (Luttenberger, 2010: 1034).

Services are not certain and affected by a variety of factors, however overall explanations exist about mix of services of ports. First, port services require both equipment and human capability. Second, user participation is essential for port services. Third, the service must meet the commercial and personal satisfaction. Fourth, each port has different aims and ownership model (Jolić et al., 2008: 12-13).

In shaping port service quality the main characteristics of service and their implementations on port industry must be revealed. Those features are, the service is intangible; the service is provided and utilized at the same time; service providers, and time and place of services are various; the service cannot be stored (Jolić; 2008: 14-15). Inefficient port operations increase fixed, variable and other service costs; and to accomplish break-even point port charges are enhanced. Higher charges incurring customers perceive the port service as poor; along with poor timeliness and reliability also anticipate extra returns on investment. This poor perception negatively affects port competitiveness. An efficient port not only requires high level of service quality but also need efficient network to overcome this timeliness and reliability (Ugboma et al., 2007: 333-334). Quality triggers customer's choice and the relational quality that point out interpersonal quality between service providers and customers is an important factor to measure port service quality (Cho et al., 2010: 420-421).

Customer satisfaction is associated with the service provided (Ugboma et al., 2004: 488). Although there are many criteria that can attract customers, port efficiency is a significant factor for both shippers and carriers. Efficiency means fast and reliable service in port industry (Ugboma et al., 2007: 334-336). Tongzon and Ganesalingam (1994) grouped the port efficiency into two sections as operational and customer-oriented. The operational efficiency measures touch on capital and labour productivity; the customer-oriented measures are port fees; ship's waiting time, efficient inland transport network and reliability.

1.4.5 Supply And Demand Factors of Port

The continuity of demand and perishability of service are conflicted. The discontinuous demand creates some difficulties for port operators. There are several methods to gather demand and supply at the same level. The procedures involve

different pricing techniques in periods, complementary services, booking systems, seasonal employment, efficiency of services and equipments (Jolić; 2008: 13-15).

1.4.5.1 Supply Factors of Ports

Ports have three main groups of the supply factors; infrastructure, superstructure and technological applications in port operations and planning (Gaur, 2005: 42).

1.4.5.1.1 Supply of Port Infrastructure

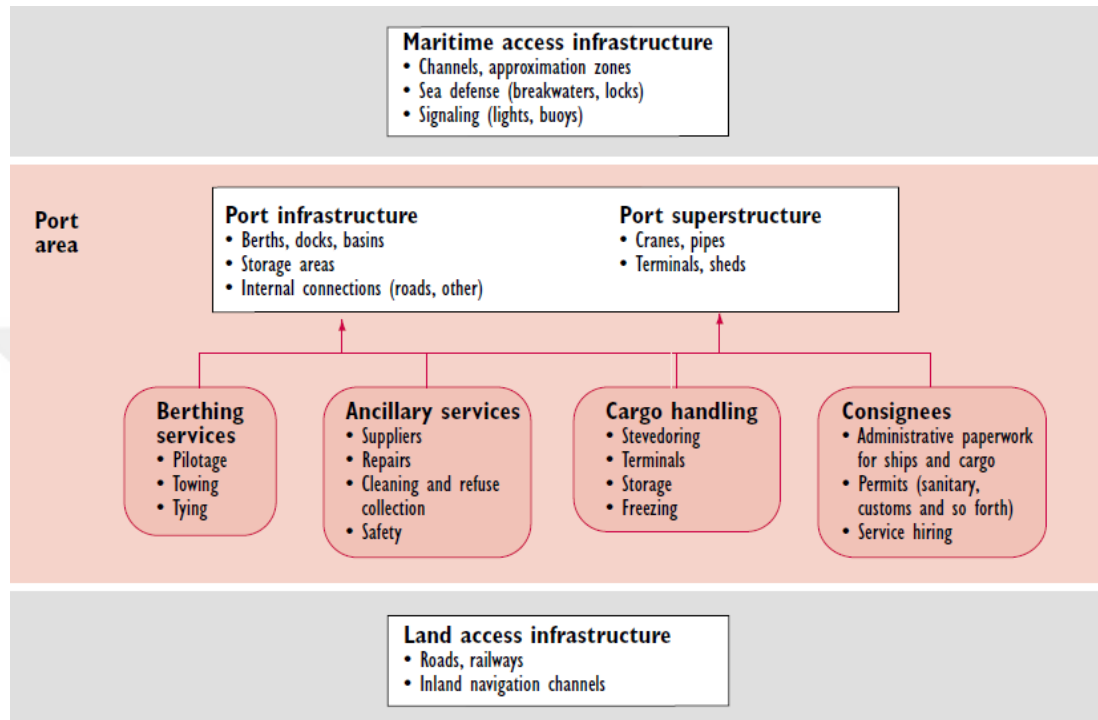
The infrastructure is a requisite to advance trade and to rule out congestion. The expansion of performance level of port and terminal infrastructure are conjunctive with hinterland network. Apart from the size of terminal, especially the status of hinterland connected transportation infrastructure influences competition (OECD, 2011: 9-12). Infrastructure has direct effects on efficiency and capacity of transport modes. Poor infrastructure is concluded with adverse economic results. Infrastructure states quality of cranes, quality of information systems and intermodal network alongside number of berths and cranes, tugs and terminal area. Port capacity must be directly proportionate to demand otherwise port congestion and inefficiency appear. Moreover deficiency of available information and sufficient information systems decelerates the documentation (Rodrigue et al., 2006: 45; Tongzon, 2002: 5-6).

Port infrastructure conflicted with changes in markets and technologies because of difficulties and cost of adjustment. Most important one is the adoption to the containerized trade which must be invested in wider port area, different and complex handling systems (Stough, 2005: 30-32). The quality of port infrastructure gives accession to domestic and foreign market, and leads to global trade and welfare by diminishing transit time and costs. The need for capable and efficient port infrastructure increases in accordance with world trade. The evolution of port infrastructure is expensive none the less hinterland based infrastructure expansion is required to be integrated in global supply chain (Aerts et al., 2014: 274-275).

Figure 2 Typifies elements of infrastructure and superstructure, and explains which services are given. A typical port infrastructure contains berths, storage area and inland transport network; besides that a port infrastructure is not only

considered as land-based but also maritime access infrastructure is vital. The maritime access infrastructure involves approaching channels, entrance, preservative buildings, sea locks (Gaur, 2005: 42-45).

Figure 2: Port Activities



Source: Worldbank, 2000: 2

However operational port infrastructure also contains turning basins, quay walls, jetties and piers, aids to navigation, and buoys (Gaur, 2005: 45-47).

1.4.5.1.2 Supply of Port Superstructure

Port infrastructure coalesced with the fixed and mobile equipments, warehouses, offices, and information and automation systems that are laid to port superstructure. Cargo handling activities differ from port to port while quay cranes, which load and unload cargoes from shore to ship and ship to shore, are available for everyone. The planning of port superstructure are ultimate indicators of port productivity. Also warehouses and sheds must be designed in the manner that contributes efficiency of berth area. Superstructure, in general, may cover surfacing, terminal lighting, parking areas, sheds and warehouses, stacking areas, repair

shops, fuel supply, and offices (Gaur, 2005: 47-48; Way, 2008:1-2; Tovar, 2004: 8-9).

The containerization is cut out for easy storage and stacking of import and export cargoes. A special stacking area is arranged for cargoes according to container types such as standard, reefer and dangerous (Tovar, 2004: 8-9; Way, 2008: 1). Planning of that equipment must be paid great attention to. The main categorization of port equipment; tugs, line handling vessels, dredging equipment, ship-to-shore handling equipment, and cargo handling equipment for both apron and terminal. There are three basic yard cranes as Rail-Mounted Gantry Crane (RMG), Rubber-Tyred Gantry Crane (RTG) and Overhead Bridge Crane (OBC). The equipment working on rail line must be harmonized with full automation. Multi trailers and automatic guided vehicles move horizontally, cannot stack cargoes, and only work on the purpose of transportation. Other equipment carrying and stacking commodities in the terminal are straddle carriers, forklifts and reach stackers (Gaur, 2005: 47-48; Way, 2008: 1-2).

1.4.5.1.3 Supply of Port Technology

Technological implementations develop port productivity and port capacity. The port technology is separated into information technology and intelligent transport system (Gaur, 2005: 48). To operate the port and port sub-systems are needed a complex planning and design in the environment of logistical, technological and economic uncertainties. Traditionally, flexibility, versatility, and adaptability of service are used to overcome these uncertainties (Taneja et al., 2010: 235-241).

Electronic data interchange (EDI) is the documents and information sharing system for businesses and that is the initial information technology can be successfully adapted to the port industry. EDI provides market updated technology, accelerated cash flow, better inventory control, superior customer services, and lower operating and communication costs. EDI is regarded as a management system more of a technical device (Gaur, 2005: 49-50).

Radio frequency identification (RFID) is a kind of data collecting and addressing system for ports. The system has active and semi - active tags. Active tags can read up to 100m because they involve battery. Tags store data to prohibit unofficial readings. Active tags may involve global positioning system (GPS)

receiver, satellite links or sensors. Instead of active tags RFID identification cards can be replaced. The contactless cards work without battery and around a limited range; hence those are passive RFID tags just as situated labels on pallets and containers. The barcode represents sum of data about commodities to which is associated. RFID technology procured time savings and decreasing error as against with human depending barcode or manual methods. The system also explicates record storage and conformation to governmental security and custom regulations (Shi et al., 2011: 332-335).

The smart transport system is the next floor of information technology, and provides higher competitive level for terminals, and augments port performance and efficiency. Other technological factors of ports are (Gaur, 2005: 50-53):

- *Integrated Information Systems*: It works through smart cards. Vehicle driver must be registered at the entry and exit into computerized information system with fingerprint. After entry system gives information about loading and discharging.
- *Exit and Entry Control System*: On the booking period of container by shipper, information is sent to port operator through online system. The driver touches smart card with thumb impression at the port entrance, and gate simultaneously transfers data to main computer. The system directs the automated gantry vehicles involved loading, unloading and destination information.
- *Track and Trace of Container*: Container locating system that is activated through barcode at the entry.

The other application of Intelligent Transport System can be smart card at the gate, geographical information system, traffic lights at the gate, sensors at the entry gate, camera at the entry gate-damage control, resource management system, wireless network in the storage area, terminal at the straddle carrier, yard inventory management, handheld loading and unloading control system, automatic invoicing. The technologies must regard shipper requirements and efficiency of port operation (Gaur, 2005: 53-54).

1.4.5.2 Demand Factors of Ports

The demand of ports is correlated with the supply side. Therefore external demand upsurge in a port touches the demand in other port; thus port competition

can clearly be explained with analyzing port demand. When supply side acts with the common strategies, the demand may not be mutually affected (Da Silva and Rocha, 2012: 207-208). Notwithstanding, port demand cannot completely explain competitiveness factors of ports though port structured their plans on the basis of demand enlargement (Yap and Sam, 2006: 338-350).

The demand of a container port consists of export, import and transfer container. The transfer of containers necessitates some value-added services such as consolidation, and deconsolidation. The demand level is directly influenced by port fees and transshipment in this way demand level determine congestion level; therewithal this congestion induces demands of port and its competitors. The demand of advantageous port may exchange by virtue of congestion, and the rival port may get ahead (Bae et al., 2013: 479-482).

The port traffic forecasting is to establish accurate relation between supply-demand. This technique is used for ascertainment of quantity, variety and form of cargoes. In demand forecasting changes on market condition, changes in global economy, changes on hinterland, and changes in technology and transport systems must be considered (Jugovic et al., 2010: 60-62). Port traffic is predicted for the purpose of sector forecasting and planning, shipping and port planning (Frankel, 1987: 164-167).

1.4.6. Port Promotion Methods

The port promotion is the communication between port and its customers and users (Bichou, 2009: 223). Promotion function of marketing is the most obvious one because the port can explain itself and its services under favour of this important tool (UNCTAD, 1995: 7-8). UNCTAD (1995) noted port promotion tools as "advertising, direct mailing, international shipping exhibitions, organizing port days, personal selling, representatives, domestic networking, domestic fairs, school visits, organizing conferences, speaker at a conference, international press days and other promotion tools" while Bichou (2009) summarized these tools under six categories:

Table 4: Tools of Promotional Mix

Advertising: Press, radio and TV advertisements, direct mailing, telemarketing, online marketing, brochures and catalogues, direct listing, sponsorship, etc.
Personal selling: Sales presentation, representatives or agencies, etc.
Direct marketing: Establishing direct relationships with targeted customers
Sales promotion and networking: Incentives and rebates, international exhibitions, fairs and trade shows, organizing or speaking at conferences and seminars
Public relations
Other tools

Source: Bichou: 2009: 223

The objectives of ports through implementing these tools can be summarized as; ease information and activities; increase in quality of communication; contribute other marketing strategies of port in a high-grade and contemporary frame; differentiate communication tools and strategies through the instruments of addresses or payees; unify advertising, promotion and direct action to consolidate tasks and to penetrate new market (Coto - Millán, 2010: 11-14).

1.4.7 Corporate Social Responsibility and Greening of the Ports

Business sustainability depends serving in search of profit and acting socially responsible to globe while satisfying customers and stakeholders needs. Nowadays, to act legally and morally under the light of improving financial situation of company is called as corporate social responsibility (CSR). The company's activities must be performed by considering interests of customer, environment, suppliers, employees, shareholders, communities and other stakeholders (Mujtaba and Cavico, 2013: 58). CSR addresses social, environmental and economic benefits together through their strategies and operations. It is a strategic rush for companies (Mujtaba and Cavico, 2013: 59). This concept was first become official at the governmental level, but the critical issue is that institutions and enterprises apply their strategic plans up to CSR (Lombardo et al. 2012: 91-92).

Ports as the gateway of maritime transportation, land transportation and international trade are a significant place for human-based environmental pollution. Therefore ports are firstly willing to decrease air emissions of ships; and they constitute new regulations to support energy efficiency by reducing air emissions. Also ports are concerned with local environmental problems causing from port traffic

(Luo and Zip, 2013: 401-402). The global warming and climate change are highly emphasized in the environmental management. Green supply chain and green port has become one of the initial concerns to industries and customers (Lirn et al., 2014: 159). Most of the biggest ports such as Rotterdam, Antwerp, Valencia, and Hamburg etc. give great significance to the corporate social responsibility implementations in port industry. However, nowadays there are also two more up and coming concept called as green shipping and green port. As a good example Green port projects of The Port of Long Beach include green flag ship incentives, green port leases, clean diesel locomotives, yard tractor retrofit, and testing hybrid yard tractors (www.aapa.files.cms-plus.com, 05.07.2015).

The air pollution, peculiarly greenhouse gas (GHG) emission that is indicated as major reason of global warming; and the water pollution that impacts marine ecosystems are two main port generating environmental factors. Otherwise due growing size of vessels, infrastructure development and deepening and widening works disarray the marine ecosystem. And waste disposal, industrial implementations and expansion constructions are other important port pollution categories. CSR has become an economic and environmental competitiveness factor hence in order to preserve their position port authorities are disposed to practice green port implementations (Lam and Nottebom, 2014: 170-173)

1.5 RELATIONSHIP BETWEEN PORT COMPETITION AND HINTERLAND CONNECTIONS

In the era of globalized supply chain only physical assets are not sufficient to explain competitive level of a port. The supply chain accession is a key indicator for port, therefore efficient linkage of port to the port hinterland yields the requirements of shippers and suppliers by providing cost, time and availability advantage in freight flow. This freight distribution view syntonizes the supply and demand factors by taking into consideration physical flows, efficiencies and economies (Hesse and Rodrigue, 2004: 171-176).

Since container ports have begun to link global logistics chain, competition between ports has shifted to competition between transport chains (Robinson, 2002: 241-245). However today container port industry is faced fierce competition. On one hand captive hinterland are sought to make pinned, on the other hand ports are endeavoured to take share from contestable cargoes (Van der Horst and De

Langen, 2008: 108). Although the capacity of hinterland transportation does not completely match the cargo volume of its port; hinterland access is still assumed as the initial success factor of a port. The port authority, container operators, freight forwarders and terminal operators have an effect on the quality of hinterland accession; because the assessment of hinterland transport and its coordination needs for the inter-organizational collaboration (Zondag et al., 2010: 180; Van der Horst and De Langen, 2008: 108-109).

The technology, value-added services, customer relations, intermodality and channel integration of sea and land promote the supply chain integration of port (Song and Panayides, 2008: 73-79). In order to constitute borderless and more regionalized main port geographical location is an important limitation for both port and its hinterland (Notteboom and Rodrigue, 2005: 297-301). Since hinterland transport requires a competent intermodal chain is a mix of road, rail and marine transport, the inland distribution center concept (port regionalization) turns up pressure on the modes of transport. The external area is accessible and the negative effects of the externalities are not involved, in this way port regionalization offers cheaper solution in capacity expansion. Regionalization enlarges the hinterland access via a series of scenario to reach distribution centers (Notteboom, 2008: 23-29; OECD, 2008: 9 -11).

CHAPTER TWO

PORT HINTERLAND CONCEPT

2.1 CONCEPT OF PORT HINTERLAND AND FORELAND

The scope of terminal traffic is straightly associated to market they serve (Rodrigue and Notteboom, 2007: 4). This geographical and spatial market place is the range of land area where a port serve, traditionally called as hinterland. The various determinants such as context of shipping services and port traffic, quality of terminal tangibles and services, the extent and productivity of land transport network, and level of competition for the hinterland may alter from one terminal to other one (Bichou, 2009: 9-10). The port specifications, particularly location, formalize hinterlands, yet place incorporates sea and shore transport systems. In other words, terminals systemize its hinterland and foreland (Rodrigue and Notteboom, 2007: 4). Hinterlands are areas sited at the rear of terminals deliver and promote cargoes, export movements, and transport and appeal imports (Jafari and Khosheghbal, 2013: 1041).

Each port has its own customer portfolio under the concept of hinterland. Cargo movement is either from main hinterland or competition margin. The port is principal in main hinterland while the port compete with others in competition margin. The main hinterland is the hearth of market of the port with advantageous access level. The competition degree is the topic of network, cost, quality and reliability (Rodrigue and Notteboom, 2006: 5-7).

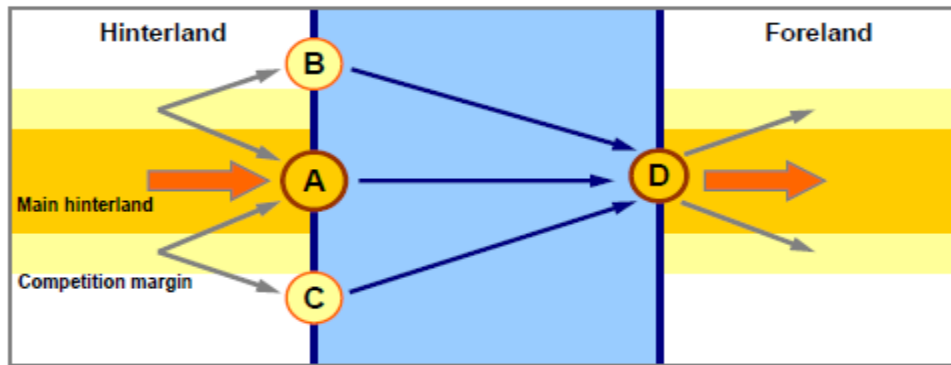
Rodrigue and Notteboom (2006: 5) define the foreland concept as follow;

"The term foreland is the ocean-ward mirror of the hinterland, referring to the ports and overseas markets linked by shipping services from the port."

Forelands are the market place that is connected to a port via shipping services. To put it simply, foreland is the area across the shore where the port of delivery is located (Jafari and Khosheghbal, 2013: 1041-1042). In a sense, this concept is an issue for both port and foreign markets in which shipping lines serve to (Zohil and Prijon, 1999: 175-177). The foreland is interacted with expansion of the world economy (Rodrigue and Notteboom, 2006: 5-6). The service providing to a great variety of markets is assumed to be a gain with the raise of supply chain

networks, where the port is considered as one ring of the door-to-door transport chain (Rodrigue and Notteboom, 2006: 5-6; Notteboom and Winkelmans, 2001: 71-77; Robinson, 2002: 21-26).

Figure 3: Port Foreland and Hinterland



Source: Rodrigue and Notteboom, 2006: 5

The growing volume of cargo transportation let changes in the market with respect to capacity between hinterland and foreland. The port regionalization was mostly interested in hinterland and land transportation to sustain form of the network, but when huge container vessels created a new asymmetry and strengthened foreland focus for regionalization. It reinforces export activities with qualified connectivity of terminals to global shipping networks. An ideal settlement between hinterlands and forelands should guarantee an admissible degree of return on investment (Rodrigue and Notteboom, 2010: 26-28).

2.1.1 Types of Port Hinterland

The hinterlands consist of three main sub-category; the macro-economic, the physical and logistical hinterland. The macro-economic hinterland identifies which elements have impact on transport demand; the physical hinterland considers nature and dimensions of transport supply; and logistical hinterland is related with organization of supply and demand (Rodrigue and Notteboom, 2006: 8-9). These hinterland types are explained in the following sections.

2.1.1.1 Macro-Economic Hinterland

The macro-economic hinterland mainly focuses on production and consumption level. The regional settings have become important in transport demand. Globalization has assured additional macro-economic factors such as interest rates, exchange rates, prices, productive capacity and dept. These items are related to external foreland and hinterland forces. The flow of commodities and transportation volumes are directly mirrored by world economy, and hence port hinterland is also modified within trade instability (Rodrigue and Notteboom, 2006: 9-16).

International and regional transport dynamics are elementary constituent of economic activities. The transportation industry, as an essential part of economy, leverages the improvements on welfare of human being. More productive transport system produces more social and economic advantages. The mobility, which is the initial specification of economic motion, meets the basic requirements of going one location to another. The economic significance of transport sector may be evaluated from the macroeconomic perspective. The economic improvement identifies how the transport system develops involving timing and characteristics of transport (Rodrigue et al., 2007: 83-90).

2.1.1.2 Physical Hinterland

Network is a model of routes of different transportation modes through as cluster of locations. The network establishment requires mixing of different strategies such as mobility, accessibility, and technological development. And the essential factors of transportation network within transport geography are nodes, links, flows, hubs or corridors (Rodrigue et al., 2007: 17-18). Cluster of port performs for certain hinterland and physical adjacency is feature of the cluster (De Langen, 2008: 8).

The physical hinterland is also a substance of this cluster from intermodal and modal view, therefore transportation network are supposed as the basic tool for connection hinterland thereby providing regional accessibility. The global network of hinterland has become more effective and accessible with intermodal transportation. Port ranges can be designed for promoting competition with a great gateway reach to inland corridors. However the fluctuations in trade are directly related with new

geography of ports from the physical perspective (Rodrigue and Notteboom, 2007: 9-10).

2.1.1.3 Logistical Hinterland

Ports have many channels such as trade channels, supply chain and logistical channels that comprises of professionals for efficient cargo progress. Ports gather these three channels, but ports hardly ever check logistics channels although these channels are necessary sources for international freight distribution. (Bichou and Gray, 2004: 47-49). The container movements are thought they are connected with ports, moreover they also pressure the logistics channels (Fan et al., 2009: 328). The logistics channels are co-operation of incorporated and serial physical and other transport activities. The port logistics channel can be characterized to connect marine-land interface (Lopez and Poole, 1998: 33).

The logistical hinterland is subject to modal choice and synchronization of transport modes. Shippers' role in the management of hinterland flow of ports is advancing via alignments with road and rail transport operators. The maritime transportation channels are tightly controlled by maritime operators. However the conflict is that a more efficient inland transportation may cause more congestion costs because high throughput from both inland and maritime interfaces (Rodrigue and Notteboom, 2007: 10-11). Monios and Wilmsmeier (2012: 210-211) reveal that;

"Port-centric logistics and logistics hubs have been used rather loosely as concepts over the last decade but they have not been given sufficient theoretical grounding"

Port-centric logistics facilitate arrivals, consolidation, sorting and bonding settlements within one place; and increase flexibility by eliminating phases in supply chain (Demirbaş, 2014: 81-83).

2.1.2 Demand Estimation of Port Hinterland

The container traffic has increased worldwide and hence the investments and enlargement of ports have also increased. Although there are many studies about forecasting, sharp growth rates in port demand enables port capacity forecasts (Veldman and Bückman, 2003: 17-21). The shifting functions of port

industry execute the planning and forecasting very difficult due to logistical, technological, political and economic uncertainties (Taneja et al., 2010: 221). Otherwise, because shippers are willing to minimize total shipments and cost of moving containers, hinterland traffic estimation requires intermodal transport network forecasting (Zhang, 2008: 7).

The anticipation is a kind of planning device for preventing misallocation. First, planners must clarify major factors that influence hinterland production and transpiration capacity to create a consistent scenario. Although there are many determinants, planners tend to single scenario (Taneja et al., 2010: 222-224). Forecasting the throughput in this complex body of distribution is also related with the deep-sea container operators (Veldman and Bückman, 2003: 17-18).

The throughput volume of the port and its hinterland is about supply capacity and demand status. This supply and demand are affected by past and future events, regional environment, GDP growth, socio-economic structure, political considerations etc. Furthermore, most importantly the competition alternates the cargo movements, and that is faced high degree of variations. The port cargo volume interacts with regional economy, and they are interacted. On the one hand, sudden growth in port cargo distribution speeds up economic growth, and terminal operators are required to invest in port for maintaining market power and gaining higher returns. On the other hand, a negative reaction of port cargo movements in the future can force the operators to take more protective attitudes in investing; by this means operating costs are tried to diminish, and this situation is disadvantageous for economic development (Tian et al., 2013: 685-687).

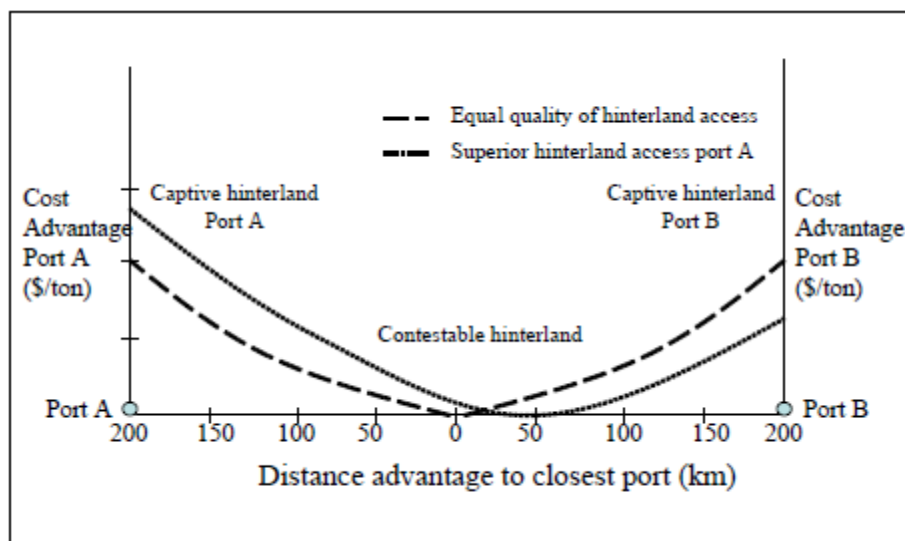
The port market is volatile, complex and unpredictable, and it is hard to estimate cargo volume forecasting (Tian et al., 2013: 688).

2.1.3 Types of Port Hinterland Competition

There are several studies on port hinterland in the literature. First port hinterland analysis was performed by Sargent in 1938 (De Langen, 2007: 2). The latest studies show that distribution stream bring about captive hinterlands while most ports extremely compete for contestable container markets (Van der Horst and De Langen, 2008: 108-109). The shift from captive to contestable hinterland switches the condition of the port market from monopolistic or oligopolistic to competitive (Notteboom, 2008: 4).

An absolute difference between captive and contestable hinterlands is that, the captive hinterland represents the regions in which one port has competitive advantage by virtue of lower transport cost, and this port undertakes the majority of cargoes from these regions. However, there is no unique flagman of region with a distinct advantage in contestable hinterlands. Figure 4 demonstrates this distinction (De Langen, 2007: 3). The cost advantage of a port concerns with distance advantage of a competing port.

Figure 4: Distinction between Captive and Contestable Hinterland



Source: De Langen, 2007: 4

There is no cost difference between competing ports when the quality of hinterland network is same. The figure shows that only distance is not enough to explain level of cost advantage. The competition is fierce in those contestable hinterlands where no single terminal has pure cost advantage (De Langen, 2007: 2-5). On the other hand the locational relationship is used for grouping contiguous terminals. There is no organization between ports, and the hinterland is highly contestable as many of adjacent ports that compete for the handling of the same commodities (Notteboom, 2008: 12-13).

2.1.3.1 Captive Hinterland

The port has higher impact and share on the cargo flow within a portion of the potential market that is nearer to the terminal (Jafari and Khosheghbal, 2013: 1042). The system of overlapping hinterlands in which two ports compete for a mutual hinterland may be supported with the raising container trade; but in many markets both overlapping and captive hinterlands can be incurred (Zhang, 2008: 25-26). The captive hinterland is called as the hinterlands where a single port has considerable advantage, but the captive hinterland has decreased or disappeared for many of today's port systems (Notteboom, 1997: 99-100).

The captive hinterlands do not face direct competition. However wider captive hinterland for a port would provide more frequent services by lines; lead to accommodate larger vessels; give in higher handling activities; contribute evolution of logistics operators; and create more value-added services (De Langen, 2002: 206-211; 2004: 143-146). All these information can create competitive advantage for ports within these areas. A wider captive hinterland would conclude in higher cargo traffic and lower freight rates (Zhang, 2008: 27-28).

2.1.3.2 Contestable Hinterland

The contestable market theory facilitate entry and exit to markets with growing efficiency, in spite of limited number of firms exist in the sector, the prices of products or services change competition margin. Therefore in the perfect contestable market, potential entrants threat the incumbent companies to act competitively. The oligopolistic market structure would not be changed through this theory. However, apart from theory, it is impossible to enter to or exit from the market without any cost; but market contestability would be developed through policies to block natural monopoly. Another aspect of the theory is potential competition. The actual competition is considerably more critical to prevent supra-normal profits (Notteboom, 2010: 264-265).

Overall, port competition for market share is explained by several factors such as port infrastructure, service frequency, availability of distribution centers etc (Rodrigue and Guan, 2009: 4-5). More than two ports compete in a specific area that is called as competitive hinterland. The service quality and pricing strategies are the determinants within this competition (Jafari and Khosheghbal, 2013: 1043-1044).

There are many factors that ease the ascent of gateways. The initial one is containerization and the increasing size of container ships create concentration in limited number of gateways, particularly located on the long - distance routes. Price fixing also diminish port calls. Secondly, the raise of intermodal distribution by rail enables deeper market penetration; and with the intermodality and well-connected transport networks have a vital structuring impact on the hinterland reach (Notteboom, 2008: 4-6).

2.2 DIFFERENT COMPONENTS OF PORT HINTERLANDS

In the era of containerization, the spread of a standard and wide movable box divides modes of transportation, and spread of container prompt traffic levels. Containerization promote concept of economies of scale, so shipment level has increased, hence accessibility and economic opportunities have become more important. Hereby larger terminals and their hinterland links have rapidly risen (Rodrigue and Guan, 2009: 3). The factors include port side, shipping network, port policy and global supply chain management.

2.2.1 Port Side of Hinterland

The increasing freight movements have triggered transport systems that access to the hinterland; however it generates a sharp congestion problem. Whereas a port is deemed for an absolute hinterland, the freight transportation may now be overlapped through competition, and monopoly over a hinterland has been concluded (Zhang, 2008: 5-9).

Rapid evolvement of containerized traffic aggregated the hinterland accession with the pressure on terminals to increase efficiency level; but then congestion negatively affects the port performance due to port capacity cannot evolve as quickly as increase in demand. Therefore inefficient ports gradually are displaced. In words of one syllable, slower turnaround times result in higher inventory costs for the whole supply chain. Supply chain management has become a part of terminal management so the development of logistics network enforced some difficulties for port operators (Acciaro and McKinnon, 2013: 7-11).

Even if the point of origin of port system development would be the garbled location and poor connections of ports to main corridors between ports and major

hinterland center; today's larger ports highly and formerly invested in container infrastructure (Fraser and Notteboom, 2012: 10808-10809). The conventional links pertains to local geography and infrastructures that is the key criteria in shippers' port selection (Rodrigue and Guan, 2009: 3).

2.2.2 Shipping Network of Hinterland

The shipping network is a factor that provides market access and it has effects on port of calls. It is a key factor in configuration of shipper's network relative to port infrastructure. Port traffic exposes ports in gaining and losing clients (Rodrigue and Guan, 2009: 3). Port competition contains hinterland network, and costs of overall hinterland transport which is conjoined with port charges are more expensive than maritime transport costs (De Langen, 2008: 10).

Notteboom (2008) suggests that shipping lines consider not only their expectations but also their customers' logistics needs such as quality of land connections due to the door-to-door transportation costs and performance are directly influenced by. In accordance with broadening port hinterland, the shipping network of hinterland has become more important. Wiegman et al. (2008), supports that view by identifying availability and performance of shipping connections as an essential factor for ocean carriers' port selection. Leachman (2008) also highlights quality of the network functions on inland transport costs and the port selection.

Shipping network of hinterland should be readdressed for the sustainability and economic growth. For instance, the weak inland networks decrease trade volume while increasing cost of international trade. The more hub port system improves the larger volumes of cargo will be transported and handled, which gradually put the heat on hinterland network. Moreover the higher volume of transportation aids to all modes to serve efficiently and to develop (UNECE, 2010: 7-20). De Langen (2008) believes that port authority is important in logistics chain integration of hinterland network.

2.2.3 Policy Aspects of Port Hinterland

Traditionally planning and policy-making are considered similar, but planning and policy-making have conflicts. Port planners perform with a technical and

scientific perspective; at the same time policy-makers must think political, social and public interests (Everett, 2005: 347-349).

Local port policies influence the management of export flow. Because administration of a port is crucial for port policy, port operator must undertake the investments to adopt the port facilities for potential traffic growth, and to improve productivity (Cullinane and Song, 2002: 60; Rodrigue and Guan, 2009: 4). So that government ordains some specific policies to achieve competitive efficiency (Everett, 2007: 107-108).

National and supranational policies on pricing, investment and privatization are nearly related to port pricing decision and hinterland congestion (Pallis et al., 2011: 462). The developing port performance creates economic benefits and that is usually actuated with privatization which helps decreasing fiscal and managerial responsibilities of government. The privatization policy practices were motivated by political expediency (Cullinane and Song, 2002: 55-56). After maritime transportation become the interest of sustainable mobility, port policy act as a dominant factor of efficiency of ports and their hinterland. It led to modernization of infrastructure, integration of ports in hinterland networks, uphill competition, safety and environmental issues to be main areas. Port and hinterland based infrastructure projects, which develop accessibility, must facilitate trade, help to relieve congested corridors, and reduce costs of transport (Pallis, 1997: 368-375).

2.2.4 Supply Chain Management and Port Hinterland

Supply chain management (SCM) organizes movement of goods between suppliers and customers to deliver value-added productions and services for customers with less cost in the entire supply chain. SCM includes many companies eager to leverage efficiency and strategic positioning. A supply chain strategy depends on relationship control between different channels; hence the aim of the SCM is to create more profitable results for all parties (Christopher, 2011: 2-3; Bowersox et al., 2002: 2-3).

The global supply chain removes international borders thanks to linkage between many producers, suppliers, distributors and customers. It is a transparent delivery system (Branch, 2009: 2). This network organizations produce value for different processes and activities of chain in the way of products or services. However SCM is not a kind of vertical integration, because it is concluded with

ownership, but SCM is to cooperate in the light of an alluring strategy, and core of the SCM is the term outsourcing (Christopher, 2011: 13).

In early days, distribution centers were established contiguous to ports that witnessed to both heavy industrial and manufacturing activities (Rodrigue and Notteboom, 2009: 174-175). However terminals, today, play crucial role on integration of these main channels; and within the channel there are many integration of supply chain facilitators (Bichou and Gray, 2004: 47-48); in other words, nowadays seaports are an important leg of global supply chains (Panayides and Song, 2007: 133) and container transport is the most important cargo flow, and the competition has shifted from port to the entire supply chain (Van Der Horst and De Langen, 2008: 98-100). In this role, port is a value-driven element in a cluster of parties including logistics and transport operators. The value chain is faced with intermodal transportation after integration of ports and their hinterlands to supply chain (Christopher, 2011: 9). Although ports have very different and specialized facilities, these all technical capabilities do not depict the core function of ports in logistics chain (Rodrigue and Notteboom, 2009: 173-174). Heaver (1993) argues that ports are located to meet cargo related requirements of integrated supply chain. The terminal operators compete for tangible assets and services provided to supply chains. Otherwise, fierce competition has rendered gateway ports substitutable under de supply chain organization. Hence, port performance has been replaced supply chain performance. The hinterland transport cost including port charges, reliability of the logistics chain, condition of hinterland transport have become important factors in routing. This is to say a port can augment attractiveness by exploiting all components of the supply chain (OECD, 2008: 8-13).

A hinterland logistics network forms from comprehensive road and railway connections. The geographical and commercial hinterland of the container port maintains to be quite national frame (Iannone, 2012: 42-44). Indeed, in supply chain, many ports compete for contestable hinterlands and the quality of logistics services are crucial. The quality of hinterland connections is related with terminal operators, freight forwarders, container shipping operators, and the port authority (De langen, 2008: 7-11). The supply chain requires a high degree of hinterland coordination between actors (Van Der Horst and De Langen, 2008: 100-111). De Langen (2008) also clarifies five conditions for efficient hinterland access of seaports: The transport infrastructure must sufficiently meet the hinterland's requirements; this infrastructure must be used effectively; the coordination of the chain must be well-established; a

sustainable transport system is needed; and the services must attract the customers via adding value.

Conventional terminal management conflicts with between channel members while supply chain outlook supports integration and partnership. The services of ports surpass the ships and cargoes and claim additional roles and attributes through integrated logistics systems. Therefore a port is a dominant sub-component of supply chain. After emergence of TOCs collaboration and long-term partnership are promoted into the channel. Nevertheless, ports should support the supply chain through the competitive advantage and value-added chain systems (Bichou and Gray, 2004: 50-53). Also Talley (2009: 80-81) explains that;

"Ports can add value to supply chains by sharing information, undertaking long - term planning, providing the flexibility to accommodate changes in the needs of port users, and planning and organizing activities beyond their boundaries."

The port charges and transshipment activities are the main determinants of port demand within a supply chain network, so the increasing demand affects port capacity and port's congestion level (Bae et al., 2013: 482-485). Therefore bigger ports positively influence the competitiveness. The handling productivity effects market performance in transshipment flow. The port performance in maritime logistics causes to changes in port's strategies and attitudes (Sohn and Jung, 2009: 124-126). When services provided to ship are not sufficient in terms of profit, terminal operators of transshipment hubs pursue for new service areas such as packaging, labeling etc (Lotfi and Hajbi, 2014: 253-254). The transshipment density attracts much more carriers in each port (Sohn and Jung, 2009: 120-121). The transshipment traffic is closely related with port location (Lotfi and Hajbi, 2014: 254-257).

Intermodal transportation, as the main facilitator of logistics network, may be defined as the transportation of a person or a load from its origin to its destination by a sequence of at least two transportation modes, the transfer from one mode to the next being performed at an intermodal terminal (Crainic and Kim, 2005:1). Ports are typically intermodal transfer hubs, thus port must act as an efficient intermodal facility to conduct modal shift; but they also perform consolidation/deconsolidation, changing shape of transport unit by packaging or unitization, and warehousing. Intermodality is really reactive to cargo scheduling and information of cargo

transport design and the modal transport schedule. The residual intermodal practices turn the ports into elementary connection of transport chain by way of their traditional roles (Frankel, 1987: 538-540). The eventual achievement of terminal contingents upon promoting some elements such as technology of supply chain, value-added services, customer relations, channel integration, and simplification of intermodalism. However geographical condition is considered to be the most important challenge for intermodal perspective (Notteboom, 2008: 23-24). The well-integrated and standard intermodal corridors between terminal and hinterland provide door-to-door transportation opportunity, and develop efficiency and visibility of the port (Val and Roldan, 2013: 2-3).

2.3 FACTORS AFFECTING PORT HINTERLANDS

There are three main parameters influencing ports; location, accessibility and infrastructure (Jafari and Khosheghbal, 2013: 1043). The location is the starting point of port development. The port system development models indicate a switch from weakly connected terminals to a main network of corridors between ports and major hinterland (Fraser and Notteboom, 2012: 10807-10808). Intermodal solutions allow that most convenient mode of transport is chosen. Hence, the terminals may originate cost effective intermodal corridors within hinterland. The intermodality and its corridors have influence on the hinterland access of terminals (Roso, 2008: 782-785; Notteboom, 2008: 4).

The regionalization overcomes locality, environmental difficulties and network restrictions (Fraser and Notteboom, 2012: 10808-10809). Otherwise distribution centers force the road and rail network of hinterland although the fact that it has contrary effects on congestion and pollution. Ports prefer to use inland hubs to increase their capacity with cheaper way. However, hinterland congestion is a problem for both port and its networks. The ports and their hinterland have become more congested into the competitive environment especially with the effects of reliability. Also this congestion may influence market share of ports in their hinterlands (OECD, 2008: 6-10).

Factors such as nautical accessibility, draft of the port and operational and technical efficiency of ports explicate the hinterland traffic volume. Those elements impact the type and size ships calling at the port, and the network design of both

hinterland and foreland. The regionalization has appointed the hinterland and foreland as the mid-range hubs (Fraser and Notteboom, 2012: 10809-10810).

2.3.1 Geographical Location of Ports and Geographical Factors of a Hinterland

Ng and Ducruet (2014: 790) reveal the relation between geographical location of ports and hinterland as;

"Geographers interested in ports emphasized the applied dimension of their works with a tendency to address spatial and territorial issues in a secondary manner compared with economic and management issues, while promoting spatial and territorial issues towards other non-geographical fields."

In fact, port geography stays within the transport geography (Ng, 2012: 66). The commercial geography examines the locational features of trade. Trade spatially exhibits economic, social and industrial configuration of markets (Rodrigue et al., 2006: 93-95). The geographical system would evolve because the success of a port is pointed out by the abilities of port (Notteboom, 2008: 22). The geography plays an essential role on global supply chain where the physical abilities of transport mode, ports and infrastructure are crucial. The setting of global economic geography was fulfilled by reconstitution of global distribution networks, and ports are bottlenecks for these freight distributions (Rodrigue, 2012: 15-17).

The location of distribution activities depends on some location factors. These factors are site, accessibility, and the socio-economic environment. The importance of these factors is related with nature of location of activities. Although accessibility is the issue of transportation activities, the capacity of infrastructure has most particular effects on location of transport systems. Thus it is clear that location, accessibility, and economic activities are anchored in each other (Rodrigue et al., 2006: 60-64). The hinterland reach of the port is associated with geographical location and the distance between hinterland and port (Notteboom, 2008: 23).

2.3.2 Accessibility of the Port Hinterland

The accessibility is the core subject of transport geography, spatial planning, topography, and network design. Local access for regional transport systems is of

furthermost importance; so port operations can be affected by poor access. For the container port industry the more accessible ports are the more reachable for potential customers and suppliers (Cullinane and Wang, 2009: 106; Jafari and Khosheghbal, 2013: 1044). The accessibility has three wide approaches; infrastructure-based accessibility, activity-based accessibility, and utility-based accessibility (Cullinane and Wang, 2009: 107). Accessibility of a hinterland is a key part of port competition; as a result of accessibility conditions, the hinterlands have switched from captive to contestable where main hubs struggle for giving weight to efficient hinterland network (Van der Horst and Lugt, 2011: 415-416; Notteboom, 1997: 101-103). To obtain an accessible hinterland both public and private sectors must act jointly (Van der Horst and Lugt, 2011: 420). The qualified and developed hinterland access diminishes port operating costs that determine competitive position of ports against their competitors (Zhang, 2008: 17-18).

The service frequency is one of the most attractive dimensions for container ports hence the landward and seaward accessibility should influence the review of port competitiveness. The effective use of infrastructure also attracts shippers and carriers. This infrastructure must perform to evaluate accessibility of the nodes of a network. All the other determinants are constant, the more accessible container terminals, the higher attractive it changes into for relevant port choices. Thus, to predict the accessibility of a terminal to another one yields for measuring competition level of a port. However land accessibility is subjected to infrastructure more than service providing and it can be changed quite slowly. Otherwise radical changes can be quickly taken place for sea accessibility thereby adding or removing services (Cullinane and Wang, 2009: 104-106).

The hinterland transportation networks are vital in analyzing hinterland. A typical inland transport network affects competition margin of ports. The intermodal transportation has a residual impact on lowering transport cost (Wei, 2012: 10-13). The intermodal corridors correspond to create profitable value-added cargo based services for customers. These corridors must be integrated to ports and require coordination (Notteboom, 2008: 23-25). The essential haulage of an intermodal transport influences overall transport network in well-coordinated systems (Caris et al., 2011: 298-299). Ports, with its adequate facilities and hinterland connections, are important and integrated part of the supply chain. Hinterland access may increase competitiveness and profitability of the port. The quality of transport

services must be confident of access conditions, regular container movements, and competent combination of transport modes (Islam and Olsen, 2014: 290-292).

2.3.2.1 Road Connectivity and Accessibility of Port

Road transportation is the most used and most specialized type of freight distribution interalia means of transport particularly in short-distance (UNCTAD, 2004: 13). Truck freight offers modifiable transport in accordance with changes in demand. Even trucks can automatically carry small quantities. Trucks also propose more diversified services than other modes of transport when the destination of arrival or departure is single point (Frankel, 1987: 521-522).

The developments of road quality naturally have impacts on trade, but still the accurate data is needed. This definite information can be origin of exports, the routes involved in the country, road network condition, and cost of transport. There are several marks for road haulage (Blyde, 2013: 664-669);

- The road distance to the closest exit point and to the international border
- The briefest travel time to the hub ports
- The road distance to the airport
- The concentration in transport infrastructure

The degree of port connectivity to the hinterland transport infrastructure most probably to persist in global trade flow. The productivity and improvement of hinterland network intermesh with port performance. Vessel to port construction has changed into port to inland bottleneck. The time lag of congestion advances the increasing travel time based on fuel consumptions; and downgrades the reliability of road freight operations (Wan et al, 2013: 417-419).

The investment on transport infrastructures and superstructures basically impact the economic pathway of regions. This investment can be performed for development of transport capacity, enlargement of capacity; and can be concluded with change in costs of freight (Hurter and Moses, 2007: 112-113). In long run, private enterprise in road investment and employment positively affect the productivity level. The economic impact of this investment is analyzed under the frame of three goals (Pereira and Andraz, 2011: 466). First one is the regional disaggregation of aggregate economic impact of investments. Second goal is the analysis of the importance of value of the investments in each region. The last

objective is to designate the regions in which investments constitute superlative effects (Pereira and Andraz, 2011: 466-487).

2.3.2.2 Rail Connectivity and Accessibility of Port

The railway transportation takes much more transit time than road transportation, but it is preferred in large countries under favour of its lower cost. Its infrastructure and superstructure activities are generally driven by a national company; and then it can be privatized or allocated to some rail transport operators according as port industry (UNCTAD, 2004: 14-16).

The container transportation from both port and its hinterland has difficulties such as value for the users, and service quality and price. The value for the users still exists as long as shippers obtain different advantages from rail freight. However, the high flexibility of road connections challenges, although rail transportation provides eco-friendly, reliable and low-cost services. The pricing policies and service quality are important indicators to attract users. Pricing of rail freight has a critical balance, because it is hard to determine a price that is profitable and competitive with other modes; and that recovers investment cost. The other reliability and effectiveness factors of rail cargo can be sorted as port accession, integration within the network, and network efficiency (Monios and Lambert, 2013: 198-205).

Rail transportation is developing day by day and the perception of the road transportation is also changing by reason of environmental problems and weak quality. The semi-trailers do not convoy with marine freight; number of capable driver is not sufficient; and overall costs and environmental obligations have increased. Therefore rail transportation progressively takes share on transportation pie. Otherwise shippers, nowadays, incrementally ask for rail network of ports. It also creates pressure on governments and operators for political changes because new investments and regulations must be handled aggressively (Woxenius and Bergqvist, 2007: 1-5). Woxenius and Bergqvist (2007: 1-2) argue that;

"Factors internal to the industry include the increasing costs of road haulage, congestion at port gates and in port city traffic, increased volume and concentration of semi-trailer flows to a scale suitable for rail due to strengthened world trade."

A contractual relationship between terminal and railway companies and it creates a coordination conflict in ports; because the daily handling plans of ports require an optimum efficiency of train slot usage on terminal. Thereof congestion is assumed as one of the biggest coordination problems in terms of rail freight between ports and their hinterlands (Midoro et al., 2005: 90-96).

The cost of infrastructure development and financing of network configuration impacts operations and network models. Private and public corporation is not promoted for rail infrastructure as it has been in management and improvement of road infrastructure (Monios and Lambert, 2013: 212-216). Rail infrastructure and operational modeling are related with the degree of geographical and functional integration of road and rail infrastructure (Pittman, 2007: 170-172). This situation is peculiarly valid for the vertically separated railroad connection (Monios and Lambert, 2013: 217-218).

The policy action must be brought for coordination of railways in hinterland. This coordination is difficult due to it involves many principals to plan and enhance rail container infrastructure. It is suggested four essential methods to overcome the coordination challenges such as unused capacity and congestion, often combined in the peak-load problem, delays, limited planning and exchange of rail cargo (Monios and Lambert, 2013: 214-218):

- Introduction of incentives via reward or penalty system such as differentiated tariffs etc.
- Creation of inter-firm alliances
- Organization scope change for risk allocation or integration on chain
- Collective action through governmental or private interposition

2.3.2.3 Coordination Challenges in Hinterland Chains

The hinterland concept has increasingly been penetrated with mobility effect of contemporary containerization, and many ports are attracted to compete for this market. Hinterlands have become individual market area after development of container transport corridors and intermodal facilities; yet, port authorities are still delighted to encourage their centrality to hinterland (Rodrigue and Notteboom, 2006: 10-12). Port hinterland is not supposed as fixed longer. The direct hinterland of a port is continuous while distant areas are evaluated as discontinuous; because the

cargo carriage from or to hinterland diminished by virtue of accessibility of transport corridors and inland terminals (Rodrigue and Notteboom, 2006: 11-13).

The port-based maritime container movements constitute coordination problems (Van der Horst and De Langen, 2008: 108). Ports are typically interested in internal matters and do not strive for overcome coordination problems in hinterland chain, thus the coordination advancing investments are limited; because to obtain this cooperation is considered difficult, and also the experiences in coordination also appoint the firm's actions. There are five general coordination problems to be argued (Nooteboom, 2004: 253-256):

- The inadequate allocation of costs and benefit coordination.
- The scarcity of resources to invest in transport network.
- Strategic plans.
- The absence of a firm, which have an absolute supply chain power, to increase coordination.
- Risk avoidance within hinterland chain

Coordination problems especially appear on rail terminals. The coordination is needed on the last part of the rail movement due to shunting activities cause to extra idle time. Nevertheless information exchange is missing between ports and rail operators for efficient delivery process. A new hinterland service expects a basal volume of cargo movement. However the port users such as shippers, forwarders, shipping lines etc. do not espoused a new service to adjust their activities into the new hinterland service. Also the planning o empty containers can be accepted as a coordination problem of hinterland chain (Van der Horst and De Langen, 2008: 113-116). Van der Horst and Lugt (2011: 417-418) explain the coordination mechanism of hinterland distribution as follow;

"Actors in hinterland transport introduce coordination mechanisms. These mechanisms are defined as all modes of organizing transactions, including operational transactions, agreements and contracts, incentives, alliances, introduction of new actors or markets, and vertical integration."

2.3.3 Hinterland Logistics and Infrastructure Development of Hinterland

It is obvious that the hinterland capability and network is one of the key aspects of users in port choice. This network and capability are configured through

accurate relationship between capacity, congestion and reliability; and logistics plays a significant role in planning and adding value the hinterland network. Therewithal, the logistics adoption of maritime freight have differed the geography of and infrastructure development of hinterland into the logistics systems (Acciaro and Mckinnon, 2013: 12-16).

The overall responsibilities of the port users have been forced to change with the emergence of supply chain and logistics era because ports are the functional base of the transport activities in hinterland network chain. The functional adjustment of the port to the hinterland transportation is enhancing. Thanks to logistics integration of the actors within the hinterland some additional steps in the transport system have been deleted. Hence the costs and freight have decreased in reply to the logistics integration (Rodrigue and Notteboom, 2007: 17-29).

The new developed policy of European Union also contains the rail transport integration, the deployment of smart distribution network, and action plan for freight logistics (Newton et al., 2010: 48-49). According to Kotut and Mugambi (2012: 408);

"The strategy of developing port networks with hinterland nodes and dry ports in the hinterland has become widely accepted as a viable strategic option."

The regionalization concept emphasizes the importance of geographical location in terms of port development. The port competition has faced higher degree of inland distribution via this theory, and network corridors and logistics centers have begun to appear (Kotut and Mugambi, 2012: 410-412). The market players of the hinterland are inflicted to transform their services in direction of port regionalization (Rodrigue and Notteboom, 2007: 17-18). The regionalization, as a focus strategy for ports, creates the advantage to captive markets and more suitable market access through intermodality of connections. Thus, not only the location of port, but also geographical position of the logistics centers is essential for supply chain network of hinterland (Rodrigue and Guan, 2009: 23-25). Otherwise the quality of port infrastructure is critical to attract the users within its hinterland; and so that the novel port development strategies are performed under the light of integration of transport infrastructure. Both port and transport infrastructure, and the technological adoption of the port must be suitable to shoulder port traffic (Acciaro and Mckinnon, 2013: 12-13; Jafari and Khosheghbal, 2013: 1044).

CHAPTER THREE

CONTAINER PORT SELECTION CRITERIA

3.1 CONTAINER PORT SELECTION CRITERIA OF PORT USERS

Ports serve in a competitive environment thereby meeting customers' needs for enhancing market share and the attributes of port services attract customers on their decision (Saeed and Aaby, 2013: 9). The determinants of port choice have severally been studied (Lam and Dai, 2012: 511). There are many criteria that have been found in early researches on port selection of shippers, forwarders, and shipping companies. For instance, Saeed and Aaby (2013) used following attributes to examine the selection criteria for ports:

- Service quality
- Loading/discharging rate
- Handling charges
- Number of TEUs handled at the port
- Number of vessels calling at the port
- Level of congestion at the port
- Location
- Efficiency of the hinterland connections
- Personal contacts
- Logistical services provided at the port
- Storage facilities
- Value-added services provided at the port
- Navigational availability (night navigation)
- Switching cost from one port to another
- Asset specification (Investment made by port and investment made by shipping line)
- Structure of port authorities and ownership

According to Talley (2009) price and characteristics of ports, and ship-schedule characteristics of ships calling at a port are major influencer in port selection. Port and ship-schedule characteristics affect shipper who is exposed to time prices.

Bichou (2009) also classifies the selection criteria into three main groups, and each category has own sub-factors; route factors (location, accessibility,

connectivity, hinterland network, frequency and transit time), cost factors (freight rates, tariff and charges and capacity) and service factors (several aspects such as efficiency congestion, reliability, flexibility, safety and security). However, Lam and Dai (2012) strongly highlight that tariff and service characteristics of road and rail companies, frequency of ship visits, and freight rates are important issue in port selection.

Most of the studies related with port competitiveness suggested facility and equipments, port charges, transit time, frequency of travel and damage on cargo, hinterland connectivity, potential market location and hinterland, and port accessibility as vital port competitiveness criteria in 1980s. On the other hand at the next decade, although more comprehensive perspectives were in question such as politic, social, stability, geographical location and quantity of throughput etc., service quality, transit time, equipment ability and cargo information are the major factors of port choice in much analysis. The analysis results of 2000s' studies show that the criteria such as location and economy capacity of the hinterland have been given more attentions than before. (Kim et al., 2009: 138-140).

According to literature review on port selection criteria that are comprehensively shown in Table 5, studies were implemented to shippers, forwarders, shipping lines and terminal operators. However the majority of the studies focus on both shippers and shipping lines. The eleven of the studies have performed to the shipping lines; seven of the studies were carried out to the terminal operators; fifteen of them are implemented to shippers; and only eight researches were practiced on forwarders. In tramp shipping it could happen that shippers and forwarders choose a certain port however mostly shippers and forwarders choose shipping lines to send their cargoes not choose port to visit. It is an essence right of shipping line to select port. Therefore studies do not highly concern with forwarders port selection criteria; but increasing outsourcing usage have caused that selection criteria of freight forwarding industry should be deeply evaluated. In Table 5, port selection factors seem to be similar but there are sharp distinction in terms of their methods and results. Also many of existing studies did not consider the difference of region.

Table 5: The Summary of Port Choice Criteria in Literature Reviewed

Authors	Target Group	Factors
Slack (1985)	Shippers, Forwarders	Number of sailings, Freight rates, Congestion, Intermodal links
Branch (1986)	Shippers	Cost, Nature of traffic, Adequacy of port facilities, Overall efficiency, Industrial relations record
Bird and Bland (1988)	Forwarders	Frequency of shipping service, Port charges, Time, Grouping and freight consolidation, Labour problems at ports, Spirit of free enterprise, Delivered price
Frankel (1992)	Governmental Bodies, Shipping Companies, Shippers, Forwarders	Liner companies revenues / costs / fleet size / fleet employment, Cargo volume / value / allocation
Murphy et al. (1992)	Large / small Shippers, Carriers, Ports, Forwarders,	Loading / unloading facilities for large / odd sized freight, Large volume shipments, Low loss and damage frequency, Available equipment, Convenient pickup and delivery times, Information concerning shipments, Assistance in claims handling, Flexibility in meeting special handling requirements
Murphy and Daley (1994)	Purchasing managers (shippers)	Shipment information, Loss & damage performance, Freight charges, Equipment availability, Convenient pickup and delivery, Claims handling ability, Special handling ability, Large volume shipments, Large & odd sized freight
Tongzon (1995); (2009), Tongzon and Sawant (2007)	Forwarders	Frequency of ship visits, Port efficiency, Adequate infrastructure, Location, Port charges, Quick response to port users' needs, Port reputation for cargo damage
Malchow and Kanafani (2001), (2004), (2010)	Shippers	Distance, Frequency of sailings, Average size of vessels, Loading / unloading time
Kumar and Vijay (2002)	Shippers	On time performance, Value, Information technology, Customer service, Equipment and operations

Table 5: The Summary of Port Choice Criteria in Literature Reviewed (Continued)

Mangan et al. (2002)	Decision makers in transport companies	Service availability, Sailing frequency, Risk of cancellation, Fastest overall route, Proximity of ports to origin / destination, Cost, Speed of getting through ports, Suitability for special cargo, Delays, Intermodal / connecting links, Information availability
Ha (2003)	Shipping Companies	Information availability on port activities, Port location, Port turnaround time, Facilities available, Port management, Port costs, Customer convenience
Tiwari et al. (2003)	Shippers	Ship calls, Total TEUs handled at the port, TEUs per berth at the port, TEUs of cargo per crane, Handling volume per length of quay, Number of routes offered, Port and loading charges
Lirn et al (2004)	Shipping Lines	Physical infrastructure, Geographical location, Port administration and service to vessels, Carriers cost per call
Song and Yeo (2004)	Ship owners, Shipping Companies, Shippers Terminal Operators, Academics	Cargo volume, Port facility, Port location, Service level, Port expenses
Cullinane et al. (2005)	Shippers , Port Authorities	Price, Generalized cost, Quality of service, Policy developments
Guy and Urli (2006)	Shipping Companies	Port infrastructure, Cost of port transit for a carrier, Port administration, Geographical location
Ugboma et al. (2006)	Shippers	Efficiency, Frequency of ship visits, Adequate infrastructure
Acosta et al. (2007)	Terminal Operators	Infrastructure, Superstructure, Technology and communications systems, Internal competition, Cooperation of the institutions and companies involved in the port activity

Table 5: The Summary of Port Choice Criteria in Literature Reviewed (Continued)

Shintani et al. (2007)	Shipping Companies		Costs, Empty container distribution
De Martino and Morvillo (2008)	Port Authorities, Shippers, Forwarders, Shipping Companies		Quality of the entire port, Value is generated by joint effort of port actors in the satisfaction of clients' needs
Grosso and Monteiro (2008)	Forwarders		Connectivity of the port, Cost and port productivity, Electronic information, Logistics of the container
Leachman (2008)	Importers		Transportation costs, Alternative routes, Door - to - door transit times, Shipments pooling, Lead times of container movement
Meersman et al. (2008)	Shipping Companies, Terminal Operating, Companies, Port Authorities		Port hinterland connection capacity
Weigmans et al. (2008)	Container Operators	Terminal	Port physical and technical infrastructure, Geographical location, Port efficiency, Interconnectivity of the port, Reliability, capacity, frequency and cost of inland transport services by truck, rail and barge, Quality and costs of auxiliary service such as pilotage, towage, customs etc. Efficiency and costs of port management and administration, Availability, quality and costs of logistic value - added activities, and costs of port community systems, Port security / safety and environmental profile of the port, Port reputation
Karlaftis et al. (2009)	Shipping Companies		Distances between ports, Demand, Supply, Service time

3.2 AN EVALUATION OF MAIN FACTORS USED IN CONTAINER PORT SELECTION BY SHIPPERS AND FREIGHT FORWARDERS

Although there are many criteria that attract shippers in terms of port selection. At the end of a comprehensive literature review the port selection factors were reduced and gathered under the roof of seven main components.

3.2.1 Port Location and Hinterland Connections

Competition is an important engine for growth and change. Internal competition forces firms to innovate and seek out new niches, and further fosters specialization. Maritime activities, such as shipping, shipbuilding and port and maritime services, are clearly geographically concentrated in a number of maritime clusters (Lam and Bai, 2012: 510). Ports are differentiated in terms of facilities and capacity. Hence, comparative effects on customer satisfaction are likely to be differentiated by the location of the ports (Cho et al., 2010: 922). Bai and Lam (2014) state that location is only a source of specialization without different geographical focus. This concentration results in specialization at different areas different areas. The internal competition between two ports locating close to each other force them to create different and specialize service for making more profit (Lam and Bai, 2012: 510). The port contains of a group of intermodal infrastructure benefiting from a geographical location, providing a high level of network to access with its hinterland and foreland (Lun et al., 2010: 221-226). Competition between ports over a similar hinterland can only be found in locations where ports compete for the same market, and (Wilmsmeier and Notteboom, 2011: 218-219).

In geographical monopolies, intense inter-port competition has supported to change boundaries delimitating port-specific forelands and hinterlands with contributions of technological improvement, economic development and global supply chain. The selection of location may conclude in cost savings, remarkably transportation costs (Ng and Çetin, 2012: 758). The geographical focus of ports tends to be clustered. The port cluster involves all economic activities related to vessels and shipments of goods. The port cluster is a convenient environment for supply chain implementations since many ports and port-related firms situated nearby (Bai and Lam, 2014: 1-6). It is common that selection of a port from the cluster individually based on needs of port users (De Langen, 2004: 210).

Traditional concepts of port selection have concentrated on geographical location as one of the most substantial characteristics of a ports' attractiveness (Tiwari et al., 2003: 71; Malchow and Kanafani; 2004: 317-318), and port location is an important criteria in port selection is concerned with the geographical functions of ports (Ducruet, 2013: 124-125).

Ports are no longer simply competing with neighboring ports for cargo (Witters, 2001: 17); moreover, are competing between a numbers of alternate intermodal chains (Wan et al., 2013: 417). In many seaports, some of the cargo traffic originating or estimating from captive hinterland, but most ports compete for transportation flows in contestable hinterland. This traffic has become more sensitive to shift between ports. The container ports have become links in supply chain and the competition has shifted from port to transport chains. Therefore the location and geographical proximity of ports have become crucial (Van Der Horst and De Langen, 2008: 108-109). The liner shipping network has an essential affect on transport costs. Port competition and port choice suggests more perceptions into the determinants of customer shifts between ports (Wilmsmeier and Notteboom, 2011: 214).

Geographical location and the nature of the site have always been accepted a significant factor in the establishment of a port and for its survival (Palmer, 1999: 106). The accessibility of the port by land and sea is one of the new ways to attract shippers and carriers in rapidly changing containerized environment (Witters, 2001: 24-27). The land and sea side location of port reflected by exploiting opportunities of natural advantages. These opportunities were enhanced by the improvement of more precise navigation systems in globalized commerce (Palmer, 1999: 102). The distance between entrance, depth, turnaround channel of the port and terminal operations must be lowered to be more competitive. Hence only the natural advantage is not enough to explain competitive level; maintaining sea side of the port is also a great determinant for directly carriers and indirectly shippers (Witters, 2001: 31).

Highly accessible hinterlands are drivers to inter-port competition (Wilmsmeier and Notteboom, 2011: 221). The increasing overlapping hinterlands and ability to replace each port increase inter-port competitiveness in the context of distribution of transport flow (Laxe, 2010: 15). Hinterland transport and transport costs are an important factor in the costs of the supply chain and therefore an

important competitive factor, thus ports play active role in developing all modes driving within hinterland (Zondag et al., 2010: 179).

The transshipment facilities close to ports and hinterlands is also important in the frame of hinterland connections. Transshipment hubs for the divergence of different means of transport (Gleissner and Femerling, 2013: 43-45) have totally changed with acceleration of container usage (Zeng and Yang, 2002: 164). In examined port selection and competition, the transshipment level of the port has been placed within primary criteria because, the transshipment level determines the level or port demand (Bae et al., 2013: 480-481). The container transportation has faced operational changes since ports specialized in transshipment with emergence of intermodalism. This system allows hubs to be a particular point in the network and to facilitate container traffic. Soever the transshipment port selection of carriers is not primarily important for shippers; the some attributions such as cost and transit time implicitly influence other port users (Lun et al., 2010: 138-144).

The distance variable that obviously influence port attractiveness (Malchow and Kanafani, 2001: 270) is critical and addresses the overland distance covered between the point of origin of the freight and the final destination Menéndez and Valero, 2009: 251-252). The increasing distance may trigger the transit time and both the operating cost of carrier and the cost passed to the shipper from the carrier (Malchow and Kanafani, 2001: 272-273). Menéndez and Valero (2009) indicate that the overland distance at destination is deemed more important than the overland distance at the point of origin; but considering distribution of cargoes as the main objective of intermodal transport chains, geographic distance still matters. Ng et al. (2013) state that at the operational level, the decision of port selection is restrained by distance between hinterland and port. Low and Tang (2012) indicate the distance and accessibility of the port with other nodes is important for liner shipping network and liners' decision. Cho et al. (2010) also point out that accessibility and land distance of ports generally determine competitive advantage of ports that are integrated within logistics centers.

Today container ports as the important links of supply chain are part of a set of organizations that create value to end consumers by competing for efficiency and location and also or supply chains of shippers (Robinson, 2002: 241-242). Supply chain oriented port approach is more needed for port selection because port choice is related with network costs. Therefore entire network is related to port selection criteria. The selected ports should minimize overall costs including inventory, sea,

port and inland costs of shippers (Notteboom, 2008: 6-9). Since port selection is derived choice from the selection of supply chains by port users (Robinson, 2008: 12), the essential supply chain that is chosen by the shipper would be that supply chain for which shipments incur the least logistics costs. The selected supply chain would also provide greater competitive advantage to the shipper, not only in terms of lower logistics costs, but also in terms of enhancing its market value (Song and Panayides, 2008: 75-76). In other words, supply chain includes ports and so that decision on supply chain selecting naturally involves port selection (Robinson, 2008: 13). The issue is to select a port from a cluster of ports which are serving in a certain supply chain.

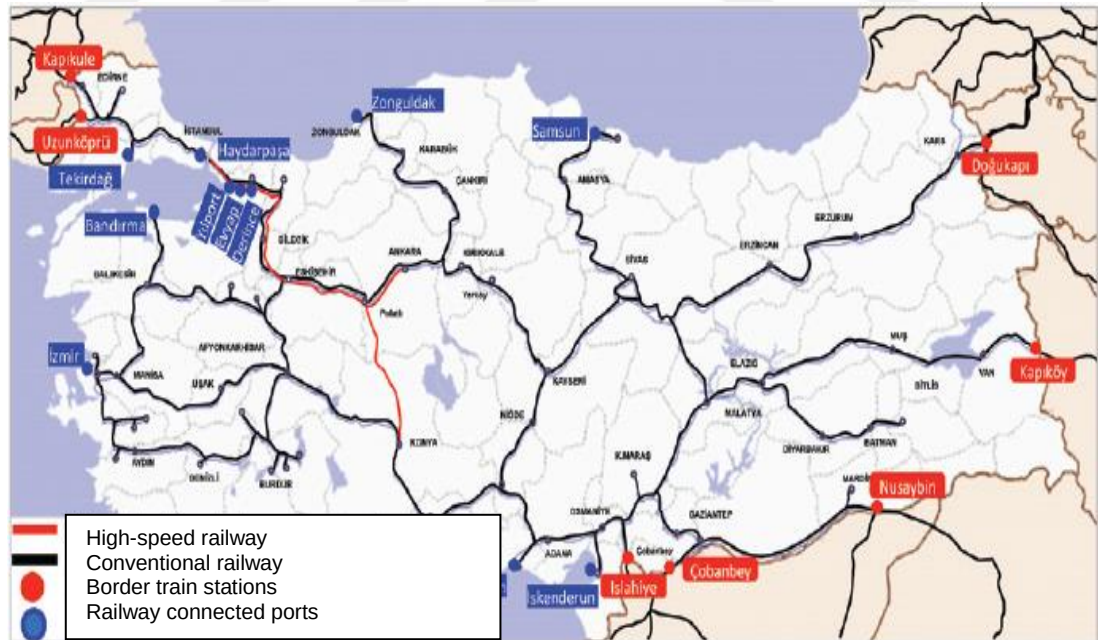
Port performance interlaced with performance of inland networks. It is clear that port selection process of both shippers and carriers is strongly influenced by inland transport operations of the hinterland (Wan et al., 2013: 417). It should be noted that better land corridor is determinant in shippers' preference. Therefore road conditions (Blyde and Iberti, 2014: 4), maintenance degree and quality are seen as avoiding some additional costs. Beside its physical quality, road transport quality also means the smooth flow of goods on a specific corridor (Fawie, 2008: 78-81). On the other hand quality of information provided from road transport operations contributes to decision making (Popovic and Habjan, 2012: 1309). Although there is a negative relation between domestic transport cost and commerce, developing quality and conditions of road decrease the transportation costs with the effects of; first increasing speed that reduce time-based costs, and second lower cargo damage risk (Blyde, 2013: 664-667; Blyde and Iberti, 2014: 13-15).

For a port development rail integration is a key factor for economic, environmental and competitive conditions. The development of port to rail accession does not only change the modal split share, but also constitutes a healthy competition (Eliza et al., 2013: 40). And the rail connection of port to dryports and logistics centers is a strategic element of port development. Rail transportation helps to solve problems in hinterland infrastructure such as economies, congestion and lack of space. One of the positive effects of integrating rail and maritime transport is first of all the increase of the area that can be serviced. Decrease of congestion in ports could be achieved by increased utilization of resources, predictability of service, improved transit times, strengthening of the supply chain, enhanced competitiveness of ports (Eliza et al., 2013: 40). The long-term agreements between rail freight operators and carriers have caused increasing competitive level with new

routes and innovative marketing. The cost efficiency of rail transportation is concerned by shippers as rising element of port selection (Woodburn, 2007: 323-327). Besides, the increasing environmental awareness and corporate social responsibility have resulted in shifting from road freight to rail haulage (Woodburn, 2008: 445).

There are particular advantages and disadvantages per each transport mode. However, as substitutes of road and rail inland waterway and air transportation have major share especially for containerization (Mangan et al., 2008: 34-135). Air freight is an alternative mode of transport for transit cargo, essentially high value and perishable cargoes. Indeed air cargoes are transported by passenger aircraft, and extra handling costs, loss and damage are incurred, and cargo capacity is limited. Furthermore aircraft do not provide reliable service for cargoes because they earn more by carrying passengers (Fawei, 2008: 84-85; Mangan et al., 2008: 136). The initial advantage of air is speed, and fixed cost lower even though the variable cost of air freight such as fuel, maintenance, security requirements, etc., is high (Mangan et al., 2008: 136-138).

Figure 5: Railway Connected Ports and Border Stations in Turkey



Source: TCDD (2014): 83

According to Figure 5, in Turkey, there are capable railway connections for only 11 ports. These are Haydarpaşa, Derince, İzmir, Bandırma, Mersin, Samsun,

İskenderun, Tekirdağ, Zonguldak, Yılport, and Evyap. However only 6 of these ports have been chosen in the study: İzmir Alsancak, Mersin, İskenderun, Samsun, Evyap and Yılport.

Figure 6 also shows road networks of Turkey. These networks connect several intermodal transportation projects from Europe to Africa and Asia.

Figure 6: Road Networks in Turkey



Source: UDH (2014): 41

Although maritime transportation has a great share in distribution of Turkey's import (of 94%) and export (of 73%) activities, for the shipment within Turkey scenario is dramatically different. In 2010, almost 90% of commodity transportation has been performed by road haulage. It is distinct that for more efficient intermodal transportation applications sea transportation should be used higher in countrywide good exchange. On the other hand, the negative effects of road transportation such as accidents, noise, traffic problems, environmental pollution etc. would be removed with minimizing road usage and maximize maritime transportation. The rail transport network is totally 11.490 km and share of railways in cargo distribution is only 5.3%. However, national railways are located on the organized industrial zones and

logistics centers. Therefore, the usage of railway supported maritime transportation should be widened and to increase profitability (UHD, 2014: 35-38)

There are 20 logistics village establishment projects. These are; 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) and Bitlis (Tatvan). These places have been selected because these places have organized industrial zones related intense cargo carriage potential (Figure 7).

Figure 7: Logistics Centers in Turkey



Source: TCDD (2014): 45

Only Samsun, Uşak, Denizli (Kaklık), Köseköy, Halkalı and Eskişehir (Hasanbey) have been entered into activity; on the other hand Balıkesir, Bozüyük, Mardin, Erzurum, Mersin (Yenice) and İzmir (Kemalpaşa) are in process of construction. The auctions, projects and nationalization exercises of other logistics center are maintained (TCDD, 2014: 45-46).

Table 6 illustrates that the distance from cities in selected hinterland to selected ports. It is obvious that for these cities there is both inter-port and intra-port competition exist in terms of road distance; however only road distance is not meaningful to explain competitive level.

Table 6: Distance between Selected Hinterland and Ports

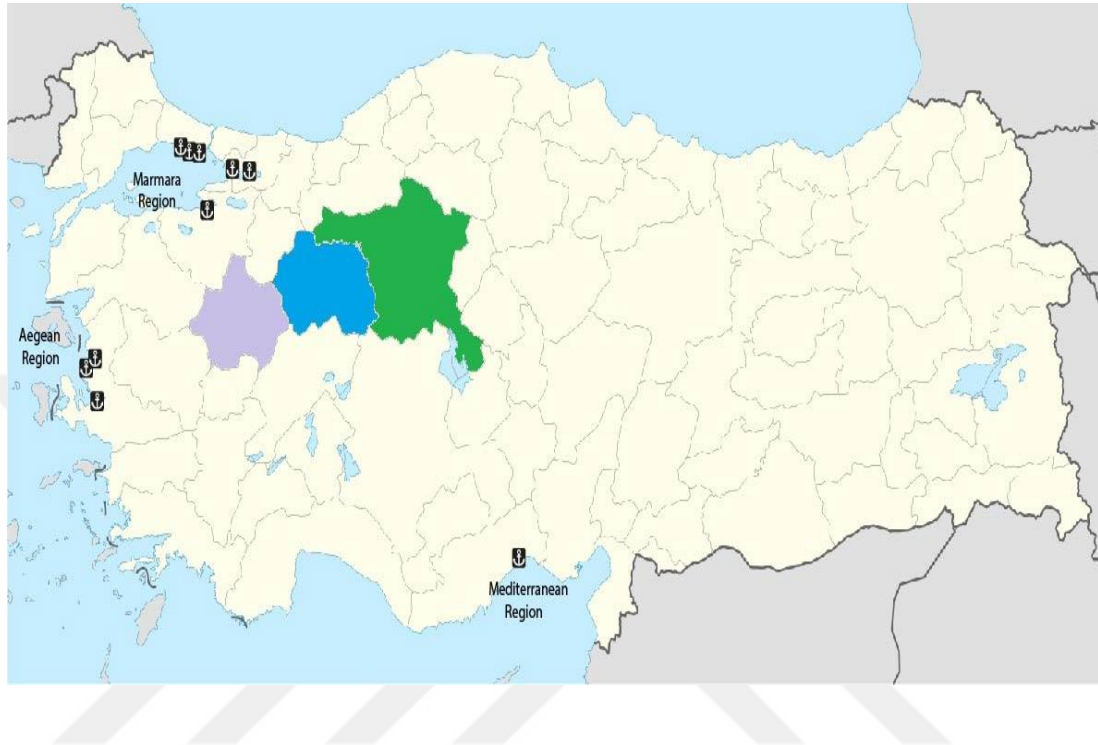
City	Port	Distance (km)
Ankara OSB	Alsancak	578
	TCEEGE	616
	Nemport	617
	Port of Mersin	501
	Mardaş	475
	Gemport	412
	Evyap Port	355
	Marport	474
	Yılport	337
	Kumport	474
Eskişehir OSB	Alsancak	423
	TCEEGE	461
	Nemport	462
	Port of Mersin	659
	Mardaş	370
	Gemport	190
	Evyap Port	250
	Marport	369
	Yılport	233
	Kumport	369
Kütahya OSB	Alsancak	337
	TCEEGE	375
	Nemport	376
	Port of Mersin	681
	Mardaş	403
	Gemport	223
	Evyap Port	283
	Marport	402
	Yılport	265
	Kumport	402

Source: Calculated via Google Maps

In figure 8, ports and contestability of the selected hinterlands are projected. The green city is Ankara, blue city is Eskişehir; and gray city is Kütahya. Marmara Region involves Marport, Kumport, and Mardaş at the northern side; Yılport and Evyap port at the eastern side; Gemport at the southern side. Aegean Region

contains İzmir Alsancak Port, TCEECE Container Port, and Nempt; and Mediterranean Region includes Mersin International port.

Figure 8: Illustration of Selected Hinterlands and Ports on Map



3.2.2 Port Physical and Technical Infrastructure and Superstructure

Port physical and technical infrastructure is (Wiegman et al., 2008: 523):

- nautical accessibility profile
- terminal infrastructure
- hinterland accessibility profile

Port infrastructure is an important part of international cargo flow. At present, increase in world trade lead an increase in both port and hinterland operations (Taneja et al., 2014: 42-43). The fact is that, port infrastructure are nearly an economic source both for managers and users (Maresca, 2013: 141). For infrastructure perspective, not only number of container berths, cranes, tugs and size of terminal area but also the quality of cranes, quality and effectiveness of information systems, availability of inter-modal transport, the approach channel are indicated (Tongzon and Ganesalingam, 1994: 317-319).

The level of infrastructure has important affect on decreasing freight rates (Wilmsmeier and Hoffmann, 2008: 150). The port congestion and inefficiency occur

when volumes handled exceed handling capacity of port. It dissatisfies port users. Therefore sufficient infrastructure diminishes maritime transport costs by eliminating port congestion and ship waiting time (Sanchez et al., 2003: 199-203). Lack of competent equipment results in increasing costs and turnaround time for shipping lines. To reduce these costs, there is a requirement for developing port infrastructure (Fawei, 2008: 93-95). For attracting more customers should serve dependently upon customers' requirements and develop infrastructure. Ports that invested in port infrastructure would endeavour to survive in fierce competition (Feng et al., 2012: 492-506). The physical infrastructure is crucial for both port and economy of the hinterland it serves (Sanchez and Wilmsmeier, 2010: 20-21). Feng et al. (2012) states that port ownership should be varied to decrease cost and develop infrastructure, to promote investment for improvement of infrastructure. Ports should establish more seaside and logistics links to attract more cargoes from the hinterland and to enhance port image.

Table 7: Transportation Infrastructure in Turkey

Transportation Superstructure	2014
Air Passengers	166 m.
Airports	52 (13 international)
Road Network	65.099 km
• Highway	2155 km
• National Highways	31.280 km
• Country Roads	32.474 km
Railway Network	12.097 km
• Conventional Line	11.029 km
• High-speed Line	888 km
Port Handling	386 m. (tons)
• Loading	116 m. (tons)
• Unloading	216 m. (tons)
• Transit	54 m. (tons)
Air Cargo	2.3 m. (tons)
• Inner-city	685.000 (tons)
• International	1.7 m. (tons)

Source: UHD and TÜİK (2014)

In Table 7 exhibited below, the situation of the Turkish transportation superstructure in 2014 is illustrated. It is remarkable that the enormous difference between road and rail network. Although railway is cheaper and more energy efficient, it is not given required attention for railways. Another spectacular difference is between loading and unloading rate of ports. In other words the import activities of Turkey are almost two times bigger than export activities.

3.2.3 Port Management and Administration

Talley (2009) explains the port governance as the ownership, management, and control of the operations of a port. A private organization or public may own the port. A governmentally owned port is managed by a port authority appointed by a governmental body. However a private port is managed by private owner, but the operations of port may be performed by its private owner, its representative or a company who leases port operations (Talley, 2009: 126).

Ports can be categorized as to their type of ownership or administration: state ownership, autonomous, municipal ownership, and private ownership (Alderton, 2005: 92-94).

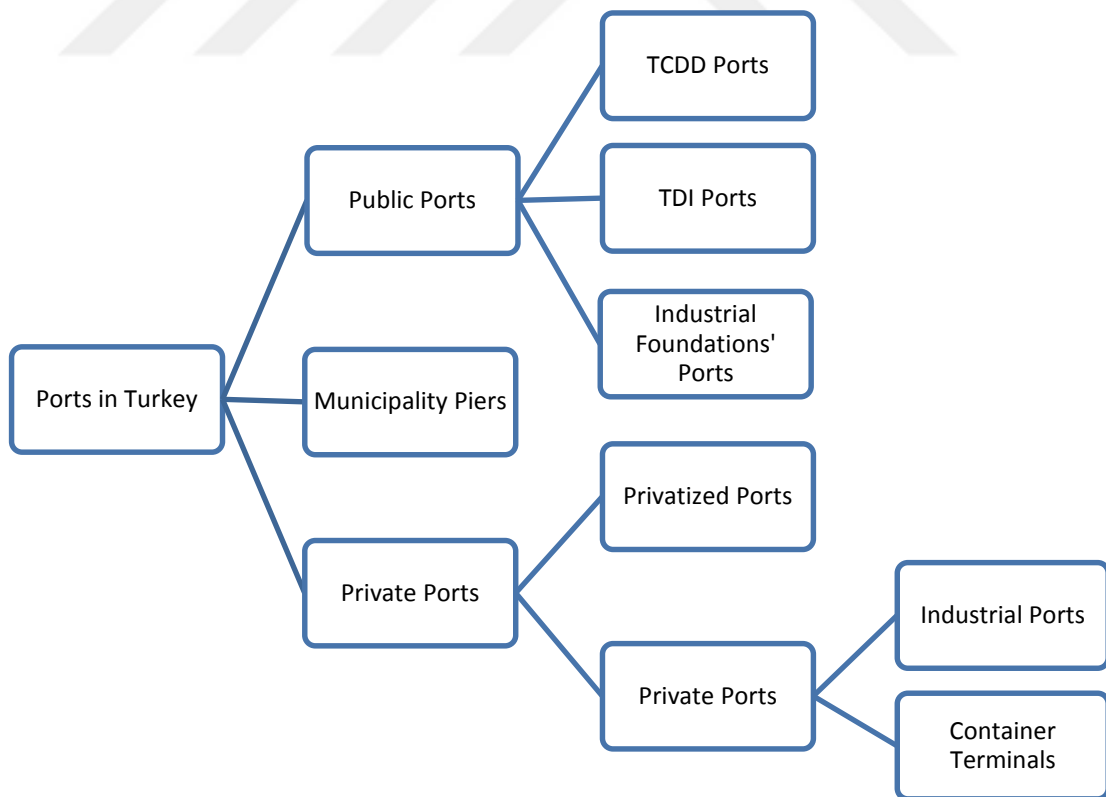
The World Bank Port Reform Toolkit (2001) also defines port management types as: the service port, the tool port, the landlord port, and the private port.

The service port is governmentally owned. A port authority that is found by government, drives port operations. The advantage of the service port is that only port authority is responsible for the port's services and decision-making processes. A disadvantage is that there is little or no private participation in the port's operations. Also lack of private competition would conclude in insufficient port operations. As for the tool port public owns land and all assets and port authority manages port. The port authority's crew runs port-owned equipment, but other handling activities such as moving cargo to and from vessels can be implemented by a private cargo handling company. A landlord port is also owned by government and managed by the port authority. However port authority gives up its control over port operations by leasing port's infrastructure to private terminal operators. The main advantage of landlord port is that private terminal operators are likely to be more responsive to changing market environment than port authority. A possible disadvantage is duplication in the marketing of the port to potential customers by the port authority and the private terminal operator. These four main groups help to

identify port users' selection. Quick response requirements of customers direct the users to prefer private involvement (Brooks, 2004: 165-170).

For the private port, land and infrastructure of a port is owned and managed by a private institution. The operational activities are also performed by a private operator. The main advantage of the privately owning port is that it is more and more flexible than public port in port operations, port marketing activities, decision-making, and investments. A disadvantage is the lack of government inclusion in port economic policies. Since a port improvement requires huge investments and capital so lack of the government involvement may give rise to problems in overcoming these needs. On the other hand privately owned ports and their operators tend to act in a monopolistic behaviour. Port monopoly in a hinterland makes difficult to alter transportation activities for port users. Hence, port selection of port users, especially shippers, is negatively affected from the monopoly. Otherwise, public involvement may also lead to dissatisfaction in service quality of selected port (Talley, 2009: 126-129).

Figure 9: Ports in Turkey Sorted by Management and Operating Type



Source: Ateş, 2014: 438; Sesli, 2008: 82

3.2.4 Port Service Quality

Port involves for both cargo and ship services such as pilotage, towage and mooring, all cargo handling operations and passenger services (Luttenberger, 2010: 1034). According to the ISO series, the quality of ports is defined as the provision of services that meet customer expectations (Pantouvakis, 2006: 405). The service quality issue is closely associated with the efficient port operations (Gifford and Stalebrick, 2002: 647). The service quality is one of the five major evaluation criteria for the service performance of container ports. The degree of service quality interacts with level of service performance (Chou, 2009: 927-928). The competitive level of a port is determined with the service quality level rather than traditional factors (Cho et al., 2010: 919). As well as price, port service quality is one of the essential factors in which port users select the port. Port service quality is complemented with efficiency and price performance to acquire an absolute advantage in competition port (Luttenberger, 2010: 1035-1039). Slack (1985) also states that port selection seems to be based more on service quality alongside price. The logistics service quality and effective integration of transport systems offered by port have also become more important (Yeo and Song, 2006: 409).

Different users perceive the service quality in different ways, thus communication between port and its customer enable the enhanced customer-focus of services. The service quality in container handling is deemed as one of the major factors for customer satisfaction that is directly related with the port services (Ugboma et al., 2007: 334-336). In order to strengthen the existing customers and to influence new customers it should be understood the principals of port service quality, and these services should be utilized to improve favourable marketing strategies (Cho et al., 2010: 919-920). On the other hand as the port competition has evolved, service quality has been given a great significance in determination of market share, return on investment and cost reduction; hence it is seen as critical to institutional success. Customer satisfaction pioneers to market share and profits. Inefficient port operations result in shifting of customers to the rivalries, because this situation causes increase in port charges and weak performance of port operations. These two factors impact the delivery position of port services (Ugboma et al., 2007: 331-334).

Ports are also anticipated to respond quickly to customers' problems and needs. That is to say, ports should monitor and realize requirements of the port

users to provide faster solutions to them in competitive edge (Tongzon, 2009: 189). D'Este and Meyrick (1992), Ugboma et al. (2006) and De Langen (2007) have also identified "customer focus or quick response to users' needs" as one of the factors considered by shippers and freight forwarders in their port selection decisions.

Nir et al. (2003) pointed out loss and damage performance has been determined as the most important one from nine factors. Cargo damage is notable criteria in port service quality (Yeo et al., 2014: 253). Cargo safety consideration can be a more effective factor than actual safety in competitiveness. Customers' choice directly impact from the reputation of the safety issues -especially unsafe cargo handling- of port. Hence, marketing tools are used in announcing port's features to improve overall reputation. In this way, the achievements of the ensuring customer loyalty are provided in terms of service quality and reliability (D'Este and Meyrick, 1992: 115-120).

Port logistics, as a part of overall port service quality, hold a critical position in the global supply chain. There may be port competition for same customers in cargo flow uncertainty. These elements cause to a considerable fluctuation in port logistics market (Tian et al., 2013: 685-686). Due to high level of competition in port industry, port functions have exceeded the classical port services with the effects of logistics integration into service attributes of port. Door-to-door service ability that is obtained with port logistics is assumed one of the several attractions of port services in port selection of port users (Yang et al., 2013: 396).

Shippers derived value from distributing cargo through that port; and shippers would select that port and its related service suppliers in a door-to-door logistics pathway which delivered adequate value on a sustainable essence (Robinson, 2002: 245-246). Even though ports have several functions, some services and activities can take place within ports and these operations create different value. Furthermore, many ports have concentrated in value-added services after widespread logistics integration in strong competitive environment (Feng and Hsieh, 2010: 584). As competitiveness have become an increasing trend in port industry, value creation concept of supply chain has become relevant with port industry integrated to the chain (Song and Parola, 2015: 189). Ports compete not basically on the operational efficiency or location that offers shippers greater value. Chains compete, not individual ports. In fact, the port's value suggestion is lined up with the value proposal of its shippers (Robinson, 2002: 250). Following the change in role of ports, port services are required value-added activities such as labeling,

assembling, semi-manufacturing and some kinds of integrated services associated with industrial activities. However, these sectors may tend to cluster within ports, and locational clustering of these industries may increase competitive level of ports (Feng and Hsieh, 2010: 586).

3.2.5 Port Efficiency and Productivity

Port service frequency and time factor is substantial for freight forwarding (Lam and Dai, 2012: 511). Even if an ocean carriers' service frequency critically attracts shippers in port selection, shippers and freight forwarders may be influenced via high efficiency of port services (Lam and Dai, 2012: 511; Tongzon, 2002: 4).

In literature, three types of efficiency were discussed: technical, allocative, and overall efficiency. Technical efficiency is described as acquiring highest level of productivity with the current inputs; in this perspective no idle resource is acceptable. Allocative efficiency is to produce or serve what customers want. Overall efficiency is defined as maximization of both technical and allocative efficiency (Pagano et al., 2013: 102-103). However, port efficiency can be measured as operational and customer-oriented. Operational efficiency measures are related with capital and labour productivity alongside utilization of asset. The customer-oriented measures involve direct charges, ship's waiting time, removal of delays in land transportation, and reliable service (Tongzon and Ganesalingam, 1994: 319-326).

Performance measurement mostly relies on productivity and efficiency. These two concepts can frequently be used interchangeably. Even though they are related with each other and they are used for benchmarking of ports, productivity and efficiency are different notions. Productivity is the ratio of acquired products and factors used in the production; efficiency is the capacity to produce without wasting materials, time or energy. Port efficiency may be promoted by increasing speed of cargo handling activities, accessibility of port, level modal split, and by decreasing managerial procedures and customs. Insufficient port access cause to change in preferences of port users between competitive port, even between transport modes (Suárez-Alemán and Hernández, 2014: 463). Port efficiency may be reflected in the freight rates of ocean carriers, in turnaround time and cargo dwelling time. The long waiting time of a vessel results in extra costs that are obviously reflected to freight

charges of shipping lines. The inefficiency of a port directly influences shipping lines' services and indirectly influences shippers' decisions (Tongzon, 2002: 4-7).

Hinterland competition of ports, effective policies, and institutional relationship have a considerable effect on port performance (Cheon, 2009: 86-87). UNCTAD suggests two categories of port performance indicators: macro performance indicators which represent port impacts on economic activity, and micro performance indicators evaluating input/output ratio measurements of port operations (Bichou and Gray, 2004: 48-50).

Efficiency of ports can constitute a distinguished impact in decrement of the period of vessel stay at port; finally, port efficiency also can cause customer satisfaction, demand increase and profitability rising up (Jafari et al., 2014: 255). It is clear that port efficiency is initially important in competition, and appropriate performance of port determines the success level (Suárez-Alemán and Hernández, 2014: 474).

Port congestion ultimately affects service quality and port performance. There are two main approaches to the problem of port congestion. First, it should be invested in more capacity, and hence growing capacity of port increase service quality but it attracts more cargo traffic at the port. Second one is to be incurred higher service charges to reduce demand for port services (Xiao et al., 2012: 630). It is also called as port congestion price that associates demand-based and variable-cost strategies, thus putting it into practice to modulate port demand with the actual supply (Bichou, 2009: 124-125). Port congestion is most probably to be in topic in next years, if this progression continues. In general, congestion creates coordination conflicts between parties within the process. In the short term if capacity is over-utilized, coordination among different intra-port gears and speed of termination of vessels' transactions are the only overcoming for struggle congestion (De and Ghosh, 2003: 9).

Congestion is the one important source of delays in ship scheduling. The total ship turnaround time that is correlated with berth*side efficiency is another important determinant on deciding whether a shipper should select because they lead indirect cost (Ng et al., 2013: 153). Port waiting time cause that "port queuing costs" arise if port demand surpass port's resources; thus congestion pricing has been adjusted to augment utilization of port's assets when queuing congestion occurs (Talley, 2009: 116). Congestion may also occur at a port's inland gate (Talley, 2009: 96). When considering inland competition, differences in port

congestion encourages switching when the market has access to two or more ports (Fan et al., 2012: 480).

According to Ateş and Esmer (2014), the most effective port is Evyap Port although its total cargo handling rate is low. Table 8 shows the containerized cargo handling capacity of Turkish ports divided into regions.

Table 8: Regional Container Handling Capacity of Turkish Ports (2015)

Region	Current Capacity (TEU)
Marmara	6.100.000
Aegean	1.760.000
Mediterranean	2.720.000
Black sea	505.000
Total	11.085.000

Source: IMEAK DTO, 2015: 3

Besides, conclusions of their study illustrates that Kumport, which is one of the ports that can handle more than 1 m. TEU, is not effective. One another important result is that more efficient ports are located near to the industrial zones; also ports that have weak network with their hinterland and that is not integrated to world trade lines are the least efficient ports. However if it should be considered overall Turkish container ports, the effective capacity usage and efficiency is not sufficient (Ateş and Esmer, 2014: 71-72).

3.2.6 Port Tariffs and Costs

Cost of transportation of a product from origin to destination, and port selection generate cost component of supply chain routing (Notteboom, 2008: 6). The customers mostly regard price of goods or services as selection criteria. In port industry, carriers and shippers consider that port fees and tariffs particularly increase the total transportation cost. The tariffs and transshipment activities are vital for the port demand. Both shipping lines and shippers seek for lower service charges; however increasing size of ships, developing technology of ships and handling systems; and the hunger of exploiting economies of scale have made the

cargo handling service charges as the most important port service and initial determinant of a ports competitive position (Bae et al., 2013: 480; Tongzon and Heng, 2005: 409).

The over-utilized port capacity force many port authorities to adopt their port charges for attracting more shippers and carriers. The port charges, broadly, refer to fees, tariffs, and surcharges collecting from vessels and cargoes. There are different types of port charges. These charges may differ between ports. These charges are categorized into two main group as compulsory and noncompulsory. Compulsory charges are collected whenever a ship enters a port, whereas noncompulsory charges are collected only when specific services are rendered to the vessel. Those are based on the ship's capacity in registered tons, its length and draft, and its commercial load, which involves cargo delivered or taken on. Terminal handling charges are levied on cargoes with different rates for different cargoes. These charges may usually vary depending on port's ownership, location, policy, marketing strategy, and the size/type of a vessel. Along with costs of investment, operation, and maintenance; level of competition is also another important consideration in adjusting port charges (Park and Min, 2014: 34-35; Tongzon, 2002: 6-7; Tongzon, 2009: 189).

To capture a hinterland port charges have a particular role in increasing port's inter-port competitive level, so that, all else held constant, lower fee influences more shippers and carriers (Ishii et al., 2013: 92). The service charge arrangement can be up to demand level or strategic behaviour especially for high price levels. The growing competitive environment of ports obliges ports to make more capacity investment and to collect less profitable price level (Xiao et al., 2012: 630).

Zan (1999) finds out that port charges are one of the most important elements in carriers' port selection. With a domino effect, this decision also impacts shippers' choices and attitudes. Tolofari et al (1987) suggest that cost structure of ports influence carriers' decisions. Park and Min (2014) state that port choice of shipping lines are not highly sensitive to increase and decrease of port tariffs because the elasticity of port fees on port traffic is not as high as it was expected. Therefore port side should focus on promotions of its services and develop infrastructure hinterland connections.

Otherwise, shipper side is shaped a little bit different than carriers' choices. Although port charges are principal factors in shippers' port selection, overall costs that means, the total logistics costs incurred after selection of a port, have become

more and more crucial for shippers. Shippers and forwarders are more related with indirect costs generating with delays, loss of market share, loss of customer confidence due to service inefficiency, than with port charges. That is to say, some users do not care high level of port charges, they only consider efficient, qualified, and reliable services (Tongzon, 2002: 6-7).

3.2.7 Number and Frequency of Shipping Lines Calling at Port

Ship scheduling and routing of a shipping line, which regularly serve between ports, is important activity for planning and operation of vessel operator. In the era of globalization, many supply chains exist. In order to meet shippers' requirements and maintain competitive level, liner shipping companies are anticipated to enhance their network (Lam, 2010: 34-37).

Port selection has shifted from shipper to carrier, ports realize that carriers concentrate directly in cost and time, and indirectly in economies of scale and just-in-time transportation. Therefore ports try to find ways to accommodate more carriers. In this way ports show some changes as (Luberoff et. al., 2000: 23-28):

- the dredging of terminal facilities to accommodate larger ships,
- the improvement of the process to reduce the cargo dwell time,
- the enhancement of terminal space to allow economies of scale, and
- the negotiation of port-throughput contracts favorable to larger volumes.

Some different attributes such as service quality, loading/discharging rate, and handling charges are important for shipping lines. Whether the terminal is publicly or privately owned is not a significant issue for container lines. Besides, their personal contacts are not given any considerations. Today's liners that operate larger and more modern ships seek for shorter berthing periods. Therefore ports should invest in equipment to enhance handling speed (Saeed, 2009: 280-288).

When it is obtained particular cost advantages from inland distribution, a ship call at a neighboring port can increase very few the marine distance of cargo distribution. Ports that can accommodate larger ships while maintaining rapid ship turnaround times will likely see an augmentation in the number of calls by larger vessels. Inversely for ports with big enough draft, ports with lower draft will most probably exercise a diminish in ship call as dimensions of vessels increase. If a port in a port range charges substantially lower port fees to ocean carriers than another port in this port range, the greater is the likelihood that the former port will be

selected by carrier over the latter port in this port range. Also, if one port has great inland distribution networks, existing port relationships with container lines, and closer access to trade routes, the given shipping line tends to prefer this port. Ceteris paribus, if one port in a range of ports is subject to less port government regulation than another port, the former will more likely be selected as the port of call in this range than the latter. Port calls may also be influenced by mergers, acquisitions, and alliances in the shipping line industry. (Talley, 2009: 65-71).

One of the important issues in port selecting by carriers is ship scheduling. Therefore service route planning has crucial significance in liner shipping. The route planning procedure is regarded to consist of five steps as follows (Ting and Tzeng, 2003: 381-389):

- Deciding service scope and route type
- Deciding fleet mix by number and size of ships
- Choosing candidate ports of call
- Ship routing and scheduling
- Cost and profitability analysis

CHAPTER FOUR

RESEARCH METHODOLOGY

4.1 AIM AND SCOPE OF THE STUDY

As port competition has been increasing rapidly in recent decades, container terminals do not only compete for transshipment cargoes but also for cargoes in the contestable hinterlands. Understanding selection criteria of port users is significantly important for container terminals to be competitive. Therefore, the main aim of this study is to investigate port selection criteria of port users in contestable hinterlands and make implications for port competition in contestable hinterlands. An important objective of this study is to develop a scale for measuring port selection criteria in contestable hinterlands. Another objective of the study is to measure perceptions of freight forwarders for port selection in contestable hinterlands.

Another important aspect of this study is to implement the survey in a certain region in Turkey where the hinterland is considered to be contestable. The scope of the study is limited with shipments performed in cities of Ankara, Eskişehir and Kütahya. These cities were chosen since they are located in a contestable hinterland where shippers use container terminals located in Marmara Region, İzmir and Mersin for their shipments either as export or import. Therefore, the survey of this study was implemented on freight forwarders who are active in this region for handling the shipments of their customers.

4.2 QUESTIONNAIRE DEVELOPMENT AND DESIGN

The primary data collection method of this study is questionnaire survey. In order to determine the variables used in questionnaire, relevant literature on port selection criteria was reviewed. The port selection literature, especially port selection by shippers and forwarders were taken into consideration in the questionnaire development. Total 24 researches were on port selection criteria were found in the literature as shown in Table 5 in Chapter 3. From this literature, it was found that 16 of the researches are related with either shipper, forwarder or both perspectives. The variables used for measuring port selection by forwarders were discussed with 5 experienced freight forwarders through interviews in terms of their clarity and appropriateness of their content.

Table 9: Port Selection Variables Used in the Questionnaire

Criteria	
1.	Road connection of port
2.	Railway connection of port
3.	Size of warehousing area at port
4.	Information technologies used at port
5.	Number of port equipment
6.	Quality and technology of port equipment
7.	Reefer cargo warehousing capacity of port
8.	Port administration type
9.	Features of port operating company
10.	Value added services at port
11.	Reliability of services given by port
12.	Corporate social responsibility projects of port
13.	Green port applications of the port
14.	Logistics services given at port
15.	Flexibility of ports for specific requirements of customers
16.	Customized services for customers
17.	Information provided for shipment of shippers
18.	Performance of port about cargo loss and damage
19.	Safety of port
20.	Quick response to users' problem
21.	Relation dated to back between port and your company
22.	Attitude and behaviour of port personnel
23.	Experience, ability and competence of port personnel
24.	Congestion at port
25.	Total turnaround time
26.	Duration of average container loading/unloading
27.	Distance of port to cargo origin and destination port
28.	Distance between port and airport
29.	Total port tariffs and costs
30.	Flexibility of port in pricing
31.	Ease of payment for customers
32.	Total logistics cost occurring due to port choice
33.	Number of container lines calling the port
34.	Frequency of sailings
35.	Total transit time of cargo

As Bryman (2012: 171) suggests, the interviews helped the researcher to ensure face validity of scale. Necessary adjustments and corrections were made in

the questionnaire according to views and comments of freight forwarders and academicians. The list of selection criteria is presented as above in Table 9.

The variables used for port selection with shipper and forwarder perspectives were found to be concentrated under 7 main constructs as shown in Table 10. These 7 main constructs include total 35 variables as shown in Table 9. These constructs and variables are taken from literature according to their adoptability to the Turkish port competition. The criteria of port selection suggested by literature have been adjusted up to Turkey's condition. Confirmatory factor analysis was implemented to ensure that grouping of 35 variables under 7 main constructs was valid. The 35 variables were reduced to 32 to enhance model fit by deleting three variables: "Relation dated to back between port and your company", "Duration of average container loading/unloading", "Distance between port and airport".

Table 10: Main Port Selection Criteria

1.	Port location and hinterland connections
2.	Port physical and technical infrastructure and superstructure
3.	Port management and administration
4.	Service quality of port
5.	Port efficiency and productivity
6.	Port tariffs and cost
7.	Number and frequency of shipping lines calling at port

The questionnaire was carried out in Turkish as all the respondents are located in Turkey. The final version of the questionnaire was tested by a pilot study with 12 freight forwarders. Wordings of 3 variables in the questionnaire was slightly changed and clarified in order to increase understandability. The questionnaire consists of two sections. In the first section of the questionnaire profile questions of forwarders were asked to respondents including their experience and the ports they work with. The second part includes 32 port selection variables of freight forwarders.

Interval scale was used for the questionnaire to weigh importance of each criterion for port selection. In the likert scale, 1 means "not at all important" and 5 means "very important".

4.3 DATA SAMPLING

Since this study was implemented within the context of business-to-business market (Malhotra, 2008) and considering the purpose of study judgmental sampling method was chosen. The sample used in the study was obtained from the population of freight forwarders in Turkey to determine port selection criteria of users in contestable hinterlands. Freight forwarders were chosen as respondents of the survey as they act as an intermediary between shippers and shipping lines as well as they are considered as agents of shippers. In addition to this freight forwarders are also regarded as contractual carriers and important users of ports. Besides, freight forwarders either significantly influence the decision of shippers or makes buying decision of port service on behalf of shippers. These characteristics of freight forwarders enable them to gain substantial knowledge about needs and wants of shippers in all logistics aspects including their port selection criteria. In addition, freight forwarders are considered as logistics professionals having significant expertise, experience and insights in logistics, shipping and port market.

The member list of Association of International Forwarding and Logistics Service Providers (UTİKAD) was used to determine population and sampling of the study. At the time of conducting the study, total number of freight forwarders who are member of UTİKAD was determined as 408. However, these members were consisted of not only freight forwarders dealing with sea transportation but also other logistics providers such as road transportation companies and air freight forwarders. An e-mail was sent to UTİKAD to determine total number of members offering sea transportation service. A list of 132 freight forwarders was received from UTİKAD and these companies were included in the study.

4.4 DATA COLLECTION

The data was collected through self-completion internet based questionnaire in the study (Bryman, 2012). Freight forwarders in the sample were called by phone and the e-mails of relevant people were received. Accordingly, the questionnaire was sent to 132 companies from the sample. The questionnaire was sent through e-mails including a link which directs respondents to a website created at Google Forms. This online method of replying questionnaire was preferred to ensure ease

of responding for freight forwarders. Total 74 usable questionnaires were received from 52 companies. It means that total response rate was 39.4%.

4.5 DATA ANALYSIS

In this study, the data was analyzed by using SPSS version 21.0 statistics program. In the analysis, first related descriptive statistics were performed. Means, frequencies, percentages and standard deviations were calculated. In addition to these, one-way Anova test was performed whether port selection criteria change or not based on respondents' experience. Then, confirmatory factor analysis was performed to ensure structural validity of the model.

4.6 RELIABILITY AND VALIDITY

4.6.1 Reliability Analysis

Reliability of a research examines if the results of study are repeatable. In social sciences, it tests if the measures developed for concepts are consistent (Bryman, 2012). According to Bryman (2012), there are three different types of reliability. These are stability (test-retest), internal-reliability and inter-observer reliability. The reliability of scale of this study was ensured by internal reliability. In order to test the internal reliability of the study, Cronbach's alpha was performed. The Cronbach's alpha (α) method is a popular method to find out internal reliability analysis. The acceptable value of Cronbach's alpha is usually considered to be 0,70. The Cronbach's alpha value of this study is 0,917 over 32 items; thus the scale can be defined as reliable.

Table 11: Reliability Analysis of the Study

Cronbach's Alpha	Number of Items
0,917	32

However only the Cronbach alpha value is not enough to explain reliability, therefore each question must individually be investigated in terms of their support to

reliability to make an accurate evaluation. Moreover, reliability analysis must be checked what if a question is deleted.

Table 12: Reliability Analysis of the Study If Any Item Deleted

	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Cronbach's Alpha if Item Deleted
Road Connection of Port	129,85	229,772	0,413	0,915
Railway Connection of Port	131,01	218,945	0,497	0,914
Size of Warehousing Area at Port	130,55	223,511	0,465	0,914
Information Technologies Used at Port	130,47	217,595	0,673	0,911
Number of Port Equipment	130,2	222,054	0,644	0,912
Quality and Technology of Port Equipment	130,14	221,708	0,636	0,912
Reefer Cargo Warehousing Capacity of Port	130,8	221,616	0,486	0,914
Port Administration Type	130,78	224,72	0,296	0,918
Features of Port Operating Company	131,55	221,867	0,419	0,916
Value-added Services Given at Port	130,11	226,07	0,543	0,914
Reliability of Services Given by Port	129,95	226,572	0,527	0,914
Corporate Social Responsibility Projects of Port	131,64	211,879	0,647	0,911
Green Port Applications of Port	131,12	211,067	0,659	0,911
Logistics Services Given at Port	130,09	223,566	0,597	0,913
Flexibility of Port for Specific Requirement of Customers	130,15	225,553	0,497	0,914
Customized Services for Customers	130,42	220,055	0,579	0,913
Information Provided for Shipment of Shippers	130,28	225,987	0,44	0,915
Performance of Port About Cargo Loss and Damage	129,89	228,92	0,467	0,915
Safety of Port	129,96	223,081	0,66	0,912
Quick Response to Users' Problem	129,85	228,923	0,501	0,914
Attitude and Behaviour of Port Personal	130,51	220,774	0,57	0,913
Experience and Ability and Competence of Port Personal	129,97	225,643	0,552	0,914
Congestion at Port	129,82	230,147	0,4	0,915
Total Turnaround Time	130,3	221,828	0,488	0,914
Distance of Port to Cargo Origin and Destination	130,36	231,55	0,204	0,918
Total Port Tariff and Cost	130,2	222,958	0,461	0,914

Table 12: Reliability Analysis of the Study If Any Item Deleted (Continued)

	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlatio n	Cronbach' s Alpha if Item Deleted
Flexibility of Port in Pricing	130,26	226,55	0,374	0,916
Ease of Payment for Customers	130,57	215,81	0,627	0,912
Total Logistics Cost incurring due to Port Choice	130,05	226,819	0,49	0,914
Number of Container Lines Calling the Port	130,27	229,323	0,297	0,917
Frequency of Sailings	130,26	222,988	0,489	0,914
Total Transit Time for Cargo	130,19	231,471	0,257	0,917

According to Table 12, a significant change does not occur even if any item is deleted. However the table above shows that if some questions were deleted the reliability will dreamy be decrease. Only "Port Administration Type" and "Distance of Port to Cargo Origin and Destination" face 0.001 positive effects on reliability.

4.6.2 Validity

Validity is to ensure whether a research model developed to test a concept really reflects and measures it as envisaged (Bryman, 2012). Structural validity of our model in this research was ensured through three types of validity that includes content validity, convergent validity and discriminant validity as explained by Hair et al. (2010). Hair et al., (2010) also indicate that;

“Convergent validity means the extent to which indicators of a specific construct share a high proportion of variance in common and discriminant validity means the extent to which a construct is distinct from other construct”

Content validity ensured through including variables in relative literature and consulting these variables to experienced practitioners and academicians in shipping and port industry to assess appropriateness of them for measuring port selection criteria. The variables were also assessed with 3 academicians who have expertise on shipping and port business. We performed confirmatory factor analysis (CFA) in order to ensure convergent validity and discriminant validity. The results of the CFA will be explained in more detail in the findings part of the study.

4.7 CONFIRMATORY FACTOR ANALYSIS

CFA defined as a way of testing how well variables represent the smaller amount of constructs (Hair et al., 2010). Hair et al., (2010) explain that;

“CFA is applied to test the extent to which a researchers’ a-priory, theoretical pattern of factor loadings on prespecified constructs represent the actual data thus it tells us how well our theoretical specification of the factors matches the reality”.

Table 13: Grouping of Variables under Main Port Selection

Main Port Selection Criteria				Port Selection Variables
Port Location and Connections	and	Hinterland		Road Connection of Port
				Railway Connection of Port
				Distance of Port to Cargo Origin and Destination
Port Physical Infrastructure and Superstructure	and	Technical		Size of Warehousing Area at Port
				Information Technologies Used at Port
				Number of Port Equipment
				Quality and Technology of Port Equipment
Port Management and Administration				Reefer Cargo Warehousing Capacity of Port
				Port Management Type
Service Quality of Port				Feature of Port Operating Company
				Value-added Services Given at Port
				Reliability of Services Given by Port
				Corporate Social Responsibility of Port
				Green Port Applications of Port
				Logistics Services Given at Port
				Flexibility of Port for Specific Requirement of Customers
				Customized Services for Customers
				Information Provided for Shipment of Shippers
				Performance of Port About Cargo Loss and Damage
				Safety of Port
				Quick Response to Users Problem
				Attitude and Behavior of Port Personal
				Experience and Ability and Competence of Port Personal

Table 13: Grouping of Variables under Main Port Selection (Continued)

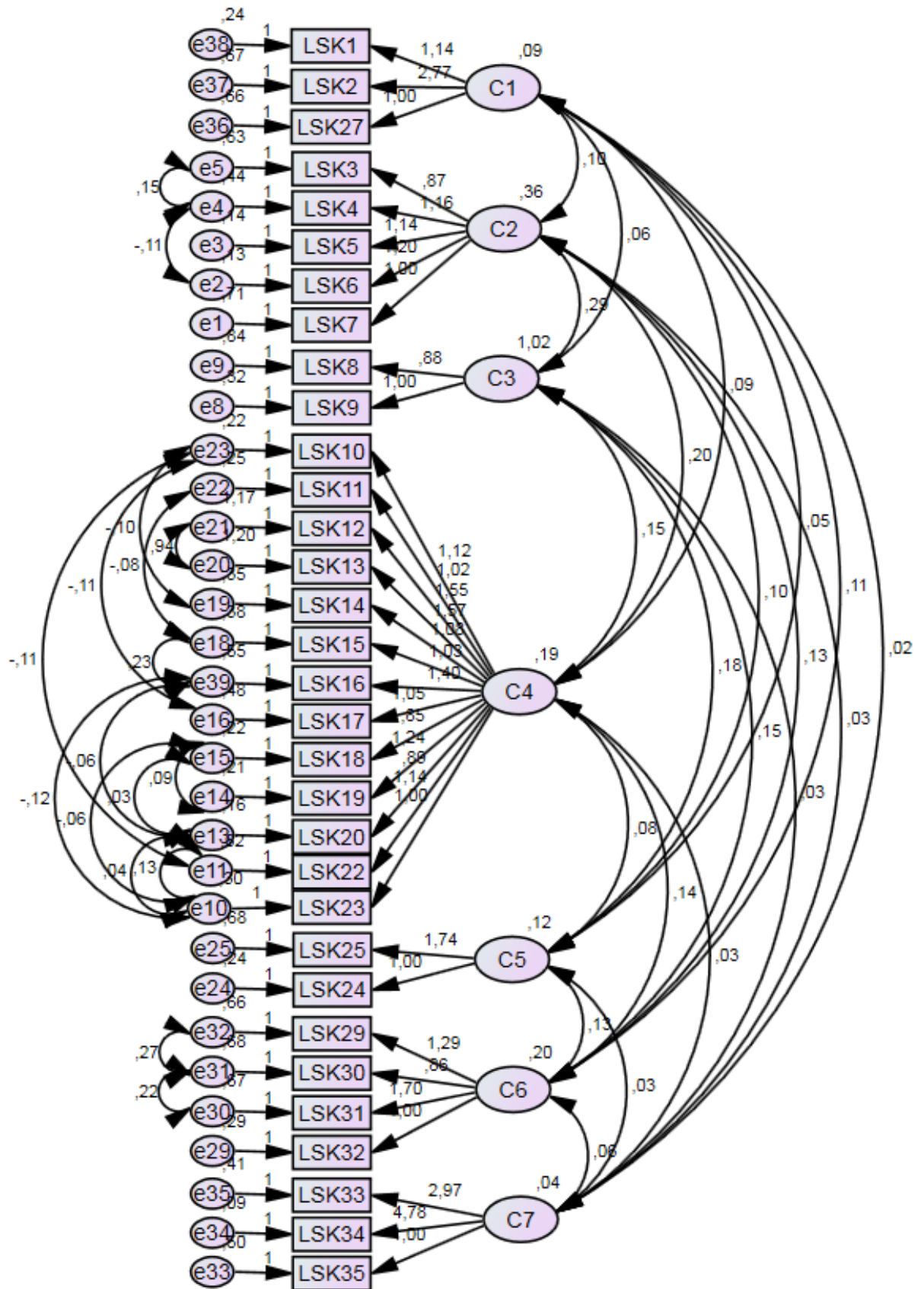
Main Port Selection Criteria	Port Selection Variables
Port Efficiency and Productivity	Congestion at Port
	Total Turnaround Time
Port Tariff and Costs	Total Port Tariff and Cost
	Flexibility of Port in Pricing
	Ease of Payment for Customers
	Total Logistics Cost incurred due to Port Choice
Number and Frequency of Shipping Lines Calling at Port	Number of Container Lines Calling the Port
	Frequency of Sailings
	Total Transit Time for Cargo

In this study there are 7 constructs and 32 variables that represent these constructs shown at Table 13 above (at the beginning there were 35 variables but it must have been deleted 3 of them in order to improve model fit).

Also, in the Figure 10, there are two headed arrows at the left side of the figure. These arrows show the co-variation of the error terms in the same constructs in order to increase the model fit. It was covariates the error terms that show high correlations in the same constructs as suggested by Hair et al. (2010) in order to improve the model fit.

It was performed Confirmatory Factor Analysis on the model in order to assess the convergent validity and the discriminant validity. In order to increase model fit, 3 of the 35 variables are deleted. Convergent and discriminant validity were tested through model fit indices, factor loadings and construct correlations, average variance extracted and construct validity which were presented in the above figure and tables.

Figure 10: Results of Confirmatory Factor Analysis



CFA presents range of information to test the convergent validity. Hair et al. (2010) indicated in order to ensure convergent validity factor loadings should be at least 0,5 and preferably higher than 0,7. Average Variance Extracted should be exceeding 0,5; and Construct Reliability values should be higher than 0,7. Table 14 presents the factor loadings. The lowest loading is the 0,85 which links the “Service Quality of Port” (C4) to the “Performance of Port about Cargo Loss and Damage” (LKS18). The other loadings are even higher than 0,85. They all are higher than 0,7.

Table 14: Standardized Factor Loadings

	C1	C2	C3	C4	C5	C6	C7
LKS1	1,14						
LKS2	2,77						
LKS27	1,00						
LKS3		0,87					
LKS4		1,16					
LKS5		1,14					
LKS6		1,20					
LKS7		1,00					
LKS8			0,88				
LKS9			1,00				
LKS10				1,12			
LKS11				1,02			
LKS12				1,55			
LKS13				1,57			
LKS14				1,08			
LKS15				1,09			
LKS16				1,40			
LKS17				1,05			
LKS18				0,85			
LKS19				1,24			
LKS20				0,88			
LKS22				1,14			
LKS23				1,00			
LKS25					1,74		
LKS24					1,00		
LKS29						1,29	
LKS30						0,86	
LKS31						1,70	

Table 14: Standardized Factor Loadings (Continued)

	C1	C2	C3	C4	C5	C6	C7
LKS32						2,00	
LKS33							2,97
LKS34							4,78
LKS35							1,00

Table 15: Construct Correlation Matrix

	C1	C2	C3	C4	C5	C6	C7
C1	1,00	0,10	0,06	0,09	0,05	0,11	0,02
C2		1,00	0,29	0,20	0,10	0,13	0,03
C3			1,00	0,15	0,18	0,15	0,03
C4				1,00	0,08	0,14	0,03
C5					1,00	0,13	0,03
C6						1,00	0,06
C7							1,00

The Average Variance Extracted estimates were presented in the Table 15. The AVE estimates range between 0,47 and 0,55. The three of the AVE values were slightly lower than the threshold value of 0,50 that indicated by Hair et al. (2010): 0,47 for “Port Location and Hinterland Connections” (C1) ; 0,47 for “Port Efficiency and Productivity” (C5) and 0,48 for “Port Management and Administration” (C3). The others were higher than the threshold value of 0,50.

Table 16: Average Variance Extracted and Construct Reliability

	C1	C2	C3	C4	C5	C6	C7
Average Variance Extracted	0,47	0,53	0,48	0,54	0,47	0,55	0,52
Composite Reliability	0,68	0,71	0,65	0,78	0,69	0,74	0,72

Construct Reliability values range between 0,65 and 0,78. The threshold value for construct reliability is the 0,7 (Hair et al., 2010). Table 16 shows the construct reliability values. The construct reliability values of the three of the constructs were slightly lower than this threshold value. Those include: 0,68 for “Port Location and Hinterland Connections” (C1); 0,65 for “Port Management and Administration” (C3) and 0,69 for “Port Efficiency and Productivity” (C5). The other values were higher than the threshold of 0,7.

Considering the convergent validity measures all together, the values confirms the model ensures the convergent validity. All factor loadings exceed the threshold value of 0,7. The three of the constructs' AVE values were slightly below the threshold of 0,5 and others seemed exceeding the threshold. Additionally, three of the construct reliability values were slightly below the threshold of 0,7 and others were seemed not harmful. In conclusion, all values of item that used for testing the convergent validity provides evidence that convergent validity of the model relatively ensured.

For examining the discriminant validity it is needed to check the correlations between constructs. According to Hair et al., (2010) for establishing discriminant validity, the values of AVE of the constructs need to be compared with the construct correlations and the construct correlations should not exceed the AVE values. Construct correlation matrix presented in the Table 15 and the AVE values were presented in Table 26. All the estimated values of AVE presented in Table 16 were higher than the construct correlation values presented in the Table 15. Thus, this can be interpreted as the discriminant validity is ensured.

Table 17: Summary of Modal Fit Indices of Confirmatory Factor Analysis

	X2/df	CFI	TLI	GFI	SRMR	RMSEA
Reference						
Index					< 0,5	< 0,5
(Hair et al. 2010)	< 3/1	> 0.90	> 0.90	> 0.90	(acceptable up to 0.8)	(acceptable up to 0.8)
Index of Results	1,532	0.91	0.84	0.87	0.71	0.75

The model fit indices indicates fitness level of the model. Table 17 shows the model fit indices of CFA. X2/df is within the threshold. CFI is just little higher than the threshold with the value of 0,91. TLI is slightly below the threshold of 0,90 with a value of 0,84 and CFI is also slightly under the threshold of 0,90 with a value of 0,87. The SRMR value is in the range of acceptable level with a value of 0,71. RMSEA value is also in the acceptable rage, with a value of 0,75. In overall, values of model fit indices are in the rages of acceptable levels that show the model fit is relatively well.

CHAPTER FIVE

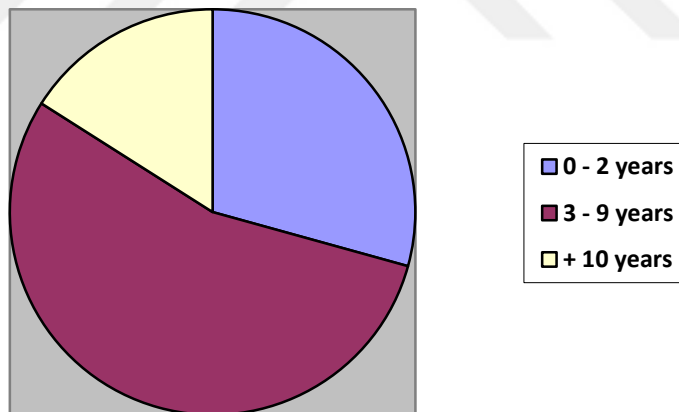
RESULTS AND FINDINGS

5.1 PROFILE OF RESPONDENTS

The profile questions of study include industrial experience and experience in the company of the respondents. In addition to this, ports used by the freight forwarders were also involved in the profile questions.

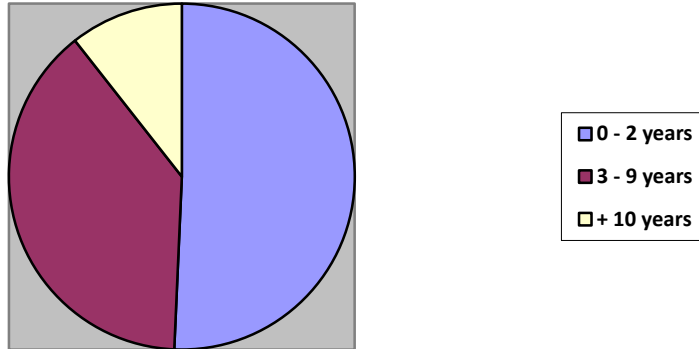
The respondents answered how long they have been performing within this business. Overall experience is important to measure the perception of respondents on port selection criteria. As shown in Figure 10, Almost 70 percent of respondents have at least 3 years of experience in the maritime transport industry. 54.7% of the respondents have experience of between 3-9 years in maritime transport industry. 16% of the respondents have experience of 10 years and more; and 29.3% of respondents have experience of between 0-2 years in maritime transport industry.

Figure 11: Industrial Experience of Respondents



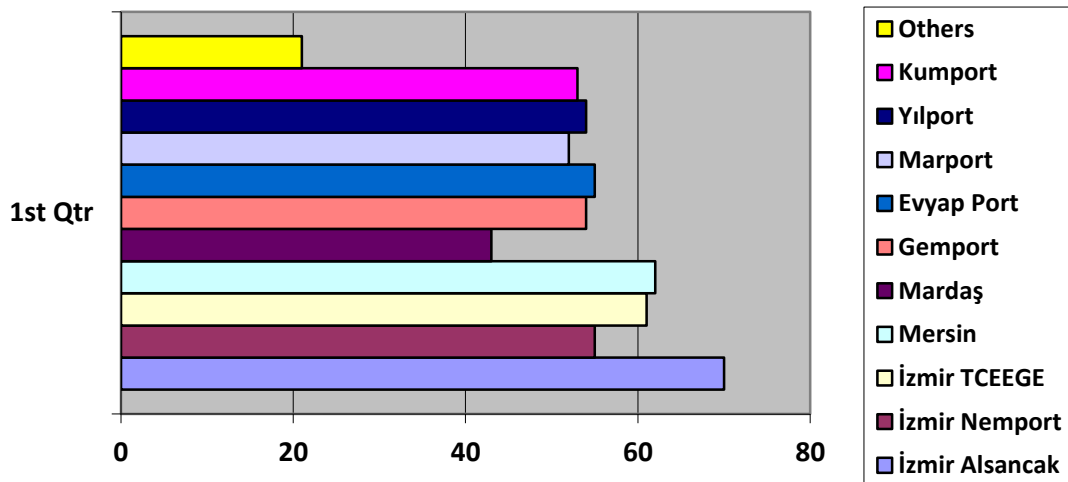
The respondents were also asked how long they have been working in their company. In the Figure 11, 50.7 percent of the respondents have experience of between 0-2 years in their company. 38.7% of the respondents have experience of between 3-9 years; and 10.6% of respondents have experience of 10 years and more.

Figure 12: Experience of Respondents in their Company



The port selection by the freight forwarders for the cargo shipments from/to Ankara-Eskişehir-Kütahya are shown in Figure 12. This figure consists of 10 ports and others. It includes 3 ports from İzmir port region, 3 ports from İstanbul port region, 2 ports from İzmit port region, 1 port from South Marmara region, and 1 port from Akdeniz region. The results show that majority of participants use port of İzmir Alsancak with 94.6 percent. Port of TCEEGE and port of Mersin are also selected by nearly 83 percent of respondents. Except "other ports" option, Mardaş Port was selected at lowest degree by respondents with 58 percent. 28 percent of respondents choose other ports along with ports those are asked in the study. The "other ports" involves Antalya, İskenderun, Limak, Borusan, Samsun, Asyaport, Derince, Batı Port, and Yarımca. Most of the respondents selecting "other ports" indicate Port of Antalya has also an upward trend in users' selection.

Figure 13: Selected Ports by Respondents



5.2 VARIANCE ANALYSIS

The analysis of variance (ANOVA) test is implemented to reveal the differences between three or more independent variables (Eymen,2007). All groups must randomly be chosen from a universe which exhibits normal distribution; this is one of the prerequisites of this test. However ANOVA do not give any information about from which group or groups the differences are sourced. In this purpose, One-Way ANOVA test is carries out and the accurate differences between groups are determined (Altunışık et al.,2012).

Table 18: Information about Independent Variables Used in ANOVA Test

Independent Variable	Group 1	Group 2	Group 3
Sector Experience of Respondents	0-2	3-9	+10
Experience of Respondents in their Company	0-2	3-9	+10

According to Multiple Comparison Data which is obtained from One-Way ANOVA test of this study, significant differences are observed between independent variables. That is to say, it has been achieved that there is a significant difference between the industrial experience of groups in considering importance of the port selection variables. Similar distinctions have been found for other independent variables of the study which is "experience of respondents in their company". The results show that, the respondents with more than 10 years industrial experience give notably higher importance than the respondents with less than 2 years industrial experience for "corporate social responsibility of port". Additionally, the tendency of more experienced participants' devotion to higher importance to "distance of port to cargo origin and destination" is more likely than less experienced respondents. The detailed results of post hoc anova tests are included in appendix section of the study.

5.3 DESCRIPTIVE STATISTICS OF THE STUDY

In this part, descriptive statistics of the study are presented. The usage of basic descriptive statistics provides quite fast and easy understanding of research phenomenon. Nevertheless, the descriptive statistics are convenient for data that

are obtained from interval scales. Also it should be used the given frequency distribution for nominal scale data (Eymen, 2007).

The mean is acquired by gathering together of all measurements and splitting up by the total number of measurement taken. The numerical data can be computed with mean. Otherwise mean ignores degree of importance in different categories of data. Mean value is simply arithmetic average of different data set (Nicholas, 2006). The examined values may deviate from the mean thereby differing amounts. The standard deviation is a type of average of these deviations from the mean (Nicholas, 2006). In the descriptive statistics mean and standard deviation are calculated. 5 indicates highest value and 1 shows lowest value.

In this of study, mean and standard deviation values were determined for all the factors of port selection criteria of shippers in contestable hinterland. According to Table 14, mean scores and standard deviations score were sequentially extracted from the highest value to the lowest value. "congestion at port" has been found as the most important port selection criteria by freight forwarders (4.74). The other two important factors are "road connection of port" and "quick response to users' problem" with the value of 4.72. "Performance of port about cargo loss and damage" follows them with 4.68; and the last but not the least "reliability of services given by port" with 4.62 mean value. On the other hand, lowest ranking is "corporate social responsibility" with 2.93 ; and "feature of port operating company" has also been given second least significance with 3.01 average. The third lowest value has been given for "green port applications" with 3.45. A slightly higher consideration has been given for "railway connection of port" with 3,55; and "reefer cargo warehousing capacity of port" has been selected with 3.77 mean value.

Table 19: Descriptive Statistics of Port Selection Variables

Port Selection Variables	N	Mean	Std. Deviation
Congestion at Port	74	4,74	0,598
Road Connection of Port	74	4,72	0,609
Quick Response to Users' Problem	74	4,72	0,562
Performance of Port About Cargo Loss and Damage	74	4,68	0,599
Reliability of Services Given by Port	74	4,62	0,676
Safety of Port	74	4,61	0,718
Experience and Ability and Competence of Port Personal	74	4,59	0,701

Table 19: Descriptive Statistics of Port Selection Variables (Continued)

Total Logistics Cost incurred due to Port Choice	74	4,51	0,707
Logistics Services Given at Port	74	4,47	0,763
Value added Services Given at Port	74	4,46	0,686
Quality and Technology of Port Equipment	74	4,43	0,812
Flexibility of Port for Specific Requirement of Customers	74	4,42	0,776
Total Transit Time for Cargo	74	4,38	0,735
Number of Port Equipment	74	4,36	0,786
Total Port Tariff and Cost	74	4,36	1,001
Flexibility of Port in Pricing	74	4,31	0,92
Frequency of Sailings	74	4,31	0,95
Number of Container Lines Calling the Port	74	4,3	0,856
Information Provided for Shipment of Shippers	74	4,28	0,836
Total Turnaround Time	74	4,27	1,024
Distance of Port to Cargo Origin and Destination	74	4,2	0,876
Customized Services for Customers	74	4,15	0,975
Information Technologies Used at Port	74	4,09	0,968
Attitude and Behaviour of Port Personal	74	4,05	0,949
Size of Warehousing Area at Port	74	4,01	0,958
Ease of Payment for Customers	74	4	1,123
Port Management Type	74	3,78	1,285
Reefer Cargo Warehousing Capacity of Port	74	3,77	1,041
Railway Connection of Port	74	3,55	1,184
Green Port Applications of Port	74	3,45	1,305
Feature of Port Operating Company	74	3,01	1,164
Corporate Social Responsibility of Port	74	2,93	1,286

The seven main constructs of the port selection variables have individually been dealt with. According to Table 15, port location and hinterland connection" as the first construct has been chosen with 4.13 mean value in average. This value is the lowest rate of overall constructs. Although "railway connection of port" is one of the least rated criteria of the all variables, "road connection of port" has 4.71 mean value. In addition, "distance of port to cargo origin and destination" is the other component of this group with 4.20.

Table 20: Descriptive Statistics of Main Port Selection Constructs/Port Location and Hinterland Connections

Port Location and Hinterland Connections	N	Mean	Std. Deviation
Road Connection of Port	74	4,716216	,609
Railway Connection of Port	74	3,554054	1,184
Distance of Port to Cargo Origin and Destination	74	4,202703	,876

Although road transportation has environmental and cost-based problems in Turkey, it is preferably chosen as inland transport mode. In spite of that, the railway transportation, which is cheaper and more eco-friendly, is not completely adopted between ports and hinterlands. There might be two reasons of this situation: First, road haulage is faster and more flexible; second railway infrastructure and connections are not sufficient to meet the traffic between ports and hinterlands.

The second construct of the study is port physical and technical infrastructure and superstructure" (Table 16). The average mean value of this group is 4.15. The highest value have been delivered for "quality and technology of port equipment" with 4,43. "Number of port equipment" follows this with 4.36. "Information technologies used at port" and "size of warehousing area at port" have almost been chosen with same mean value with 4.09 and 4.01. The lowest value of the group is 3.77 for "reefer cargo warehousing capacity of port".

Table 21: Descriptive Statistics of Main Port Selection Constructs/Port Physical and Technical Infrastructure and Superstructure

Port Physical and Technical Infrastructure And Superstructure	N	Mean	Std. Deviation
Size of Warehousing Area at Port	74	4,013514	,958
Information Technologies Used at Port	74	4,094595	,968
Number of Port Equipment	74	4,364865	,786
Quality and Technology of Port Equipment	74	4,432432	,812
Reefer Cargo Warehousing Capacity of Port	74	3,77027	1,041

Since fast and precisely loading and discharging of their cargoes is crucial for freight forwarders, the equipment related variables have been found more important within this construct. The widespread introduction of supply chain concept, logistics villages, and door-to-door transportation activities lead to establishment of

alternatives storage facilities around the port; thus size of warehousing area at port has been given lowest consideration in this group.

In Table 17, "port management and administration" criteria has 3.39 value in average. This is also the lowest value within seven constructs. "Port administration type" has 3.78 value, and "features of port operating company" has 3.01 value for port management and administration construct.

Table 22: Descriptive Statistics of Main Port Selection Constructs/Port Management and Administration

Port Management and Administration	N	Mean	Std. Deviation
Port Administration Type	74	3,783784	1,285
Features of Port Operating Company	74	3,013514	1,164

Most of the ports and terminals in Turkey have been privatized in last decade; hence, the consideration of the port management might be chosen as the lowest item of seven constructs. Furthermore, some port operating and management varieties that are used in different counties such as Rotterdam, Antwerp etc., are not applicable in Turkey. These two reasons have not created particular difference in terms of port selection criteria.

Table 18 illustrates descriptive statistics of "service quality of port" as the one of main construct of port selection. "Quick response to users' problem" and "performance of port about cargo loss and damage" have been selected at higher degree with 4.71 and 4.67. The third and fourth highest variable is "reliability of services given by port" with 4.62, and "safety of port" has 4.60 mean value. "Corporate social responsibility" (2.93) and "green port applications of port" (3.44) are the least selected variables in this construct. "Corporate social responsibility" is also the lowest determinant of port selection evaluated by respondents of the study. "Logistics services given at port", "value-added services given at port", and "flexibility of port for specific requirement of customers" are assumed as nearly equal important by freight forwarders with 4.47, 4.45, 4.41 respectively. "Experience and ability and competence of port personal" also has significant mean value with 4.59. The average mean value of entire group is 4.26.

Nowadays, most of the hinterlands are no longer captive. These hinterlands are more accessible; and tariffs and costs of ports become similar, so that one of the most important weapons of ports is to make difference in service quality to acquire competitive advantage.

Table 23: Descriptive Statistics of Main Port Selection Constructs/Service Quality of Port

Service Quality of Port	N	Mean	Std. Deviation
Value added Services Given at Port	74	4,459459	,666
Reliability of Services Given by Port	74	4,621622	,676
Corporate Social Responsibility Projects of Port	74	2,932432	1,286
Green Port Applications of Port	74	3,445946	1,305
Logistics Services Given at Port	74	4,472973	,763
Flexibility of Port for Specific Requirement of Customers	74	4,418919	,776
Customized Services for Customers	74	4,148649	,975
Information Provided for Shipment of Shippers	74	4,283784	,836
Performance of Port About Cargo Loss and Damage	74	4,675676	,599
Safety of Port	74	4,608108	,718
Quick Response to Users' Problem	74	4,716216	,562
Attitude and Behaviour of Port Personal	74	4,054054	,949
Experience and Ability and Competence of Port Personal	74	4,594595	,701

Components based on problem avoiding nature of port service quality are essential according to freight forwarders because, the ports remain open for many externalities and herewith, even a small problem may cause irrecoverable results between freight forwarders and their customers. Beside, the results show that a port is not only a mechanic workplace but also that is dynamic area with meaningful human effect. Entire "service quality of port" construct -except environmental and social factors- almost have the highest value in average. The social and environmental considerations have a growing trend worldwide, but these are not given enough importance in Turkey. The essential reason of this situation is lack of an effective governance and port policy implementation.

"Port efficiency and productivity" group is included in Table 19 with 4.50 average mean value. It is the highest value of seven construct of port selection. This group involves "congestion at port" and "total turnaround time". "Congestion at port" has also been found the most important item within complete study by participants with 4.74. The other component of construct has 4.27 mean value.

Probably, the most striking result of the study is that, the average mean of this construct and the mean value of the congestion variable have the highest value. Likewise, the term port congestion is traditionally perceived as the congestion only at sea side, thus it is rated as one of the most important items in previous studies on port selection criteria of shipping lines. This result must be evaluated from two

different perspectives. First, the sea side congestion seems like directly influencing shipping lines, in fact it affects entire port users. Alongside the waste of time, the increasing cargo waiting duration in port facility causes additional costs incurred by freight forwarders. From the forwarder side, it means both additional storage cost and decrease in profit; and a particular problem in providing reliable service for shippers. Second is the land side congestion. The congestion in inland transportation and gate congestion hinder that commodities are not delivered to the port in time. One another reason of high tendency on congestion is that there is an enormous traffic problem within country-wide due to insufficiency of infrastructure of port connections in Turkey.

Table 24: Descriptive Statistics of Main Port Selection Constructs/Port Efficiency and Productivity

Port Efficiency and Productivity	N	Mean	Std. Deviation
Congestion at Port	74	4,743243	,598
Total Turnaround Time	74	4,27027	1,024

In table 20, elements of "port tariffs and costs" are listed. The highest value has been given to "total logistics cost incurring due to port choice" with 4.51. The following two variables are "total port tariff and cost" (4.36) and "flexibility of port in pricing" (4.31). The lowest ranking is 4.00 that is rated for "ease of payment for customers". This construct is the third important criteria of the study and its mean value is 4.29.

Table 25: Descriptive Statistics of Main Port Selection Constructs/Port Tariffs and Costs

Port Tariffs and Costs	N	Mean	Std. Deviation
Total Port Tariff and Cost	74	4,364865	1,001
Flexibility of Port in Pricing	74	4,310811	,920
Ease of Payment for Customers	74	4	1,123
Total Logistics Cost incurring due to Port Choice	74	4,513514	,707

Price is considered to be a very important determinant for selection of any product or service. For years, many ports acted under a monopolistic competition especially in the captive hinterlands where the price was not flexible. However with the impacts of new entrants and governments' regulations the contestability has

transformed the price conditions on behalf of port users. There is no doubt it is very clear that port tariffs and costs still remain to be most important criteria in many researches. However tariffs and costs have begun to be similar between different ports. Although these are substantial determinants, the port tariffs and costs are meaningless without supports of some various elements. On the other hand only port costs are not single-handedly enough to explain the competition level of a port. The study reveals that respondents mostly consider overall logistics costs. However, concern of "total logistics cost incurring due to port choice" is strongly high level while "distance of port to cargo origin and destination", "size of warehousing area at port", and "railway connection of port", which have direct effect on logistics costs, are relatively lower in each variables.

The last port selection construct is categorized in Table 21. "Number and frequency of shipping lines calling at port" is perceived as the second most important port selection criteria by respondents with 4.33. Three factors of the group are "number of container lines calling at port", "frequency of sailings", and "total transit time for cargo". Their mean values are ordered as 4.29, 4.31, and 4.37.

Table 26: Descriptive Statistics of Main Port Selection Constructs/Number and Frequency of Shipping Lines Calling at Port

Number and Frequency of Shipping Lines Calling at Port	N	Mean	Std. Deviation
Number of Container Lines Calling the Port	74	4,297297	,856
Frequency of Sailings	74	4,310811	,950
Total Transit Time for Cargo	74	4,378378	,735

In many studies dealing with port selection criteria of shippers and freight forwarders such as Slack (1995), Bird and Bland (1998), Tongzon (1995-2009), Tongzon and Sawant (2007), Malchow and Kanafani (2001-2004-2010), Tiwari et al. (2003), Ugboma et al. (2006), and Lechman (2008), it is suggested that "number and frequency of shipping lines calling at port" as the most important determinant in selecting a port or terminal. However in this study this construct is rated in second rank. It is impossible that a freight forwarder chooses the port unless the container line, which is contracted with this freight forwarder, is not called by port. Indeed, therefore shipping lines' usage of port activities are essential for port competition in contestable hinterlands.

DISCUSSION AND CONCLUSION

Ports are important accelerator of economic development at a region and critical nodes in the logistics system that affect the logistics of shippers and shipping service providers in terms of time, cost and quality. Port competition has been increasing rapidly globally as well as in Turkey. The competition exists not only for attracting more transshipment container movements but also more shipments from the contestable hinterlands. Contestability of hinterlands is increasing thanks to improvement in land transportation and more involvement of private port operators in different region. Hence, attracting port users located in contestable hinterlands has become significantly important. Thus, the purpose of this study was to investigate port selection criteria of users located in contestable hinterlands and develop a model for measuring port selection criteria in contestable hinterlands.

First, a literature review on port selection criteria was performed and total 7 main constructs comprising 35 variables were found out. Then, a survey study is conducted on freight forwarders who work with shippers located in cities of Ankara, Kütahya and Eskişehir. This region comprising these three cities was intentionally chosen as it is regarded as a quite contestable hinterland. The survey was carried out through self-completion internet based questionnaire. The questionnaire was sent to 132 freight forwarding companies. 74 usable questionnaires from 52 companies were received. A confirmatory factor analysis was performed for ensuring validity of the model and 3 variables were deleted from 35 variables to increase model fit. In the end, a model including 7 main constructs comprising 32 criteria was developed for port selection criteria in contestable hinterlands.

The main constructs are port efficiency and productivity, number and frequency of shipping lines calling at port, port tariff and costs, service quality of port, port physical and technical infrastructure and superstructure, port location and hinterland connection and port management and administration. In the study, the top five most important criteria are found as congestion at port, road connection of port, quick response to users' problems, and performance of port about cargo loss and damage and reliability of services given by port.

There are several limitations at this study. First, this study was focused on merely container terminals which are faced to competition in contestable hinterlands. Second the study was applied only on freight forwarders who are members of UTİKAD. Third, only a specific region was selected as a contestable

hinterland to implement the survey of this study. Finally, this study did not consider the competition between container terminals in terms of transshipment cargoes. Further studies may include shippers and container lines to demonstrate perceptual differences between different port users. Moreover, several contestable hinterlands can also be investigated to reveal if any difference exist between the users in different hinterlands regarding port selection criteria.

The aim of this study was to investigate port selection criteria of port users and develop a scale for measuring port selection criteria in contestable hinterlands. A survey research was performed on freight forwarders to evaluate their port selection criteria for the shipments in contestable hinterlands. Total 7 main constructs of port selection criteria were determined in the literature review of port selection criteria. These 7 main constructs include total 35 variables. A questionnaire with these 35 variables was sent to freight forwarders for weighing the importance of each variable to select a port in contestable hinterlands. Confirmatory factor analysis was implemented to ensure that grouping of 35 variables under 7 main constructs was valid. The 35 variables were reduced to 32 to increase model fit.

The top five most important criteria were congestion at port, road connection of port; quick response to users' problems; performance of port about cargo loss and damage; and reliability of services given by port. The 5 least important criteria are reefer cargo warehousing capacity of port; railway connection of port; green port applications; feature of port operating company; and corporate social responsibility of port. Comparing to other forwarder based port selection studies, the results of the study show both similarities and dissimilarities. An important point of this study is that congestion at port was selected as the most important criterion for port selection. None of the previous literature found this variable as the most important criterion. This criterion might be chosen as the most important because port users suffered from extreme port congestion and delays in the past at some ports such as Port of İzmir.

The top five most important criteria show that users are quite concerned of delays, reliability of service, damages and problem handling capabilities of port employees. The increasing importance of supply chain performance and advanced supply chain applications such as just-in-time requires extreme reliability on timeliness, services and delivery without damage and loss. This explains why these top 5 criteria, especially congestion at port, quick response to users' problem,

reliability of services and cargo loss and damage performance, were chosen as the most important ones. De Langen (2007) found hinterland connection as the second most important criterion. This is consistent with the findings of this study which finds road connection of port as the second most important criterion. Green port applications and corporate social responsibility were found as the two of least important criteria. This implies the lack of attention of companies regarding environmental and social concerns when selecting a port.

In addition to investigating the selection criteria in detail, it is also important to evaluate the results based on the 7 selection criteria constructs. The seven criteria ranked in importance order are as follow.

- Port efficiency and productivity,
- Number and frequency of shipping lines calling at port,
- Port tariff and costs, service quality of port,
- Port physical and technical infrastructure and superstructure,
- Port location and hinterland connection and
- Port management and administration.

The results are very consistent with the results of Tongzon (2009) who also found efficiency of port and shipping frequency as the most important two criteria. However, Tongzon (2009) found reputation for cargo damage and quick response to problems as the two least important criteria.

An interesting result of this study is the importance of number and frequency of shipping lines. This suggests that forwarders think that port selection in contestable hinterlands are not carried out only based on pure port and hinterland related matters but also shipping services given at port. Port users give importance to total transit time, directness of sailing and freight rate from loading port to discharging port. All of them are affected by the number and frequency of shipping lines at a port. In other words, port users in contestable hinterlands select shipping service considering the final destination of their cargo. This construct was also found to be very important by Ugboma (2006), De Langen (2007) and Tongzon (2009).

Scientific implications

Although there are several studies on port competition and port selection criteria of port users, these studies essentially interested in both shipping lines and shippers. On the other hand freight forwarder based studies are limited. Besides, the

literature review shows that most of the studies are not contemporary, and they must have been updated. Also the port selection criteria are not completely appropriate for Turkish port competition level and geographical characteristics of port hinterlands in Turkey. Therefore these port selection variables are were adjusted under the roof of 7 main constructs. Alongside, even if quite a little studies performed factor analysis to evaluate port selection criteria, confirmatory factor analysis driving researches are more restricted. In this study, the seven main constructs and their 32 variables were verified thereby using confirmatory factor analysis. In the end, a scale model was developed; and this confirmed model is in use of further researches.

Managerial implications

Understanding needs and wants of customers is a key prerequisite to offer value for customers and to be competitive for firms. Thus, understanding port selection criteria of port users is critical for ports to be competitive. The competition between ports is increasing as more regions fall into category of contestable hinterland day by day. Hence, attracting customers in the contestable hinterland is significantly important. The results of this study reveal the selection criteria of port users located in the contestable hinterlands. Therefore, the results are considered to provide important implications for port managers.

Port managers should bear in mind that expectations of their customers in contestable hinterlands are quite demanding. Majority of the 32 criteria were determined as very important by the freight forwarders. Considering the recent developments in supply chain systems, users demand more reliable, on time and safe services with competitive prices. Users expect port managers to provide solutions for their problems. This entails port managers to understand specific needs and wants of users in different segments such as customer groups in different industries, customer groups sending their shipments to different regions or customer groups as export/import shipments. By this way, more customized solutions can be created for customers in different groups in an efficient way.

Port managers should consider that port selection decisions are not made merely based on the services given by them. The decision is also affected by hinterland connections and shipping services at port. Thus, port managers should also attract shipping lines so that port users located in contestable hinterlands can

be offered more frequent shipping services. Port managers may also provide some incentives for shipping lines to design their stowage plan at vessels more effectively. By this way, reliability of shipping services can be increased which is found to be important in the results of this study. Ports should also work close with the governments who can improve the hinterland connections of ports through investments in road and railway infrastructure. Needless to say, ports should pay utmost attention for improving their services.



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APPENDIX 1 - Questionnaire Form

A RESEARCH ON CONTAINER PORT COMPETITION AND FREIGHT FORWARDERS' PORT SELECTION IN CONTESTABLE HINTERLAND

The purpose of survey prepared by Res. Asst. Kemal AKBAYIRLI under the counseling of Prof. Dr. Durmuş Ali DEVECİ is to *determine port selection criteria of freight forwarders who perform on the cargoes of Ankara-Eskişehir-Kütahya*. Information obtained under the research is to be used only for scientific purposes; the results will not be associated with any respondent. Please send e-mail to the address below after filling out the survey. Thank you for your participation and provide valuable information to research. I wish ease your work.

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A - PROFILE QUESTIONS

1. Your experience in maritime industry
() 0 - 2 () 3 - 9 () +10
2. Your experience in your company
() 0 - 2 () 3 - 9 () +10
3. Please mark port(s) you use for cargo loading and unloading in Turkey
() İzmir Alsancak () Mersin () Evyap Port () Yılport
() İzmir Nemport () Mardaş () Marport () Kumport
() İzmir TCEEĞE () Gempport () Other

B - PLEASE INDICATE THE SIGNIFICANCE LEVEL OF PORT SELECTION CRITERIA BELOW BY CONSIDERING CONTESTABILITY OF THE HINTERLAND

1	2	3	4	5
Not at all important	Not important	Neither important nor unimportant	Important	Very important

	Port Selection Criteria	1	2	3	4	5
1	Road connection of port					
2	Railway connection of port					
3	Size of warehousing area at port					
4	Information technologies used at port					
5	Number of port equipment					

		1	2	3	4	5
6	Quality and technology of port equipment					
7	Reefer cargo warehousing capacity of port					
8	Port administration type					
9	Features of port operating company					
10	Value added services at port					
11	Reliability of services given by port					
12	Corporate social responsibility projects of port					
13	Green port applications of the port					
14	Logistics services given at port					
15	Flexibility of ports for specific requirements of customers					
16	Customized services for customers					
17	Information provided for shipment of shippers					
18	Performance of port about cargo loss and damage					
19	Safety of port					
20	Quick response to users' problem					
21	Relation dated to back between port and your company					
22	Attitude and behaviour of port personnel					
23	Experience, ability and competence of port personnel					
24	Congestion at port					
25	Total turnaround time					
26	Duration of average container handling at port					
27	Distance of port to cargo origin and destination port					
28	Distance of port to airport					
29	Total port tariffs and costs					
30	Flexibility of port in pricing					
31	Ease of payment for customers					
32	Total logistics cost occurring due to port choice					
33	Number of container lines calling the port					
34	Frequency of sailings					
35	Total transit time of cargo					

APPENDIX 2 - Anova Post Hoc Tests/Scheffe

Multiple Comparisons							
Scheffe							
Dependent Variable	(I) Experience in the Industry	(J) Experience in the Industry	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval	
						Lower Bound	Upper Bound
Road Connection of Port	1	2	-,161	,164	,619	-,57	,25
		3	-,048	,222	,977	-,60	,51
	2	1	,161	,164	,619	-,25	,57
		3	,114	,201	,852	-,39	,62
	3	1	,048	,222	,977	-,51	,60
		2	-,114	,201	,852	-,62	,39
Railway Connect.on of Port	1	2	-,085	,322	,966	-,89	,72
		3	-,190	,434	,908	-1,27	,89
	2	1	,085	,322	,966	-,72	,89
		3	-,106	,393	,965	-1,09	,88
	3	1	,190	,434	,908	-,89	1,27
		2	,106	,393	,965	-,88	1,09
Size of Warehousing Area at Port	1	2	-,289	,257	,535	-,93	,35
		3	,024	,347	,998	-,84	,89
	2	1	,289	,257	,535	-,35	,93
		3	,313	,315	,612	-,47	1,10
	3	1	-,024	,347	,998	-,89	,84
		2	-,313	,315	,612	-1,10	,47
Information Technologies Used at Port	1	2	-,458	,257	,212	-1,10	,18
		3	-,488	,346	,376	-1,35	,38
	2	1	,458	,257	,212	-,18	1,10
		3	-,030	,314	,995	-,82	,76
	3	1	,488	,346	,376	-,38	1,35
		2	,030	,314	,995	-,76	,82
Number of Port Equipment	1	2	-,247	,209	,499	-,77	,27
		3	-,524	,282	,185	-1,23	,18
	2	1	,247	,209	,499	-,27	,77
		3	-,276	,255	,559	-,92	,36
	3	1	,524	,282	,185	-,18	1,23
		2	,276	,255	,559	-,36	,92

APPENDIX 2 - Anova Post Hoc Tests/Scheffe (Continued)

Dependent Variable	(I) Experience in the Industry	(J) Experience in the Industry	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence	
						Interval	
						Lower Bound	Upper Bound
Quality and Technology of Port Equipment	1	2	-,322	,217	,339	-,86	,22
		3	-,393	,293	,410	-1,12	,34
	2	1	,322	,217	,339	-,22	,86
		3	-,071	,265	,965	-,73	,59
	3	1	,393	,293	,410	-,34	1,12
		2	,071	,265	,965	-,59	,73
Reefer Cargo Warehousing Capacity of Port	1	2	,294	,281	,581	-,41	1,00
		3	,119	,379	,952	-,83	1,07
	2	1	-,294	,281	,581	-1,00	,41
		3	-,175	,344	,879	-1,03	,68
	3	1	-,119	,379	,952	-1,07	,83
		2	,175	,344	,879	-,68	1,03
Port Administration Type	1	2	-,285	,345	,713	-1,15	,58
		3	,250	,466	,866	-,91	1,41
	2	1	,285	,345	,713	-,58	1,15
		3	,535	,422	,453	-,52	1,59
	3	1	-,250	,466	,866	-1,41	,91
		2	-,535	,422	,453	-1,59	,52
Port Operating Company	1	2	-,482	,309	,302	-1,25	,29
		3	,095	,416	,974	-,95	1,14
	2	1	,482	,309	,302	-,29	1,25
		3	,577	,378	,317	-,37	1,52
	3	1	-,095	,416	,974	-1,14	,95
		2	-,577	,378	,317	-1,52	,37
Value added Services Given at Port	1	2	-,154	,185	,707	-,62	,31
		3	-,250	,250	,608	-,87	,37
	2	1	,154	,185	,707	-,31	,62
		3	-,096	,227	,915	-,66	,47
	3	1	,250	,250	,608	-,37	,87
		2	,096	,227	,915	-,47	,66

APPENDIX 2 - Anova Post Hoc Tests/Scheffe (Continued)

Dependent Variable	(I) Experience in the Industry	(J) Experience in the Industry	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence	
						Interval	
						Lower Bound	Upper Bound
Reliability of Services Given by Port	1	2	-,111	,183	,831	-,57	,35
		3	,071	,247	,959	-,55	,69
	2	1	,111	,183	,831	-,35	,57
		3	,183	,224	,717	-,38	,74
	3	1	-,071	,247	,959	-,69	,55
		2	-,183	,224	,717	-,74	,38
Corporate Social Responsibility Projects of Port	1	2	,149	,340	,909	-,70	1,00
		3	-,679	,459	,341	-1,83	,47
	2	1	-,149	,340	,909	-1,00	,70
		3	-,827	,416	,147	-1,87	,21
	3	1	,679	,459	,341	-,47	1,83
		2	,827	,416	,147	-,21	1,87
Green Port Applications of Port	1	2	,135	,353	,930	-,75	1,02
		3	-,274	,476	,848	-1,46	,92
	2	1	-,135	,353	,930	-1,02	,75
		3	-,409	,431	,641	-1,49	,67
	3	1	,274	,476	,848	-,92	1,46
		2	,409	,431	,641	-,67	1,49
Logistics Services Given at Port	1	2	,350	,202	,230	-,16	,85
		3	,000	,272	1,000	-,68	,68
	2	1	-,350	,202	,230	-,85	,16
		3	-,350	,247	,372	-,97	,27
	3	1	,000	,272	1,000	-,68	,68
		2	,350	,247	,372	-,27	,97
Flexibility of Port for Specific Requirement of Customers	1	2	-,033	,207	,988	-,55	,49
		3	-,417	,280	,335	-1,12	,28
	2	1	,033	,207	,988	-,49	,55
		3	-,384	,254	,324	-1,02	,25
	3	1	,417	,280	,335	-,28	1,12
		2	,384	,254	,324	-,25	1,02

APPENDIX 2 - Anova Post Hoc Tests/Scheffe (Continued)

Dependent Variable	(I) Experience in the Industry	(J) Experience in the Industry	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence	
						Interval	
						Lower Bound	Upper Bound
Customized Services for Customers	1	2	-,027	,264	,995	-,69	,63
		3	-,238	,356	,801	-1,13	,65
	2	1	,027	,264	,995	-,63	,69
		3	-,211	,323	,808	-1,02	,60
	3	1	,238	,356	,801	-,65	1,13
		2	,211	,323	,808	-,60	1,02
Information Provided for Shipment of Shippers	1	2	,042	,227	,983	-,53	,61
		3	-,131	,306	,913	-,90	,63
	2	1	-,042	,227	,983	-,61	,53
		3	-,173	,278	,824	-,87	,52
	3	1	,131	,306	,913	-,63	,90
		2	,173	,278	,824	-,52	,87
Performance of Port About Cargo Loss and Damage	1	2	,201	,159	,453	-,20	,60
		3	-,155	,214	,771	-,69	,38
	2	1	-,201	,159	,453	-,60	,20
		3	-,356	,194	,194	-,84	,13
	3	1	,155	,214	,771	-,38	,69
		2	,356	,194	,194	-,13	,84
Safety of Port	1	2	,058	,194	,956	-,43	,54
		3	-,131	,262	,883	-,79	,52
	2	1	-,058	,194	,956	-,54	,43
		3	-,189	,238	,730	-,78	,41
	3	1	,131	,262	,883	-,52	,79
		2	,189	,238	,730	-,41	,78
Quick Response to Users Problem	1	2	-,065	,153	,913	-,45	,32
		3	-,083	,206	,921	-,60	,43
	2	1	,065	,153	,913	-,32	,45
		3	-,018	,187	,995	-,49	,45
	3	1	,083	,206	,921	-,43	,60
		2	,018	,187	,995	-,45	,49

APPENDIX 2 - Anova Post Hoc Tests/Scheffe (Continued)

Dependent Variable	(I) Experience in the Industry	(J) Experience in the Industry	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence	
						Interval	
						Lower Bound	Upper Bound
Attitude and Behaviour of Port Personal	1	2	-,192	,254	,752	-,83	,44
		3	-,560	,342	,269	-1,41	,30
	2	1	,192	,254	,752	-,44	,83
		3	-,368	,310	,498	-1,14	,41
	3	1	,560	,342	,269	-,30	1,41
		2	,368	,310	,498	-,41	1,14
Experience and Ability and Competence of Port Personal	1	2	,058	,190	,955	-,42	,53
		3	-,048	,257	,983	-,69	,59
	2	1	-,058	,190	,955	-,53	,42
		3	-,106	,233	,902	-,69	,48
	3	1	,048	,257	,983	-,59	,69
		2	,106	,233	,902	-,48	,69
Congestion at Port	1	2	,102	,162	,821	-,30	,51
		3	,060	,219	,964	-,49	,61
	2	1	-,102	,162	,821	-,51	,30
		3	-,043	,199	,977	-,54	,45
	3	1	-,060	,219	,964	-,61	,49
		2	,043	,199	,977	-,45	,54
Total Turnaround Time	1	2	-,294	,276	,570	-,98	,40
		3	-,369	,372	,614	-1,30	,56
	2	1	,294	,276	,570	-,40	,98
		3	-,075	,338	,975	-,92	,77
	3	1	,369	,372	,614	-,56	1,30
		2	,075	,338	,975	-,77	,92
Distance of Port to Cargo Origin and Destination	1	2	-,218	,227	,633	-,79	,35
		3	-,798*	,307	,040	-1,56	-,03
	2	1	,218	,227	,633	-,35	,79
		3	-,579	,278	,122	-1,27	,12
	3	1	,798*	,307	,040	,03	1,56
		2	,579	,278	,122	-,12	1,27

APPENDIX 2 - Anova Post Hoc Tests/Scheffe (Continued)

Dependent Variable	(I) Experience in the Industry	(J) Experience in the Industry	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence	
						Interval	
						Lower Bound	Upper Bound
Total Port Tariff and Cost	1	2	,184	,271	,796	-,50	,86
		3	,060	,366	,987	-,86	,97
	2	1	-,184	,271	,796	-,86	,50
		3	-,124	,332	,933	-,95	,71
	3	1	-,060	,366	,987	-,97	,86
		2	,124	,332	,933	-,71	,95
Flexibility ofPort in Pricing	1	2	,307	,242	,452	-,30	,91
		3	-,321	,326	,618	-1,14	,49
	2	1	-,307	,242	,452	-,91	,30
		3	-,628	,296	,113	-1,37	,11
	3	1	,321	,326	,618	-,49	1,14
		2	,628	,296	,113	-,11	1,37
Ease of Payment for Customers	1	2	,384	,302	,449	-,37	1,14
		3	,155	,407	,930	-,86	1,17
	2	1	-,384	,302	,449	-1,14	,37
		3	-,230	,369	,825	-1,15	,69
	3	1	-,155	,407	,930	-1,17	,86
		2	,230	,369	,825	-,69	1,15
Total Logistics Cost incurring due to Port.Choice	1	2	,108	,192	,854	-,37	,59
		3	-,012	,259	,999	-,66	,63
	2	1	-,108	,192	,854	-,59	,37
		3	-,120	,235	,878	-,71	,47
	3	1	,012	,259	,999	-,63	,66
		2	,120	,235	,878	-,47	,71
Number of Container Lines Calling the Port	1	2	-,078	,230	,944	-,65	,50
		3	-,393	,310	,453	-1,17	,38
	2	1	,078	,230	,944	-,50	,65
		3	-,315	,281	,537	-1,02	,39
	3	1	,393	,310	,453	-,38	1,17
		2	,315	,281	,537	-,39	1,02

APPENDIX 2 - Anova Post Hoc Tests/Scheffe (Continued)

Dependent Variable	(I) Experience in the Industry	(J) Experience in the Industry	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval	
						Lower	Upper
						Bound	Bound
Frequency of Sailings	1	2	,017	,257	,998	-,63	,66
		3	-,214	,347	,827	-1,08	,65
	2	1	-,017	,257	,998	-,66	,63
		3	-,232	,315	,764	-1,02	,56
	3	1	,214	,347	,827	-,65	1,08
		2	,232	,315	,764	-,56	1,02
Total Transit Time for Cargo	1	2	-,033	,199	,987	-,53	,47
		3	-,167	,269	,826	-,84	,51
	2	1	,033	,199	,987	-,47	,53
		3	-,134	,244	,860	-,74	,48
	3	1	,167	,269	,826	-,51	,84
		2	,134	,244	,860	-,48	,74

*. The mean difference is significant at the 0.05 level.