İşletme Fakültesi Dergisi, Cilt 15, Sayı 2, 2014, 83-115

ORGANISATIONAL CHANGE IN PORTS AND ANALYSIS OF EFFECTIVENESS IN VALUE CHAIN SYSTEMS: A SURVEY RESEARCH

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ABSTRACT

The objective of this study is to determine the changes at ports and to reveal the relationship between these changes and port effectiveness. A survey study with a sample of 51 ports in Turkey was carried out. Factor analysis was used for grouping organisational change implementations. Mann-Whitney U tests, correlation and regression analyses were used for hypothesis testing. As a consequence; perceptions regarding organisational change implementations and effectiveness measures were compared according to port characteristics and the causal relationships between organisational change and effectiveness variables were determined within the context of value chain systems.

Keywords: *Port, Organizational Change, Effectiveness, Value Chain*

LİMANLARDA ÖRGÜTSEL DEĞİŞİM VE DEĞER ZİNCİRİ SİSTEMLERİNDE ETKİLİLİK ANALİZİ: BİR SAHA ARAŞTIRMASI

ÖZET

Çalışmanın amacı, liman örgütlerinde ortaya çıkan değişimleri belirlemek ve bu değişimler ve liman etkililiği arasındaki ilişkileri ortaya çıkarmaktır. Bu amaçla, Türkiye'deki 51 liman örnekleminde bir saha araştırması gerçekleştirilmiştir. Örgütsel değişim uygulamalarını gruplandırmak için faktör analizi uygulanmıştır. Hipotez testleri için ise, Mann-Whitney U testi, korelasyon ve regresyon analizleri gerçekleştirilmiştir. Sonuç olarak, limanlardaki değişim uygulamaları ve etkililik ölçütlerine ilişkin algılar, limanların özelliklerine göre karşılaştırmalı olarak incelenmiş ve örgütsel değişim ve etkililik arasındaki sebep-sonuç ilişkileri değer zinciri sistemleri kapsamında belirlenmiştir.

Anahtar Sözcükler: *Liman, Örgütsel Değişim, Etkililik, Değer Zinciri*

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INTRODUCTION

Ports act in a dynamic environment which is complicated and in continuous change. Today, impacts of globalisation can be observed in geographical distribution and port competition whereas technological innovations affect port equipments and information systems; political regulations influence management and administration types of ports and legal regulations affect operation of ports within laws.

Among other external factors that affect ports are; global production and trade system, supply chain and logistics system as well as developments in transportation and sea transport systems which are all determined as supra-systems of ports around the systems approach which establishes the viewpoint of this study. Such developments direct the ports to apply organisational changes to adapt to the environmental changes as well as to increase organisational effectiveness. In this sense, the concepts of "organisational change" and "effectiveness" which are interrelated concepts are examined from the view of port organisations. Port organisations are evaluated as a "system" in that they have complex structures and involve several services, functions and stakeholders. It has been claimed that ports also consist of several sub-systems such as operation, marketing, logistics, human resources etc. and each port sub-system works in harmony with each other and in an effective manner so that ports create "value" both within themselves and to the supply chain and logistic systems which constitute their supra-systems.

The objective of this study is "determination of external and internal factors that encourage ports to change, identification of the change implementations performed at port organisations and revealing the causal relations between these implementations and effectiveness of ports". As required by this study, a survey research applied on a total of 51 Turkish ports.

BACKGROUND LITERATURE

Internal and External Port Value Chain Systems

Ports are considered as part of a cluster of organisations in which different logistics and transport operators are involved in bringing value to the final consumers (Carbone and De Martino, 2003). According to Robinson (2002), port functions are performed within a chain system with high levels of cross-functional integration of business processes within and individual firm or across a number of firms in the chain. In the light of these statements, in this study seaports are regarded as value

creating organisations interacting with their broader systems which indicates that they are open-systems. It is prominent that seaports can generate value by integrating their internal activities or, with Robinson's (2002: 54) words, by "increasing internal operational efficiency, as well as by interacting with their broader systems such as supply and logistics systems".

In the context of this study it is proposed that port value chain systems can be differentiated as "*internal value chain system" and "external value chain system"* in accordance with the classifications of Porter (1985), as "value chain" and "value system" and Donelan and Kaplan (1998) as "internal value chain" and "industrial value chain". According to Porter (1985: 33-34), value chain approach is "a systematic way of examining all the activities a firm performs and how they interact is necessary for analysing the sources of competitive advantage. The extent of integration into activities plays a key role in competitive advantage."

Since, seaports are multi-functional and multi-faceted organisations with complex structures; they encompass various functions in their systems. These functions or sub-systems can also be regarded as the processes or transformations in the ports. Every function needs certain inputs where some sub-systems have common inputs used to form outputs (Karataş-Çetin and Cerit, 2010a). Seaports constitute different interdependent and integrated units in their organisation structures containing operational, economical, social, strategic management and other aspects (Karataş-Çetin and Cerit, 2010b). Cleland and King (1972) suggest that the functional departments in an organisation chart can constitute the sub-systems of an organisation. It is proposed that when port sub-systems work in harmony with each other in an effective manner so that ports create "value" within themselves which comprises the "internal value chain" similar to the Porter's (1985) value chain approach.

Authors prefer to use the term "external value chain system" in lieu of "value system" named by Porter (1985). This term has been referred differently in a number of studies; "industrial value chain" (Donelan and Kaplan, 1998), "extended value chain" (Ansari and Bell, 1997) and "global value chain systems" (Gereffi, Humphrey and Sturgeon, 2005). External value chain systems create value to the customers and to whole supply chain through establishing close relationships with customers and stakeholders.

De Martino and Morvillo (2008) indicate that the ability of the port to recognise and exploit interdependencies within and between different supply chains will determine its capability to create value in supply chains. In accordance with the classifications in studies of De Langen and Van der Lugt (2007) and Notteboom (2007) regarding major developments and trends in the port environment; external value chain systems (supra-systems) of ports can be listed from the wider system to the narrower one as; global production and trade systems, supply chain and logistics systems and transport and maritime transport systems.

Changes in Port Organisations and Value Chain Systems

The changes and developments occurring recently in supra-systems of ports have changed the traditional roles of ports and force port and terminals to implement changes in their structures. Globalisation of production (UNESCAP and KMI, 2005; Chlomoudis, Karalis and Pallis, 2003) led to the international division of labour (European Parliament, 2009) and global outsourcing (Pettit and Beresford, 2009), thus multinational transport companies (Notteboom, 2007) have emerged. By the effect of globally dispersed consumption nodes and higher demand on products and services (Paixao and Marlow, 2003), shipping companies established strategic alliances, mergers and acquisitions (Cullinane, 2005) to reduce the transport costs by sharing costs and risks. These resulted in increasing vessel sizes (Haynes, Hsing and Stough, 1997) to benefit from economies of scale and widening the operational areas to benefit from economies of scope. Another effect of globally dispersed consumption points and increasing vessel sizes was seen as the emergence of the hub-and-spoke network systems in liner shipping and development of transhipment ports (Martin and Thomas, 2001). Global port operators, having foreseen these events, repositioned their container terminals through joint ventures, port terminals concessions to meet this increase in vessel size (Paixao and Marlow, 2003). The changes in the network structure by the increase of vessel sizes and introduction of containerisation forced ports to compete globally rather than regionally in a more severe manner.

Strict environmental regulations, national and international policies supporting sustainability (De Langen and Van der Lugt, 2007) and increased safety and security levels (Estache and Trujillo, 2009) forced ports to act in compliance with the related standards. Specialisation and developments in maritime technologies (Coltof, 2000) led ports to adopt advanced equipment and information technologies (De Langen and

Chouly, 2004) and this had influences on the reduction of port labour but increase in productivity.

On the other hand, the developments in supply chains and logistics systems such as; global trends of logistics network restructuring and repositioning of regional and local distribution centres, rapid progress in product and process technology, introduction of advanced information and communication technologies in logistics networks (Marlow and Paixao, 2003), shortening product life cycles De Langen and Van der Lugt, 2007), new practices such as total quality management and just-in-time (UNESCAP and KMI, 2005), responsiveness to customer demands with shorter lead times, better dispersion of information and knowledge among stakeholders and customers (Haugstetter and Cahoon, 2010) had pressures on ports to position themselves in re-organising supply and logistics chains and re-define their strategies and goals to maintain their competitive positions in the market.

The rapid increase in the port competition have pressures on ports to improve the quality of the traditional port services, implement differentiation strategy by providing value-added logistics services and deliver door-to-door transport solutions (Coltof, 2000; Musso, 2009). The developments in the logistics and port environment have created the need for ports to be part of wider logistics networks and to provide value-added services (Verhoeven, 2010). In an era of economic globalisation ports are evolving rapidly from being traditional land-sea interfaces to providers of complete logistics networks and value-added logistics services (Bichou and Gray, 2005). Port authorities have roles such as concentrating on value added logistics, development of information and communication systems (Verhoeven, 2010) to enhance the integration of the supply chain actors and port networking by strategic cooperation with other ports to be more effective and retain their competitive position.

Effectiveness in Port Value Chain Systems

Robbins (1990) and Rieley and Clarkson (2001) emphasise the relation between organisational change and effectiveness as stating that effectiveness is the main objective of the change process. Although there are various approaches to effectiveness concept in management discipline such as goal attainment, human relations, internal processes, strategic constituencies, competing values, etc., assuming that seaports are open systems (Berrien, 1976) with permeable boundaries between

itself and broader supra-systems it is decided that 'systems approach' best fits with the nature of ports. From the systems point of view, organisational effectiveness is defined by Georgopoulos and Tannenbaum (1957: 535) as "the extent to which an organisation as a social system, given certain resources and means, fulfils its objectives without incapacitating its resources".

In the systems approach to organisational effectiveness, it is recognised that no organisation can reach overall effectiveness if one or more sub-systems are performing inadequately. Therefore, the sub-systems in a port organisation should be identified to reach and assess the whole effectiveness of the system (Karatas-Cetin and Cerit, 2010b). Effective organisations as open systems should interact with its parts and with a larger environment and respond to continuous change (Beckhard, 1969).

While efficiency and performance are widely studied concepts in port business and economics literature, there is still a limited number of papers (Baltazar and Brooks, 2007; Sayareh, 2007; Sayareh and Lewarn, 2006) attempting to explain the effectiveness of port organisations. This study attempts to evaluate organisational effectiveness of seaport from a multivariate perspective. For this, 13 measures that can explain the effectiveness of port organisations at all points are determined for the survey study. Related literature is provided in the following "determination of variables" section.

RESEARCH MODEL AND HYPOTHESIS

The main framework of the research model consists of four concepts which are: "external and internal drivers of change in ports", "changes in port organisation systems", "effectiveness in port value chain systems" and "organisational and individual characteristics of ports". Figure 1 represents the research model applied in the survey study and the related hypotheses developed by the authors.

In the first part of the model, the external and internal environmental determinants which force ports to change are stated. The aim is to understand the effects of these factors influencing port organisations' change implementations. The second component of the model includes the changes taken place in each of the port sub-systems. In the light of the studies of Robbins (1990), Connor and Lake (1994) and Prastacos, Derquist, Spanos and Wassenhove (2002); main areas of change in port organisations are determined as technological, structural, strategic and managerial and human resources. The third part of the

model involves measures identified for assessing the effectiveness of port value chain systems. The last component of the model is related to the organisational and individual characteristics of port organisations.

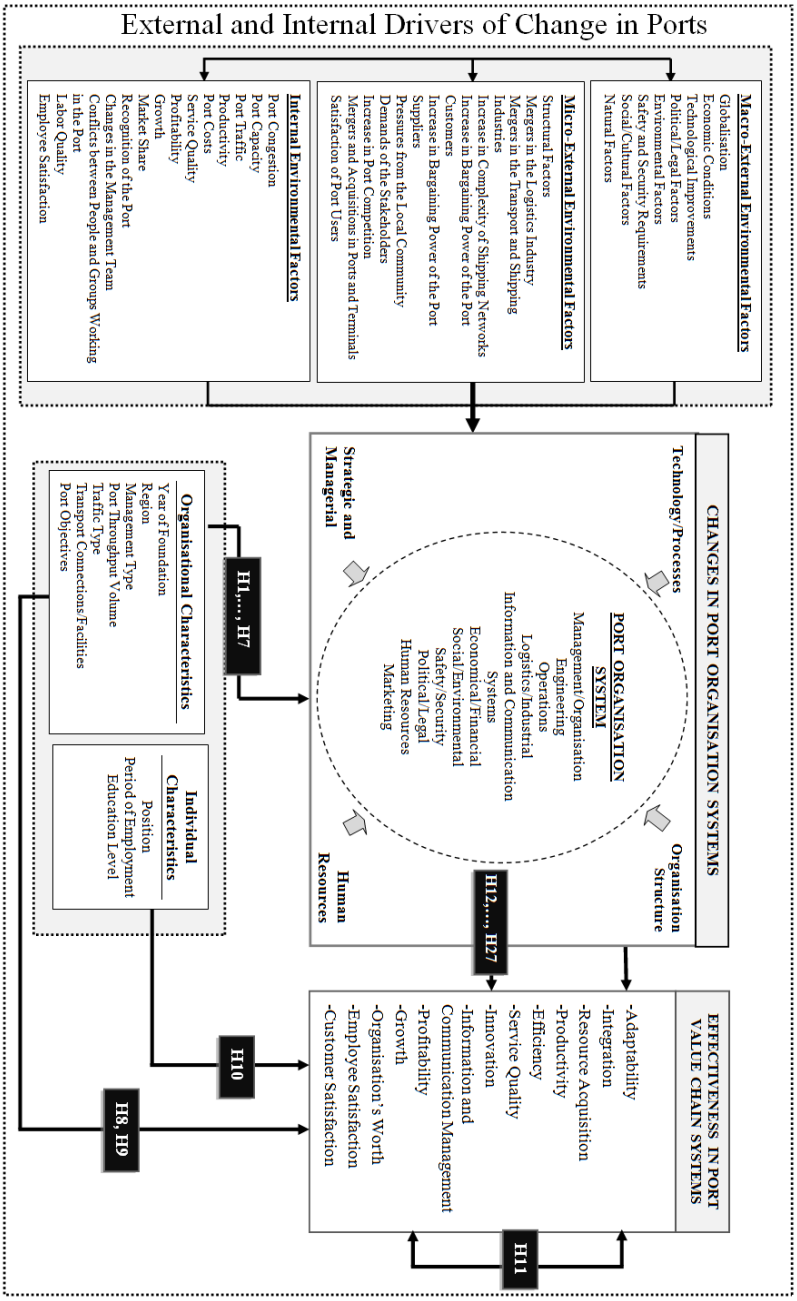

Figure 1. Survey Research Model

By the research model it is indicated that in order to achieve effectiveness, organisational changes which are triggered by external and internal forces, are implemented in each sub-system, through the whole port system and in four organisational areas of the port and as a result value is generated both internally and externally through achieving effectiveness in port organisations.

As shown in Table 1, 27 hypotheses were developed. Hypotheses from 1 to 7 were developed to identify the differences in perceptions regarding organisational change implementations with regard to *year of foundation* **(H_1),** *region the port located in* **(H_2),** *traffic type* **(H_3),** *port throughput* **(H_4),** *port ownership status* **(H_5),** *port transport connections* **(H_6)** and *port objectives* **(H_7).** Hypothesis 8, 9 and 10 were related to port effectiveness as such the performances of Turkish ports related to effectiveness measures differ with respect to the *port objectives* **(H_8)**, the importance of effectiveness measures differ with respect to the *port objectives* **(H_9)** and *respondents' position in the port organisation* **(H_{10}).** **H_{11}** was developed to reveal the perceptions regarding importance-performance associations of port effectiveness measures. Hypothesis ranging from 12 to 27 were developed to explore the causal relations between organisational change implementations and port effectiveness measures.

Table 1: Hypotheses of the Research

Hypothesis
H_1: Perceptions regarding organisational change implementations differ with respect to port's **year of foundation.**
H_2: Perceptions regarding organisational change implementations differ with respect to the **location** of the port.
H_3: Perceptions regarding organisational change implementations differ with respect to the **traffic type**.
H_4: Perceptions regarding organisational change implementations differ with respect to **port throughput volume.**
H_5: Perceptions regarding organisational change implementations differ with respect to **port ownership status.**
H_6: Perceptions regarding organisational change implementations differ with respect to **transport connections** of ports.
H_7: Perceptions regarding organisational change implementations differ with respect to **port objectives.**
H_8: Perceptions regarding the performances of ports on effectiveness measures differ with respect to **port objectives.**

H_9: Perceptions regarding the importance of effectiveness measures differ with respect to **port objectives.**
H_{10}: Perceptions regarding the importance of effectiveness measures differ with respect to the **position** of the respondents in the port.
H_{11}: There is a significant positive relationship between the **importance** given to the effectiveness measures and the perceptions regarding the **performances** of ports on effectiveness measures.
H_{12}: Organisational change implementations regarding **accessibility, logistics and customer orientation** have significant impacts on the perceptions of ports on their performances related to **integration.**
H_{13}: Organisational change implementations regarding **relations and cooperation with stakeholders** have significant impacts on the perceptions of ports on their performances related to **integration.**
H_{14}: Organisational change implementations regarding **technology, managerial and strategic viewpoint** have significant impacts on the perceptions of ports on their performances related to **adaptability.**
H_{15}: Organisational change implementations regarding **technology, managerial and strategic viewpoint** have significant impacts on the perceptions of ports on their performances related to **service quality.**
H_{16}: Introduction of **new equipment** and **information technologies** has significant impacts on the perceptions of ports on their performances related to **service quality.**
H_{17}: Introduction of **new equipment** and **information technologies** has significant impacts on the perceptions of ports on their performances related to **productivity.**
H_{18}: Introduction of **new equipment** and **information technologies** has significant impacts on the perceptions of ports on their performances related to **profitability.**
H_{19}: Introduction of **new equipment** and **information technologies** has significant impacts on the perceptions of ports on their performances related to **resource acquisition.**
H_{20}: Organisational change implementations regarding technology and the support of creative ideas have significant impacts on the perceptions of ports on their performances related to **innovation.**
H_{21}: Organisational change implementations regarding being innovative by the use of **information technologies**, increase in **cooperation and coordination between terminals** and focusing on the **strategic cooperation with the parties within logistics networks** have significant impacts on the perceptions of ports on their performances related to **information and communication management.**
H_{22}: Introduction of **new equipment** and **information technologies** has significant impacts on the perceptions of ports on their performances related to **growth.**

H_{23}: Organisational change implementations regarding **technology** and **human resources** have significant impacts on the perceptions of ports on their performances related to **efficiency.**
H_{24}: Organisational change implementations regarding **human resources, organisational structure and behaviour** have significant impacts on the perceptions of ports on their performances related to **employee satisfaction.**
H_{25}: Organisational change implementations regarding **human resources, organisational structure and behaviour** have significant impacts on the perceptions of ports on their performances related to **adaptability.**
H_{26}: Organisational change implementations regarding **social, environmental, safety and security issues** have significant impacts on the perceptions of ports on their performances related to **organisation's worth.**
H_{27}: Customer-oriented organisational change implementations have significant impacts on the perceptions of ports on their performances related to **customer satisfaction.**

RESEARCH METHODOLOGY

Questionnaire Design and Determination of Variables

Data for the survey were collected through the use of questionnaires. Questionnaire was comprised of four categories of variables that can be seen from the research model depicted by Figure 1; namely profile questions for the ports (organisational characteristics) and respondents (individual characteristics), external and internal determinants of change, organisational change variables and port effectiveness measures. The questionnaire form was constructed from information gathered by the literature review concerning the port business and management and organisation disciplines and preliminary qualitative researches such as Delphi study and semi-structured interviews that were conducted to the representatives of port organisations and associations.

Profile questions related to port traffic type, port throughput volume and port objectives were developed in accordance with the studies of Baltazar and Brooks (2007) and Brooks (2007).

As seen from the survey research model from Figure 1; 33 statements related to environmental determinants of change were provided with a seven point interval scale to assess their impacts on the changes experienced by port organisations as follows: 1: unimportant, 7: important. 25 statements related to organisational change implementations at ports were listed with a seven point Likert scale as follows: 1: strongly disagree, 7: strongly agree. 25 organisational change variables are also listed in Table 4 indicating the findings of the factor

analysis. Main organisational change variables developed in the survey can be listed as; the changes in organisational structure of ports (Estache and Trujillo, 2009; Marlow and Paixao, 2003), changes in management structure of ports (UNESCAP and KMI, 2005; Haralambides and Veenstra, 2002), changes in port equipment technologies (Coltof, 2000; Ninneman, 2008), changes in information technologies (Chlomoudis et al., 2003; De Langen and Chouly, 2004), changes in human resources management practices (Haynes et al., 1997), increase of responsibility related to safety and security, environmental and social issues (Estache and Trujillo, 2009; Rodrigue, 2010), increase in private participation and cooperation and coordination between terminals (Cullinane, 2005), integration of ports with supply chain and logistics networks, focusing on accessibility and logistics services (Bichou and Gray, 2005; Robinson, 2002) and adopting more customer focused marketing strategies (De Langen and Van der Lugt, 2007).

Regarding port effectiveness measures, 13 variables were constructed and used in two questions for the aim of identifying which measures the sample considered more important as compared to others and which measures the sample considered their ports' performances are higher related to each measure. For achieving these two aims first question was designed with a seven point importance scale where 1: very low importance, 7: very high importance and second question was developed with a seven point performance scale ranges from 1: very low performance to 7: very high performance.

Effectiveness measures for port organisations were developed as; productivity (Georgopoulos and Tannenbaum, 1957; Carbone and Martino, 2003; Park and De, 2004), efficiency (Olowokudejo and Aduloju, 2011; Tongzon and Heng, 2005), profitability (Friedlander and Pickle, 1968; Park and De, 2004), growth (Sayareh, 2009), service quality (Sayareh and Lewarn, 2006; Panayides, 2007), innovation (Chlomoudis et al., 2003; Haugstetter and Cahoon, 2010), information and communication management (Carbone and De Martino, 2003; Notteboom, 2007), adaptability (Marlow and Paixao, 2003; Sayareh and Lewarn, 2006; Tongzon and Heng, 2005), resource acquisition (Shilbury and Moore, 2006), integration (Paixao and Marlow, 2003; Panayides, 2006), organisation's worth (Friedlander and Pickle, 1968), employee satisfaction (Baruch and Ramalho, 2006) and customer satisfaction (Brooks, Schellinck and Pallis, 2011).

As seen from Table 2, effectiveness measures were explicitly defined in the questionnaire based on the studies of Carnall (2003), Georgopoulos and Tannenbaum (1957), Kök and Deliktaş (2003), Sayareh and Lewarn (2006) and Song and Panayides (2008) in order not to encounter any misunderstandings by the respondents regarding the content of each measure.

Table 2: Definitions of Port Organisations' Effectiveness Measures

Effectiveness Measures	Definition
1. **Productivity**	Achieving maximum level of outputs by using minimum level of inputs or resources in port services.
2. **Efficiency**	The production of the desired results with minimum waste of time, money, effort and skill and use of resources rationally with minimum costs.
3. **Service Quality**	The reliability and competence of the port services.
4. **Profitability**	Ability of the port to generate earnings as compared to its expenses and other relevant costs incurred.
5. **Growth**	Increase in port's business volume, incomes, manpower, assets, capacity and market share.
6. **Adaptability**	Successful adjustment of the port's internal system to internal organisational changes and successful adaptation of the port to externally induced change.
7. **Information and Communication Management**	Completeness in the collection and analysis of information and successful functioning of all the channels of communication within and between ports and other related parties.
8. **Innovation**	The level of usage of science and technology in port and successful implementation of creative ideas to generate value added services.
9. **Organisation's Worth**	The extent to which port organisation is of value to its employees, and the extent to which the port and its employees are of value to society.
10. **Employee Satisfaction**	The degree to which a port satisfies its employees' needs and expectations.
11. **Customer Satisfaction**	The degree to which a port satisfies its customers' needs and expectations.
12. **Resource Acquisition**	Ability of the port to acquire all the required resources (e.g. financial, technological and infrastructural).
13. **Integration**	Integration of the port to the supply chain and logistics networks, by the use of utilizing its multimodal transport connections.

Source: Compiled by the authors from Carnall (2003); Georgopoulos and Tannenbaum (1957); Kök and Deliktaş (2003); Song and Panayides (2008).

Design of Sample Size

Population was defined as all cargo ports in Turkey and the sampling frame employed was considered as the database of Undersecretariat for Maritime Affairs (2010). According to this database, 178 coastal facilities are located along Turkish coastline which comprises the population of the study. Judgemental sampling was used as the sampling method. Owing to the fact that such a study aiming to examine organisational and managerial dimensions of ports in terms of change and effectiveness necessitates a sample comprised of professional and advanced ports; Turkish ports serving to international traffic and with a throughput volume of more than 500,000 tons were included in the sample. Some other limitations were introduced during sampling by considering that coastal facilities such as liquid cargo storage and filling plants, the piers of refineries and energy production plants, piers used for military purposes would not contribute to the research objectives. Thus such coastal facilities were excluded from the sample. As a result, sample size for the study was determined as 73 port managers.

In the administration process of the survey, various survey data collection methods such as stamped self-addressed envelope, an official cover letter, telephone and e-mails were used together in order to overcome any sample bias. The full survey was carried out within 11 months. After discarding one incomplete questionnaire, the survey yielded 51 usable responses. So, the response rate appeared as 70%.

DATA ANALYSIS

SPSS 16.0 for windows statistical package was used to perform data analysis. Normality of the data was checked using Kolmogorov-Smirnov test. Since, normality assumption was not achieved and number of objects for each independent group did not exceed 30 (Gegez, 2010), *Mann-Whitney U tests* instead of independent samples t-tests were applied in order to test the differences between groups in the sample for H_1 to H_{10}. *Spearman correlation analysis* was applied with the aim of testing H_{11} and identifying importance-performance associations of effectiveness measures. *Multiple regression analysis* was conducted in order to understand and analyse the causal relationship between organisational change implementations (independent variables) and the performances of ports related to each effectiveness measure (dependent variable) (H_{12}-H_{27}). Tolerance and variance inflation factors (VIF) were identified to conduct multi-collinearity diagnostics analysis.

Homoscedasticity, linearity and normality assumptions were checked using scatter diagrams.

Exploratory factor analysis was conducted with the aim of identifying the areas of change taking place in Turkish port organisations. The authors used an orthogonal rotation for the factor analysis and beforehand Kaiser-Meyer-Olkin (KMO) measure of sampling adequacy and Barlett's test of sphericity were conducted to test the adequacy of the sample size and the availability of the factor model.

Reliability and Validity

In the research process the content, face, construct and scale validity of the questionnaire form were tested in accordance with the comments of 14 experts eight of which are academicians and six are practitioners from the port industry. A pilot study was carried out for testing the face validity of the questionnaire; expert opinions were gathered to test the content and scale validity and internal consistency analysis used to test the construct validity of the questionnaire.

As a form of reliability analysis, internal consistency analysis was applied by the use of cronbach's alpha coefficient. As seen from Table 3, cronbach's alpha values were above 0.90 for all variable categories, thereby satisfying the test and the results of the study were considered highly reliable.

Table 3: Internal Consistency Analysis (cronbach's alpha)

Variable Category	No of items	Sample Size (N)	Cronbach's Alpha (α)
Internal and External Determinants of Change in Ports	33	51	.936
Organisational Change Variables	25	50	.954
Effectiveness Measures (Importance)	13	50	.903
Effectiveness Measures (Performance)	13	50	.932

DISCUSSION OF THE FINDINGS

Profile of the Sample

It has been found out that a number of ports have been established during 1990s and 2000s (23.5% and 35.3% respectively). It appeared that 27 ports (52.9%), more than half of the participating ports are located in Marmara region. Majority of the ports (37%) employ between 50 and 100 personnel. In line with the privatisation trend in Turkey, the majority of the ports (74.5%) appeared as private ports,

while seven ports (13.7%) are privatised ports that formerly operated by Turkish State Railways and Turkish Maritime Organisation and only six ports (11.8%) are publicly-owned ports.

Major cargo type handled in Turkish ports appeared as dry bulk cargo with a percentage of 49. However regarding the volume of cargoes handled in all participating ports, general cargo (74.5%), dry bulk cargo (68.6%), liquid bulk cargo (49%) and container (37.3%) arose as the highest ones.

Regarding transport connections only 13 ports (26%) are connected with railways. Maximisation of profits (76.5%) and satisfaction of port users (72.5%) appeared as the highly adopted objectives by the participating ports.

External and Internal Determinants of Change at Ports

The major external drivers of changes at ports appeared as *economic situation* and *globalisation*. Recently the introduction of several *regulations about safety and security* in maritime transport and port business, as well as initiation of measures for environmental protection, have critical impact on ports.

Today the competition between ports is not at regional but global level. In addition to the *increase in global competition*, *partnerships and mergers between maritime transport businesses* decrease the number of players in the market, increased the *bargaining power of these businesses* against ports and *competition for ports* became harsher.

Survey research made it clear that the most important determinants of changes at ports are not external environmental factors but internal environmental factors such as *efficiency, service quality, profitability, port costs, port traffic, growth targets, market share, port capacity* and *labour quality and satisfaction of port employees*, which are related to human resources.

Factor Analysis: Grouping Organisational Change Implementations at Ports

According to the results of Kaiser-Meyer-Olkin (KMO) measure of sampling adequacy and Barlett's test of sphericity tests, it appeared that the factor model and sample size was proper to pursue the factor analysis as KMO value was higher than 0.5 (0.826) and p value for Barlett's test which refers significance was lower than 0.05 (p: 0.000).

The main fields that changes have been implemented within Turkish port organisations were concentrated in five factor groups (within 25 OC variables) with a total variation of 77 percent. The main areas of change in Turkish port organisations, the cronbach's alpha scores and the total variations explained by each group are as follows:

Factor 1: Human Resources, Organisational Structure, Behaviour and Responsibilities (α : 0,947 – TVE : 28.6%)

Factor 2: Accessibility, Logistics and Customer Orientation (α : 0,918 - TVE : 17%)

Factor 3: Technology, Managerial and Strategic Viewpoint (α : 0,879 - TVE : 16.3%)

Factor 4: Relations and Cooperation with Stakeholders (α : 0,758 - TVE : 9.3%)

Factor 5: Private Sector Participation (TVE : 6%)

Factor groups and organisational change variables that are involved in each factor group, factor loadings, total variations explained by each group and cronbach's alpha scores of each factor group are represented by Table 4.

Table 4. Findings of Factor Analysis: Grouping Organisational Change Implementations at Ports

Factors of Organisational Change	Alpha (α)	TVE%	Factor Groupings and Loadings				
			I	II	III	IV	V
Factor 1: Human Resources, Organisational Structure, Behaviour and Responsibilities	**.947**	**28.639**					
increase in the **delegation of the authorities** of the managers to the subordinates			.861				
sensitiveness to the **safety and security issues**			.791				
focusing on **corporate values and corporate social responsibility issues**			.791				
supporting **creative ideas**			.765				
focusing on the **employee education programs**			.741				
sensitiveness to the **environmental issues**			.707				
focusing on the **improvement of the HR quality**			.689				
supporting **team working**			.685				
participation in decision making in the strategic concepts			.661				
becoming more innovative by using the latest **information technology**			.655				
decentralization in decision making process			.519				

(CONTINUED) Factors of Organisational Change	**Alpha (α)**	**TVE%**	**Factor Groupings and Loadings**				
			I	**II**	**III**	**IV**	**V**
Factor 2: Accessibility, Logistics and Customer Orientation	**.918**	**17.104**					
focus on the **hinterland relations and connections**				.905			
focus on the **connectivity of the port with industrial areas**				.839			
focus on the **intermodal connectivity**				.826			
value added logistics activities within the port/terminal				.737			
customer focused marketing strategies				.609			
Factor 3: Technology, Managerial and Strategic Viewpoint	**.879**	**16.391**					
increase in the **cooperation and coordination between terminals**					.807		
introduction of **new management styles**					.796		
adoption of **supply chain and logistics network oriented strategies**					.731		
flexible and horizontal organisational structure					.681		
management's focus on **intermodal and logistics integration**					.596		
introduction of **new equipment technologies**					.526		
Factor 4: Relations and Cooperation with Stakeholders	**.758**	**9.306**					
focusing on the **port users' needs and expectations**						.619	
focusing on the **strategic co-operation with the parties in the logistics network**						.555	
Factor 5: Private Sector Participation	-	**5.944**					
increase in **the roles and responsibilities of the private companies**							.863

It can be expounded that changes in Turkish ports are implemented in every aspect of the organisation and the changes in the organisational areas such as port technologies, structure, human resources and strategic and managerial viewpoint occurred interactively. Factor 2, 3 and 4 are later used as independent variables in the multiple regression analysis.

Hypothesis Testing (H_1-H_7): Comparative Analysis of the Perceptions Regarding Organisational Change Implementations

The findings of the comparative analysis testing hypothesis ranging from H_1 to H_{10} are stated by Table 5. After analysing the perceptions regarding organisational change implementations of Turkish ports whether it differs with regard to organisational characteristics following findings were revealed. The roles and responsibilities of private companies have increased at Turkish ports that had started operations after 1990s, and these ports focus more on supply chain and logistics strategies than the ones that were established before 1990. This could be associated with the acceleration of private port investments and especially container port investments in Turkey during 1990s as stated by Ministry of Transport (2009).

Organisational changes regarding environmental issues were not implemented as extensively in container and ro-ro ports as the ports without such type of traffic. The reason could be that these two cargo types do not have serious environmental impacts like the other cargoes namely dry and liquid bulk cargoes.

As an expected finding, in ports handling dry bulk cargoes, introduction of new equipment and information technologies are not as widely seen as in the container or liquid bulk terminals ports. Liquid bulk terminals and ports with higher traffic volumes handling more than 3 million tonnes focus more on the education programs and improvement of the quality of their human resources.

In Turkey private and privatised ports however not public ports, position themselves as an integral part of the supply chain and develop strategies concerning the intermodal connectivity with the industrial regions and supply chain integration. The most significant differences between privatised and public ports are that; privatised ports focus more on the supply chain oriented strategies, the relations with the stakeholders within logistics networks and connectivity with the industrial areas.

Hypothesis Testing (H_8-H_{10}): Comparative Analysis of the Perceptions Regarding Effectiveness Measures

Differences in importance attached to effectiveness measures by Turkish ports and the performance they perceive for every measure were determined with regard to port objectives. Compared to the ports which do not aim at adapting to changing conditions, ports which have such aims assign more importance to such measures as; *information and*

communication management which is associated with using technology and *adaptability* and *growth* measures. In this context, for Turkish ports with the aim of adapting to the changes, technological innovations as well as adapting to external environment and increasing the assets, capacities, business volumes and market shares of ports appeared to be more important.

However, it has been observed that the ports with the aim of adapting to the changes have higher perceived performances on *employee satisfaction* and *organisation's worth*. Thus, the following evaluation will not be a wrong one: the recent acceleration in human resources development practices by ports with the aim of adapting to changes brings an explanation to the perception of higher performance on employee satisfaction by ports.

The ports with the aim of maximisation of port profits attach more importance to the *profitability* measure, and the performance perceived by these ports related to profitability is higher. The ports with the goal of contributing to the local and national economic development assign more importance to the value of the port for its employees and the society; this can associated with the fact that these ports provide social benefit and create value through supporting societal and economic development.

Table 5: Findings of Mann-Whitney U Tests: Comparative Analysis

Hypothesis	**Significant variables**
($H_1 - H_7$): *Organisational change implementations differ with respect to…….*	
H_1: port's year of foundation *1: ports established before 1990 (n:17)* *2: ports established after 1990 (n:20)*	* increase in the roles of private companies (z:-2,779; p:0,005; Mean: 1:5,09; 2:6,180) * SC and logistics oriented strategies (z:-2,161; p:0,031; Mean: 1:4,50; 2:5,57) * decentralized decision making (z:-2,324; p:0,020; Mean: 1:3,95; 2:5,50) * focus on value added services (z:-2,018; p:0,044; Mean: 1:4,86; 2:5,71) * focus on interconnectivity with industrial areas (z:-1,996; p:0,046; Mean: 1:4,77; 2:5,68)
H_2: port location *1: ports not located in Marmara Region (n:23)* *2: ports located in Marmara Region (n:27)*	* increase in the roles of private companies (z:-2,231; p:0,026; Mean: 1:5,17; 2:6,15) *focus on the improvement of HR quality (z:-3,021; p:0,003; Mean: 1:6,09; 2:5,04) * focus on employee education programs (z:-2,334; p:0,020; Mean: 1:5,91; 2:5,30) * strategic cooperation with the parties in logistics network (z:-2,481; p:0,013; Mean: 1:5,74; 2:5,07)

H_3: port traffic type *1: ports handling stated cargo type* *2: ports not handling stated cargo type*	*Container (n:18)* *sensitiveness to environmental concerns (z:-2,963; p:0,003; Mean: 1:5,78; 2:6,38) *Dry Bulk (n:34)* *introduction of new equipment technologies (z:-2,142; p:0,032; Mean: 1:5,53; 2:6,50) *innovativeness by using IT (z:-2,741; p:0,006; Mean: 1:5,53; 2:6,56) *focus on the improvement of HR quality (z:-2,037; p:0,042; Mean: 1:5,21; 2:6,19) *focus on corporate values and CSR issues (z:-2,260; p:0,024; Mean: 1:5,18; 2:6,06) *Liquid Bulk (n:25)* * SC and logistics oriented strategies (z:-2,004; p:0,045; Mean: 1:4,64; 2:5,56) *flexible and horizontal organisation structure (z:-2,431; p:0,015; Mean: 1:4,84; 2:5,88) *supporting creative ideas (z:-2,085; p:0,037; Mean: 1:5,32; 2:6,12) *General Cargo (n:37)* * focus on employee education programs (z:-2,241; p:0,025; Mean: 1:5,35, 2:6,25) *Wheeled Cargo (n:17)* *focus on employee education programs (z:-2,553; p:0,011; Mean: 1:4,94, 2:5,91) *sensitiveness to environmental concerns (z:-2,539; p:0,011; Mean: 1:5,71; 2:6,39) * sensitiveness to safety and security concerns (z:-2,024; p:0,043; Mean: 1:6,00; 2:6,48)
H_4: port throughput volume *1: ports with annual throughput below 3 million tonnes (n:27)* *2: ports with annual throughput over 3 million tonnes (n:23)*	*delegation of managerial authority (z:-2,645; p:0,008; Mean: 1:4,85; 2:5,78) *focus on the improvement of HR quality (z:-2,109; p:0,035; Mean: 1:5,07; 2:6,04) *focus on employee education programs (z:-2,355; p:0,019; Mean: 1:5,26, 2:5,96)
H_5: port ownership status *1: private ports (n:37)* *2: public ports (n:6)* *3: privatised ports (n:7)*	*Private vs. Public ports* * increase in the roles of private companies (z:-2,481; p:0,015; Mean: 1:5,86, 2:4,33) *managerial focus on intermodal and logistics integration (z:-2,235; p:0,026; Mean: 1:4,95, 2:2,83) *cooperation and coordination between terminals (z:-2,164; p:0,035; Mean: 1:5,51, 2:4,00) * decentralized decision making (z:-2,160; p:0,031; Mean: 1:4,65, 2:3,00) *Public vs. Privatised ports* *managerial focus on intermodal and logistics integration (z:-2,103; p:0,035; Mean: 3:5,57, 2:2,83) *SC and logistics oriented strategies (z:-2,240; p:0,035; Mean: 3:5,86, 2:3,50) *decentralized decision making (z:-2,394; p:0,014; Mean: 3:5,29, 2:3,00) *focus on interconnectivity with industrial areas (z:-2,284; p:0,022; Mean: 3:6,43, 2:4,33) *Private vs. Privatised ports* *focus on interconnectivity with industrial areas (z:-2,701; p:0,009; Mean: 1:5,22, 3:6,43)

H_6: port transport connections	Hypothesis rejected
H_7: port objectives *1: ports aiming to adapt to the changing conditions (n:28)* *2: ports not aiming to adapt to the changing conditions (n:22)*	*support in team working (z:-2,192; p:0,028; Mean: 1:5,96, 2:5,32) *****focus on employee education programs (z:-2,385; p:0,017; Mean: 1:5,82, 2:5,27) *focus on intermodal connectivity (z:-1,966; p:0,049; Mean: 1:5,32, 2:4,64)
H_8: Performances on effectiveness measures differ with respect to **port objectives.** *1: ports which have the stated objectives* *2: ports which don't have the stated objectives*	*Adapting to the changing conditions (n:28)* *organisation's worth (z:-2,090; p:0,037; Mean: 1:5,89, 2:5,18) *employee satisfaction (z:-2,004; p:0,045; Mean: 1:5,50, 2:4,77) *Maximization of port profits (n:38)* *profitability (z:-2,371; p:0,018; Mean: 1:5,45, 2:4,67) *Maximization of port traffic (n:30)* *customer satisfaction (z:-2,036; p:0,042; Mean: 1:5,67, 2:6,20) *Contribution to the local and national economic development (n:30)* *adaptability (z:-2,008; p:0,045; Mean: 1:5,73, 2:5,15)
***(H_9 – H_{10}):** Importance of effectiveness measures differ with respect to ……*	
H_9: port objectives *1: ports which have the stated objectives* *2: ports which don't have the stated objectives*	*Adapting to the changing conditions (n:28)* *growth (z:-2,561; p:0,010; Mean: 1:6,14, 2:5,32) *adaptability (z:-2,330; p:0,020; Mean: 1:6,14, 2:5,45) *information and communication management (z:-2,027; p:0,043; Mean: 1:5,96, 2:5,45) *innovation (z:-2,608; p:0,009; Mean: 1:6,00, 2:5,09) *Maximization of port profits (n:38)* *profitability (z:-2,252; p:0,024; Mean: 1:6,03, 2:5,33) *Contribution to the local and national economic development (n:30)* *organisation's worth (z:-2,375; p:0,018; Mean: 1:5,97, 2:5,25) *Maximization of return on investment (n:24)* *innovation (z:-2,501; p:0,012; Mean: 1:6,12, 2:5,12) *customer satisfaction (z:-2,426; p:0,015; Mean: 1:6,67, 2:6,04) *integration (z:-2,154; p:0,031; Mean: 1:5,67, 2:4,96)
H_{10}: position of the respondents *1: respondents that are general/port managers (n:25)* *2: respondents with other positions (n:25)*	*efficiency (z:-2,681; p:0,007; Mean: 1:6,36, 2:5,64)

*Mean values are based on 7 point Likert type scale.

Hypothesis Testing (H_{11}): Importance-Performance Associations Related To Effectiveness Measures

When the importance assigned to effectiveness measures and the performance perceived at each measure are evaluated, it can be inferred that the ports could not be as successful as the importance they give implies. As seen from Figure 2, it is interesting that the measures with the highest difference between importance and performance were witnessed in such variables as service quality, profitability, growth, efficiency and productivity that were more frequently used (identified through descriptive analysis) for measuring the performance of ports.

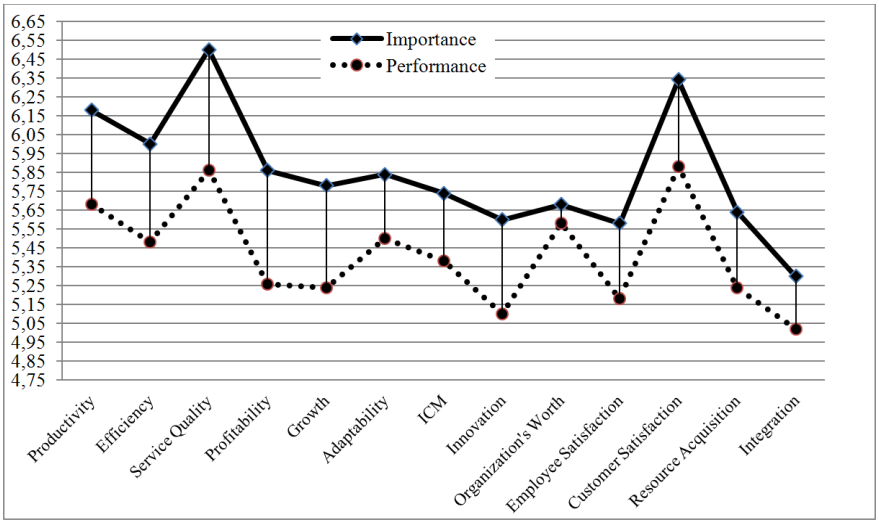

Figure 2: Comparison of Importance-Performance Levels of Effectiveness Measures

The spearman rank coefficients reaffirm the higher positive importance-performance associations for *innovation, resource acquisition, integration* and *adaptability*. Effectiveness measures and the perceived performances of ports related to each measure, it can be expounded that among Turkish ports, those ports that pay importance to acquisition of all required resources, organizing internal system through utilization of these resources and adapting to the external environment by integrating with supply chains and by focusing on accessibility are the ones which are most successful at these measures.

Although importance-performance correlations at the most widely used measures namely *service quality, customer satisfaction, profitability, growth* and *productivity* is low, the difference between importance and performance levels turned out to be high. Accordingly, it can be stated

that the perceived performances of Turkish ports in the abovementioned measures are lower than the required level.

Hypothesis Testing (H_{12}-H_{27}): Causal Relationships between Organisational Change Implementations and Effectiveness at Ports

Table 6: Findings of Multiple Regression Analysis: Causal Relations between Organisational Changes and Effectiveness at Ports

Hyp.	Independent Variables	Dependent Variable	Significant Variable	Result
H_{12}	**Factor 2:** Human Resources, Organisational Structure, Behaviour and Responsibilities	Perceived performance on **integration**	Focusing on the **intermodal connectivity** (p=0.008)	**Accept**
H_{13}	**Factor 4:** Relations and Cooperation with Stakeholders	Perceived performance on **integration**	Focusing on the **strategic co-operation with the parties in the logistics network** (p=0.010)	**Accept**
H_{14}	**Factor 3:** Technology, Managerial and Strategic Viewpoint	Perceived performance on **adaptability**	**----------**	**Accept**
H_{15}	**Factor 3:** Technology, Managerial and Strategic Viewpoint	Perceived performance on **service quality**	Introduction of **new equipment technologies** (p=0.017)	**Accept**
H_{16}	Introduction of new equipment technologies / Becoming more innovative by using the latest information technology	Perceived performance on **service quality**	Introduction of **new equipment technologies** (p=0.009)	**Accept**
H_{17}	Introduction of new equipment technologies / Becoming more innovative by using the latest information technology	Perceived performance on **productivity**	**----------**	**Accept**
H_{18}	Introduction of new equipment technologies / Becoming more innovative by using the latest information technology	Perceived performance on **profitability**	----------	Reject
H_{19}	Introduction of new equipment technologies / Becoming more innovative by using the latest information technology	Perceived performance on **resource acquisition**	----------	**Accept**
H_{20}	Introduction of new equipment technologies / Becoming more innovative by using the latest information technology / Supporting creative ideas	Perceived performance on **innovation**	Introduction of **new equipment technologies** (p=0.023)	**Accept**

H_{21}	Becoming more innovative by using the latest information technology / Increase in cooperation and coordination between terminals / Focusing on the strategic co-operation with the parties in the logistics network	Perceived performance on **information and communication management**	Increase in **cooperation and coordination between terminals** (p=0.044)	**Accept**
H_{22}	Introduction of new equipment technologies / Becoming more innovative by using the latest information technology	Perceived performance on **growth**	----------	**Accept**
H_{23}	Introduction of new equipment technologies / Becoming more innovative by using the latest information technology / Focusing on the improvement of HR quality / Focusing on the employee education programs	Perceived performance on **efficiency**	Introduction of **new equipment technologies** (p=0.011)	**Accept**
H_{24}	Introduction of new management styles / Flexible and horizontal organisational structure / Decentralization in decision making process / Participation in decision making in the strategic concepts / Supporting team works / Supporting creative ideas / Increase in the delegation of the authorities of the managers to the subordinates / Focusing on the improvement of the HR quality / Focusing on the employee education programs	Perceived performance on **employee satisfaction**	Introduction of **new management styles** (p=0.008)	**Accept**
H_{25}	Introduction of new management styles / Flexible and horizontal organisational structure / Decentralization in decision making process / Participation in decision making in the strategic concepts / Supporting team works / Supporting creative ideas / Increase in the delegation of the authorities of the managers to the subordinates / Focusing on the improvement of the HR quality / Focusing on the employee education programs	Perceived performance on **adaptability**	----------	**Accept**
H_{26}	Focusing on corporate values and corporate social responsibility issues / Sensitiveness to the environmental issues / Sensitiveness to the safety and security issues	Perceived performance on **organisation's worth**	----------	Reject
H_{27}	Focusing on the port users' needs and expectations / Customer focused marketing strategies	Perceived performance on **customer satisfaction**	----------	Reject

Findings of the multiple regression analysis testing the hypothesis ranging from 12 to 27 are stated by Table 6. All of the hypothesis except H_{18}, H_{26} and H_{27} are accepted.

The "significant" organisational change variables which have direct impact on the effectiveness of Turkish ports were determined as focusing on the *intermodal connectivity* and *strategic co-operation with the parties in the logistics network*, increase in *cooperation and coordination between terminals*, introduction of *new equipment technologies* and *new management styles.*

The *focus of ports on intermodal connectivity and cooperation with parties in logistic networks* has major impacts on the "integration of ports with supply chain and logistic networks using multimodal transport connections". As such, within the accessibility strategy implemented for the aim of integrating within supply chains, the prominent issues are ensuring intermodal transport connections between ports and their hinterlands and establishment of strategic cooperation for performing investments beyond port area.

It has been observed that *introduction of new management techniques* in Turkish ports in the recent years has positive impacts on "employee satisfaction" in addition to "adaptation to change". As a matter of fact, it has been found out that organisational and managerial characteristics of ports is an essential element as it determines port management policies and has direct impacts on management-employee relations.

It has been appeared that the most important element which increases port effectiveness is *introduction of new equipment technologies*. In Turkish ports introduction of new equipment technologies has significant impacts on the perceived performances of "efficiency" and "service quality", however, it has been observed that adoption of information technologies has impacts on neither of the measures. Research findings support the notion that change implementations related to the usage of information technologies and human resources development is a rather brand new change practice in Turkish ports.

It has been observed that *introduction of new equipment technologies* directly affected the perceived performance on "innovation", however, being innovative by using information technology and supporting creative ideas did not appear that influential. When these aspects are evaluated in conjunction with efficiency and service quality,

one can conclude that as adoption of information technologies in Turkish ports is very new for most ports; their impacts on port effectiveness has not been observed yet.

It has been extracted that *better cooperation and coordination between terminals* has significant impact on the performance of information and communication management of Turkish ports whereas the effect of *introduction of information technologies* is negligible. As such, it has become clear that cooperation and close relations between parties is a more important determinant than information technology to enable information-sharing and communication in ports.

DISCUSSION AND CONCLUSION

This study has been concerned with the concepts of organisational change and effectiveness which are major issues of management and organisation discipline. It is believed that the study provided contribution to organisational change and effectiveness literature by studying port organisations within the context of value chain approach and to port management and business literature by studying the value chain systems related to ports within the concept of relation between organisational change and effectiveness.

Scientific Implications

Considering effectiveness concept in port studies, Sayareh (2009) studied port effectiveness from the viewpoint of systems approach and identified the measures and conducted a conceptual study rather than an empirical one. Brooks et al. (2011) handled port effectiveness from the aspect of user satisfaction, competitiveness and service effectiveness and applied a survey research. In this study, however, ports are handled as value-generating systems and effectiveness measures were determined and measured for each sub-system of the ports and for the entire port system. Thus, an effort has been made to ensure that determined effectiveness measure cover the whole port value chain system. In this sense it is believed that this study will lead to some others on port effectiveness.

In line with the findings of hypothesis tests following scientific implications have been reached in the study:

- When compared to human resource oriented change implementations, more technological-oriented change implementations are performed in the port industry.

- In ports, change implementations regarding human resources training and development are related to the usage of new equipment and information technologies. At ports, introduction of new technologies require qualified and educated human capital and for this reason in ports with higher technology focus is on development of human capital.
- In addition to high-technology ports, those with high throughput volumes emphasise on education and development of the port labour.
- Accessibility and supply chain orientated port strategies are mostly developed and implemented by private and privatised ports that are managed with a commercial approach.
- In ports, ensuring flexibility in organisation structures and managing ports with more modern techniques is highly influential in the performance of the port on adapting to internal and external environment. As such, adaptation to the changes is ensured with arrangements in organisational and managerial structure along with human resources.
- Introduction of new management techniques in ports has significant impacts on employee satisfaction.
- Introduction of new equipment technologies at ports has significant impacts on the port service quality as well as efficiency and innovation. As such, effectiveness in ports is related to using new equipment technologies in from several aspects.

Managerial Implications

The results of the survey have several managerial implications. Evidence from the study suggests that in Turkish ports there have been attempts at environmental protection and security; however, no emphasis has been on the connectivity of ports with their hinterlands and industrial areas, and modification of port strategies in a supply chain-oriented manner beyond the port. Today the competition is between supply chains, not between ports (De Langen and Chouly, 2004); it is believed that Turkish ports will increase the value they generate by strategic partnerships with the parties in logistic networks as well as developing transportation and logistics connections. New investments related to IT systems are increasing in Turkey too; however, there is a need to develop systems such as "port community information systems" which are used in more modern ports of Europe to connect ports and other related parties.

Based on the understanding that port performance should not be evaluated only on operational measures such as productivity and efficiency, it is believed that the set of port effectiveness measures in the study will be taken into consideration in application by port managers for measuring the performances of their ports.

An important evaluation for port managers can be that, in Turkish port industry, organisational structures are becoming more flexible focusing on information sharing and cooperation, teamwork and creative thinking is being supported and port managers are applying modern management techniques and port management philosophies are changing. In this sense, institutionalisation and professionalism at ports is becoming prominent.

Limitations of the Study

There are some limitations that stem from the subject of the study and appear during empirical research. In the questionnaire form, evaluation has been made for the perceptions of the top managers participated to the survey for 13 effectiveness measures. Productivity, service quality, profitability etc. were to be measured for each port individually and in detail rather than based on just the perceptions of managers, but this could not be possible as measuring each of these variables required diverse specialisations and would take a very long time to complete. Measures that different port stakeholders should evaluate such as employee satisfaction, customer satisfaction and organisation's worth were evaluated by only top managers due to same limitations.

The sample covered several Turkish ports with different organisational characteristics as traffic and cargo type, ownership status, etc., which acted as a limitation for narrowing down the sample. However, the sample was chosen as wide as possible due to such reasons as the restrictions on the sample size in industrial markets, hence, the low number of ports in Turkey that are believed to make contribution for the study. As a matter of fact, the sample could not include all of the ports in Turkey, which is another limitation.

The ports participating in the survey research took as long as one year to respond the questionnaire forms. As the research topic was related to the change in ports, it was believed that such a long period of return for surveys could affect the research findings, which acts as another limitation for the study. However, as the number of ports participating in the study was low in the beginning, they were reminded of the survey forms through phone calls, e-mails and fax messages, and

it took a relatively long time to reach the number (50) that is required for implementation of several analyses.

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