1.1 INTRODUCTION

The economic development of any nation depends upon the availability of resources and the productive capacity of that country. The productive capacity depends upon the ability to move goods from one place to another place. In the modern economy, where large-scale production is the order of the day, goods have to be transported either in a semi-finished form or finished form. Similarly, with the development of territorial specialization, significance of international and coastal trade has come to prominence, besides other benefits. Thus in these two respects, the sea transport system speaks favourably over the air and surface transport systems.

Transportation of goods is an essential feature of international trade. Ports and ships are inalienable elements of sea home transportation. Ports are the natural inlets and outlets of economy. From time immemorial, marine transportation has been the main gateway of world’s sea-borne trade and more than 90 per cent of the foreign trade is carried on through ports. Nearly 75 per cent of the earth’s surface is covered with water and sea, and therefore, have their impact on the pattern of international trade. Ports are the arterial nodal of a country’s industrial and economic development.

Ports play a vital role in building up the economy of our country, as more than 90 per cent of the export move by maritime transport. In our developing nation, there are forces working towards
a more open economy, as the limited capacity of internal market does not give enough scope for the expansion of the output of any sector. The general level of economic activities of our country depends heavily on the business conditions of its export markets. It is in this respect, that the ports in our developing economy influence their international trade. The efficiency and the economy of operation in the ports help the growth of international trade of the country.

**Port**

The word “Port” originates from the Latin word “Porta” signifying an entrance or gate. “A ‘port’ may be defined as a terminal point at sea, providing resting place for the ships and half-way house for their cargo. ‘Port’ may be defined as sea-borne gateway for the foreign and intra-country cargo movement, serving as shelter and service station for vessels. Port is “a place where vessels may discharge or receive their cargoes”.

A port may be an ideal one, if it is protected from storms and has a deep draft, wider facilities for storage and sufficient space for turn round of ships.

**1.2 NEED FOR THE STUDY**

The availability of resources and the productive capacity of a country determine its economic development. The productive capacity depends upon the ability to move goods from one place to another
place. Different nations are blessed with different geographical and
topographical conditions so that each country concentrates on the
production of certain goods which they can produce cheaply and
procure the other goods from other countries where they are being
produced comparatively cheaper. When the economy is geared to
produce more than what it requires, the importance of shipping the
goods to other countries arises.

Transportation of goods is an essential feature of international
trade ports and ships are the essential elements of sea borne
transportation. From time immemorial marine transportation has
been the main gateway of world’s sea borne trade. More than 90
per cent of the foreign trade is carried on through ports. There are at
present 236 ports in India out of which 12 are major ports. Tamil
Nadu is the only state in India, which has three major ports viz
Tuticorin, Chennai and Ennore. The port service competitiveness is
essential for the survival and success of the port terminals. The prior
studies related to the major ports in India revealed that the Indian
ports are not competitive with the ports in the nearby foreign
countries. Hence, the present study focuses on the performance of
the major ports in Tamil Nadu and also the causes for such
performance of the ports.
1.3 STATEMENT OF THE PROBLEM

Because of the new economic policy of India, globalization, liberalization and privatization, a large number of multinational organizations have entered into the Indian market. Under the above circumstances, major ports have an important role to play in the economic development of India. Hence, the researcher is interested in making a thorough study of the performance of major ports.

1.4 SCOPE OF THE STUDY

Out of the 12 major ports of India, three are in Tamil Nadu. The present study would cover only the three major ports of Tamil Nadu which are at, Chennai, Ennore and Tuticorin. The other major ports of India have not been included for thorough study. The performance of these ports is examined with the help of the traffic in these ports from 2001-02 to 2008-09.

1.5 REVIEW OF RELATED STUDIES

1. Performance of port

Dow and Leschine (1990)\(^1\) found that the productivity of container port/terminal depends on the efficient use of land, labour and capital.

Barros and Athanassion (2004)\(^2\) used input and output variables to measure the performance of the port. The included input

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variables are labour input, land/capital equipment input and other input variables like number of tugs, amount of delay time and uniformity of cargo whereas the included output variables are cargo through port, level of service and user satisfaction, ships’ operating speed, tons of liquid bulk cargo and number of passengers.

Roll and Hayuth (1993)\textsuperscript{3} considered the users’ satisfaction on the various services offered by the port authorities and also at port terminal.

Yen and Chia (2008)\textsuperscript{4} found that India’s efficiency score is unsatisfactory, with the country ranking 6\textsuperscript{th} among ports using the CCR model and 10\textsuperscript{th} using the BCC model. Indian ports are facing three major barriers to its development. These are underdeveloped base infrastructure, official corruption and absurd clauses in the country’s labour laws.

2. Models for the measurement of performance of the port

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Tong Zon (1995)\textsuperscript{5} adopted multiple linear regression models to build a model of the efficiency of ports, deriving estimates of relative efficiency for a sampling of 23 international container ports.

Kin and Sachish (1986)\textsuperscript{6} used the total factor productivity (TFP) to investigate the annual growth of the Israeli port of Ashadod’s economic and technical scales.

Estache \textit{et al.}, (2004)\textsuperscript{7} applied total factor productivity malquist index (MI) analysis to evaluate the state of operations at 11 major Mexican ports between 1996 and 1999.

Kaisar \textit{et al.}, (2006)\textsuperscript{8} evaluated the efficiency of ports with the help of different types of Data Envelopment Analysis (DEA).

Tongzon (2001)\textsuperscript{9} selected the DEA - Constrained categorical regression model, to study the efficiency of four Australian and 12 other international container ports, and tested whether differences in output affected the performance and efficiency of the ports.


Yen and Chia (2008)\textsuperscript{10} examined the competitiveness of National ports with the help of Revealed Comparative Advantage (RCA) analysis and Data Envelopment Analysis (DEA). They found that the freight industry is relatively competitive while its transportation industry is not. They found that India’s largest container port (Jawaharlal Nehru) is not very efficient. The RCA analysis shows that Indian skill has a relative comparative advantage over its industrialized counterparts except for Japan and France in the transportation service industry.

Ganzalez and Tryills (2008)\textsuperscript{11} applied the translog distance function to the shipping industry to gauge whether ten Spanish ports saw their technical efficiency to improve doing three waves of reforms. The study not only found clear changes in the development of ports, but also a substupartial improvement in the use of technology.

Cullinane and Gray (2002)\textsuperscript{12} applied stochastic frontier production models to compare the efficiency of 15 container ports and terminals in Asia between 1989 and 1999.

3. Facilities at port

Pillnia (2008)\textsuperscript{13} identified that the ports of Shangai in China and Chittagong in Bangladesh proved to have particularly efficient container operations. Comparing the Indian Ports’ efficiency, with that of others in G7 and N-11 countries, Indian port is less competitive than the port of Shanghai in China. The port operations at Shangai and Chittagong were rated as being efficient over six year periods.

Debbie and Hakkan (2006)\textsuperscript{14} found that the value of resources is closely connected to how newly created actors are able to activate networks of existing yet passively connected resources.

Chinonye et al., (2004)\textsuperscript{15} analysed the service quality expectation and perceptions on Nigerian port service. They found that the service offered in Port Harcourt had a more favorable influence on the actual perception on quality received, than in the case with the service in Lagos.

Hammer and Champy (1994)\textsuperscript{16} suggested that port managers should look carefully at each of the dimensions, where customers perceived that they are receiving a different service than expected, and

\begin{itemize}
\end{itemize}
consider the extent to which they should work on influencing expectations or perceptions, or both. The privatization and liberalization of port sector will gradually erode any difference between ports.

Alexander and Tzannatos (1997)\textsuperscript{17} studied the man – machine interface and its impact on shipping safety. The accumulation of many ship board operations on the bridge of the ship demands that a high level of efficiency must be ensured. It depends on the success of incorporating the human factor in the engineering systems of ship control.

Engelzon \textit{et al.}, (1993)\textsuperscript{18} revealed that the ships pollute ports through gas emission from the main engine and hot water hose from ships, engines and exhaust emissions in the case of passenger ships. Ship maintenance and repair that take place in floating or grave docks or along side a port dock create pollution from rust removal.

Prabir and Paik (2001)\textsuperscript{19} identified that the public - private partnership is the key to success, for the development of ports in South Korea. Strategic vision, leadership and proactive commitment, 


within the government departments and patience are the prerequisites to achieve success of the port development.

4. Importance of IT in port performance

Cox (1999) identified that the terminal operators and port/transport industry, intend to develop a larger term approach to EC to improve the efficiency of operations, aiming to enhance the competence of their existing operational system.

Kia et al., (1999) analyzed the importance of information technology in port terminal operations. They found that the electronic devices, employed in container terminals, reduced the manual effort, paper flow, facilitated timely flow of information and enhanced control and quality of service and decision mode.

Kia (2000) pointed out that the use of computed stimulation has become a standard approach for evaluating design of complex cargo handling facilities. It enabled to investigate the behavior of two different operational systems, leading to significant savings, derived from the implementation of electronic devices in port terminals.


Radmilorich (2002) mentioned that the usage of electronic commerce in shipping and cargo distribution could provide transportation management, logistics management, trade and transport documentation, international trade finance and insurance.

The previous studies are related to the performance of the logistics management, supply chain management, service quality of port services, port competitiveness and benchmarking of the port services. There is no exclusive study on the performance of the major ports in Tamil Nadu, India. Hence, the present study has made an attempt to fill up the research gap with the help of the following research model. The proposed research model is given in Figure 1.1

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The above proposed research model clearly indicates the way in which the performance of the major ports in Tamil Nadu has been examined in the present study.

1.6 OBJECTIVES OF THE STUDY

The objectives of the present study are:

1. To analyze the performance of the important ports with the help of the traffic.
2. To exhibit the profile of the respondents (importers and exporters) and their relationship commitment.

3. To examine the respondents’ perception on the facilities at the ports.

4. To measure the service quality at the important ports.

5. To analyze the performance of the ports with the help of the users’ perception.

6. To evaluate the impact of facilities and service quality at the ports on the performance of the ports.

7. To identify the import and export problems at the ports.

8. To analyze the important discriminant problems among the ports and

9. To examine the impact of problems on the performance of the ports.

1.7 RESEARCH METHODOLOGY OF THE STUDY

The research methodology enlightens the methods to be followed in the proposed research activities in order to fulfil the research objectives. It includes the activities from investigation to presentation. Research methodology includes research design, sampling framework, sources of data, collection of data and frame work of analysis.

1.7.1 Research design of the study

The research design is the blue print of the research methodology, in order to collect, measure and analyze the data required to fulfill the research objectives. It includes an outline of
what the investigator will do from writing the hypothesis and their operational implications to the final analysis of data. In the present study, the descriptive research method had been applied. Since the present study has its own well-defined and confined objectives and also the pre-planned and determined research methodology, it is purely descriptive in nature. Apart from this, the present study explains the performance of the ports with the help of traffic flow and also the users’ perception of the services, facilities and performance of the ports. Hence, the applied research design of the present study is the descriptive research design.

1.7.2 Sources of data

Since the present study is based on both primary and secondary data, the sources of data have been identified. The secondary data on the traffic flow at the important ports in Tamil Nadu from 2001-02 to 2008-09 have been collected from the relevant port authorities. The primary data were collected with the help of the questionnaire/interview schedule.

1.7.3 Construct development

The questionnaire/interview schedule, framed to collect the primary data from the importers and exporters (respondents) consists of four important parts. The first part of the questionnaire/interview schedule includes the profile of the respondents and their relationship commitment in their trade. The second part covers the facilities at the
ports and the service quality of the port services whereas the third part consists of the measurement of the respondents’ attitude towards the performance of the ports. The fourth part includes the problems encountered by the respondents at the ports.

The questionnaire/interview schedule was designed on the basis of the objectives of the study. A pretest was conducted among the 20 importers and 20 exporters at the three ports. In total, 10 port officials had been included to pretest the questionnaire/interview schedule. On the basis of the comments received from the pre-test, certain modifications, additions and deletions have been carried out. The final draft of the questionnaire/interview schedule was prepared for data collection.

1.7.4 Sampling design

To assess the performance, all the three major ports located at Chennai, Ennore and Tuticorin were purposively selected. A sample of 100 exporters and 100 importers were selected from each port with the help of the port authorities. Totally 600 sample respondents (300 exporters and 300 importers) were chosen. Since the response rate on the questionnaire was only 67.00 percent, the included sample size came to 402 respondents (importers and exporters).
Measurement of variables

The present study has made an attempt to analyze the profile of the respondents, facilities at ports, service quality in ports, performance of the ports and the import and export problems on the basis of so many variables. The way in which these constructs have been developed for the study is presented below. The included constructs are (i) export and import competencies (ii) entrepreneurial orientation (iii) firm size (iv) export / import experience (v) relationship commitment (vi) facilities at port (vii) service quality in ports (viii) performance of the port (ix) usage of IT in the port terminal (x) problems in imports and exports and (xi) problem dimensions in international trade.

These constructs are given below:

**Export and import competencies**

Export and Import competencies are part of the internal environment, affecting export initiation and performance. Aaby and Slater (1989)\(^{23}\) and Cooper and Kleinschmidt (1985)\(^{24}\) examined how technology influences export performance and Katsikeas et al., (1996)\(^{25}\) observed that competencies such as product superiority and competitive pricing are important in the design and implementation of

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effective strategy. Export and import competencies among the exporters is measured with the help of the variables identified by Madsen, (1989)\textsuperscript{26}; Johnson and Vahlne (1990)\textsuperscript{27}; Johnson and Mattson (1988)\textsuperscript{28}; and Robertson and Chetty, (2000)\textsuperscript{29}. The variables included in the present study, are R&D capability, quality of personnel trade, export and import market knowledge, company’s reputation, proximity to foreign markets, product superiority, company culture consistency in exports, varieties of products and scientific knowledge in trade. The above said variables have been rated by the respondents at five point scale according to their level of existence in their firm.

**Entrepreneurial orientation**

Entrepreneurial orientation determines export marketing strategy and has three dimensions viz innovation, risk taking and proactiveness (Naman and Slevin, 1993)\textsuperscript{30}. Conservative firms are risk arises, non-innovative and reactive, while entrepreneurial firms are the opposite (Yeoh and Jeny, 1995)\textsuperscript{31}. The entrepreneurial orientation

\begin{itemize}
\end{itemize}
reduces the export and import barriers and also increases the export and import performance (Malek Zadeh and Maha Vandi, 1985)\textsuperscript{32}. The entrepreneurial orientation variables have been identified by the previous studies. These are 1) Degree of carrying out own marketing, 2) Nature of products in import and export, 3) Frequency of products imported / exported, 4) Degree of implementation of logistic management and 5) Degree of involvement in export and import in high – risk markets. The respondents are asked to rate these variables at five point scale according to their level of implementation in their business.

**Firm size**

Firm size is an objective measure and is part of the internal environment. Large firms are more likely to initiate exports (Dean et al., 2000)\textsuperscript{33} and are usually more advantaged in terms of organizational resources, economies of scale and lower risk (Christensen et al., 1987)\textsuperscript{34}. This leads to greater understanding of export market characteristics, faster response to consumer needs, and improved performance. Bonaccorsi (1992)\textsuperscript{35} summarizes the literature

and notes a mixed and innocent relationship between firm size and exports. Very small firms tend to export and the probability of exporting rises with size but beyond a certain size, there is only a weak relationship. In the present study, the firm size is determined with the help of the quantity of imports and exports per annum.

**Export / import experience**

Export / import experience determines successful export marketing (Modsen, 1989) and is an objective to measure if an experience is positively linked to internationalization (Domingulz and Sequeria, 1993) and attitude towards export initiation (Gripsrud, 1990). It develops either through experience or is taught. The former is acquired through direct contact like trade fair and personal visits, while the latter is acquired from market information (Johanson and Vahlne, 1990). Diamantopoulos and Inglis (1988) found no association between export experience and performance, while Cooper and Kleinschmid (1985) found a negative association. The export / import experience among the respondents is measured with the help of four units namely length of time since the establishment of the firm,

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length of time since export / import activity was initiated, length of
time since export / import became important in sales and total
number of countries of export / import. The exporters are asked to
rate at five point scale from very high to very low.

**Relationship commitment mix among the importer and exporter**

Commitment involves a tendency to continue a relationship that
involves both psychological and behavioral dimensions. The
psychological dimension refers to the degree of attachment between
relationship problems, including attitudes and beliefs about current
relationship (Anderson and Weitz, 1992\textsuperscript{40}; Gilliland and Bello, 2002\textsuperscript{41}),
degree of preference for existing partners (Bennett and Gabriel,
2001\textsuperscript{42}, a desire for relational continuity, and a long term orientation
(Brown *et al.*, 1995)\textsuperscript{43}. The behavioral dimensions include close
personal relationships (Johanson, 1989)\textsuperscript{44}, employee employer

\textsuperscript{40} Anderson, Ervin and Barton Weitz (1992), “The use of pledges to build and sustain commitment in Distribution channels”, *Journal of marketing research*, 29(February), pp. 18-34.


\textsuperscript{44} Johanson, Jan (1989), “Business relationship and industrial networks”, Perspectives on the economics of organization: Cranford lectures 1, Institute of Economic Research, Land: Land University Press.
relationships (Angel and Perry, 1981\textsuperscript{45}; Mowdey \textit{et al.}, 1997\textsuperscript{46}), and inter organizational relationships (Gilliland and Mello, 2002; Kumar \textit{et al.}, 1998).\textsuperscript{47}

Different types of commitment have been identified in studies of inter-firm relationships in international, and business marketing contexts. These are affective commitment (De Ryter \textit{et al.}, 2001)\textsuperscript{48} value – based contexts (Gao \textit{et al.}, 2005)\textsuperscript{49} locked in commitment (Mohr and Speekman, 1994)\textsuperscript{50}; obligation based commitment (Kin and Frazer, 1997)\textsuperscript{51}; and behavioral commitment (Gilliland and Bello, 2002)\textsuperscript{52}. The variables included to measure the relationship commitment among the importers and exporters are presented in table 1.1.

\begin{itemize}
\item \textsuperscript{48} De Ryter, K.L, Moorman and Lemmink, J. (2001), “Antecedents of commitment and trust and their antecedents in channels of distribution”, working paper, School of management, University of Minnesota.
\item \textsuperscript{52} Gilliland, David, I. and Daniel C. Bello, (2002), “Two sides of Altitudinal commitment: The effort of calculative and loyalty commitment on enforcement mechanism in distribution channels”, \textit{Journal of the academy of marketing science}, 30(1): 24-44.
\end{itemize}
Table: 1.1

Relationship commitment mix among the importer and exporter

<table>
<thead>
<tr>
<th>Sl. No.</th>
<th>Variables in Relationship commitment</th>
<th>Sl. No.</th>
<th>Variables in Relationship commitment</th>
</tr>
</thead>
<tbody>
<tr>
<td>I</td>
<td>Affective commitment</td>
<td>III</td>
<td>Locked in commitment</td>
</tr>
<tr>
<td>1.</td>
<td>Like being associated with the customer</td>
<td>1.</td>
<td>Considering everything, there is actually no alternative to this relationship.</td>
</tr>
<tr>
<td>2.</td>
<td>Enjoy the relationship with the customer</td>
<td>2.</td>
<td>Changing from this customer to another would cost too much</td>
</tr>
<tr>
<td>3.</td>
<td>Positive feelings towards the customers</td>
<td>3.</td>
<td>It would be very difficult to find a replacement for this supplier</td>
</tr>
<tr>
<td>4.</td>
<td>Believe the customer is doing the right things</td>
<td>IV</td>
<td>Obligation – Based Commitment</td>
</tr>
<tr>
<td>II</td>
<td>Value – based commitment</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1.</td>
<td>Benefits of the firm from relationship are greater than the costs</td>
<td>2.</td>
<td>We put maximum effort into the business we do with this supplier because they expect us to do so.</td>
</tr>
<tr>
<td>2.</td>
<td>Receiving a fair value from our investment</td>
<td>3.</td>
<td>It is our duty to strengthen our ties with this supplier</td>
</tr>
<tr>
<td>3.</td>
<td>Receiving a fair value from this relationship</td>
<td>V</td>
<td>Behavioral commitment</td>
</tr>
<tr>
<td>4.</td>
<td>The performance of this customer in the areas that matter, is always up to the necessary standard</td>
<td>1.</td>
<td>Our firms put considerable effort and investment into the business.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>2.</td>
<td>We have made a investment in this relationship.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>3.</td>
<td>We have strengthened our ties with this supplier during the course of our relationship with them.</td>
</tr>
</tbody>
</table>

Facilities at ports

Port activity consists of offering services to ships and goods, which makes the shipping companies and the export and import companies the ports clients. The provision of port services, is the result of the complex integration of the functions of each of the agents.
Carpinetti and De Melo (2002)\textsuperscript{53} identified the various benchmarking at ports. Lee \textit{et al.}, (2002)\textsuperscript{54} mentioned the basic qualities essential for the ports. Villegas (1996)\textsuperscript{55} revealed the various facilities at port. Muthu \textit{et al.}, (2002)\textsuperscript{56} mentioned the benchmarking for strategic maintenance quality improvement of the port. In the present study, the facilities at port have been measured with the help of the variables identified by the previous studies (Bercelo, 1992\textsuperscript{57}; Carpinetti and De Melo, 2002\textsuperscript{58}; Longbottom, 2000\textsuperscript{59}; kourkeli, 2000\textsuperscript{60}). The facilities essential for ports are presented in the following table.

\begin{table}[h!]
\centering
\begin{tabular}{|c|c|}
\hline
Facility & Description \\
\hline
Facility 1 & Description 1 \\
\hline
Facility 2 & Description 2 \\
\hline
Facility 3 & Description 3 \\
\hline
\end{tabular}
\caption{Facilities Essential for Ports}
\end{table}

\begin{thebibliography}{99}
\end{thebibliography}
Table: 1.2

Facilities at port

<table>
<thead>
<tr>
<th>Sl. No.</th>
<th>Facilities</th>
<th>Sl. No.</th>
<th>Facilities</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Location in important sea routes</td>
<td>10.</td>
<td>Access to the port</td>
</tr>
<tr>
<td>2.</td>
<td>Link with railways</td>
<td>11.</td>
<td>Mooring</td>
</tr>
<tr>
<td>3.</td>
<td>Pilotage</td>
<td>12.</td>
<td>Loading and unloading</td>
</tr>
<tr>
<td>4.</td>
<td>Towage</td>
<td>13.</td>
<td>Supply</td>
</tr>
<tr>
<td>5.</td>
<td>Natural harbour</td>
<td>14.</td>
<td>Customer clearance</td>
</tr>
<tr>
<td>6.</td>
<td>Link with roadways</td>
<td>15.</td>
<td>Administrative control</td>
</tr>
<tr>
<td>7.</td>
<td>Location near manufacturing centres</td>
<td>16.</td>
<td>Intermodal transport</td>
</tr>
<tr>
<td>8.</td>
<td>Storage facilities</td>
<td>17.</td>
<td>Location nearer to consumption centre</td>
</tr>
<tr>
<td>9.</td>
<td>Long distance roads</td>
<td>18.</td>
<td>Added value operations (finishing, packaging, labelling)</td>
</tr>
</tbody>
</table>

The respondents are asked to rate the above said facilities of port at five point scale.

Service quality in ports

The global economic boom has led to a continuous increase in international trade. It has increased competition for established ports, which have naturally experienced reduced customer loyalty (Lobo and Jain, 2002)\(^6\). Competition for transshipment cargo has also increased, and the focus has now shifted to the quality of services offered by ports to their customers. Ports, which play a significant role in transferring economic wealth to national as well as international economies, today handle 90 percent of world’s trade, in terms of

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volume (Song and Yeo, 2004). The service quality in ports has been measured with the help of SERVQUAL scale (Ugboma et al., 2004). The variables related to the service quality of ports are drawn from the reviews (Marlow and Paixao, 2001; Song and Yeo, 2004; Ugboma and Ugboma, 2004). The variables included in the present study are given in table: 1.3

Table: 1.3

Service quality variables in ports

<table>
<thead>
<tr>
<th>Sl.No.</th>
<th>Variables</th>
<th>Sl.No.</th>
<th>Variables</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Appearance of staff</td>
<td>8.</td>
<td>Settle claims quickly</td>
</tr>
<tr>
<td>2.</td>
<td>Delivery on promise</td>
<td>9.</td>
<td>Efficient in handling complaints</td>
</tr>
<tr>
<td>3.</td>
<td>Little waiting time for ships to get service</td>
<td>10.</td>
<td>Automation</td>
</tr>
<tr>
<td>4.</td>
<td>Total transit time for shipment</td>
<td>11.</td>
<td>Trustworthy</td>
</tr>
<tr>
<td>5.</td>
<td>Modern cargo-handling equipment</td>
<td>12.</td>
<td>Give value added service</td>
</tr>
<tr>
<td>6.</td>
<td>Employees possess skill / knowledge</td>
<td>13.</td>
<td>Frequency of sailing</td>
</tr>
</tbody>
</table>

The respondents are asked to rate the service quality variables at five point scale.

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Performance of the port

The performance of the port was measured by revealed comparative advantage (RCA) by Yen and Lin, 2008\textsuperscript{65}. The stochastic frontier analysis was executed by Lin, 1995\textsuperscript{66} to measure the performance of the ports. Estache \textit{et al.}, (2002)\textsuperscript{67} measured the technical and allocative effectiveness to measure the efficiency of ports. Tongzon (1995)\textsuperscript{68} used the multiple linear regression model to measure the performance of the ports. Murphy \textit{et al.}, (1997)\textsuperscript{69} and Bardi \textit{et al.}, (1989)\textsuperscript{70} used some variables to measure the efficiency of the ports. These variables are also used by Kent and Stephen, 1999\textsuperscript{71}; Wang \textit{et al.}, 2003\textsuperscript{72}; Cullinane \textit{et al.}, 2006\textsuperscript{73}. The same variables are used to measure the performance of the selected ports with the help of the users’ attitude towards the variables. The variables are listed in the table below:

\begin{table}[h]
\centering
\begin{tabular}{|c|c|}
\hline
\textbf{Variable} & \textbf{Description} \\
\hline
\textbf{Input} & \textbf{Output} \\
\hline
\end{tabular}
\end{table}

Table: 1.4

Variables in the performance of the ports

<table>
<thead>
<tr>
<th>Sl.No.</th>
<th>Variables</th>
<th>Sl.No.</th>
<th>Variables</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Transit time reliability</td>
<td>13.</td>
<td>Rate changes</td>
</tr>
<tr>
<td>2.</td>
<td>Special equipments</td>
<td>14.</td>
<td>Line haul services</td>
</tr>
<tr>
<td>3.</td>
<td>Pick up and delivery service</td>
<td>15.</td>
<td>Financial stability</td>
</tr>
<tr>
<td>4.</td>
<td>Quality of carrier salesmanship</td>
<td>16.</td>
<td>Scheduling flexibility</td>
</tr>
<tr>
<td>5.</td>
<td>Door–to–door transportation rates</td>
<td>17.</td>
<td>Quality of operating personnel</td>
</tr>
<tr>
<td>6.</td>
<td>Freight loss and damage</td>
<td>18.</td>
<td>Service charges</td>
</tr>
<tr>
<td>7.</td>
<td>Total door to door transit time</td>
<td>19.</td>
<td>Equipment availability</td>
</tr>
<tr>
<td>8.</td>
<td>Claim processing</td>
<td>20.</td>
<td>Tracing</td>
</tr>
<tr>
<td>9.</td>
<td>Shipment expediting</td>
<td>21.</td>
<td>Terminal area</td>
</tr>
<tr>
<td>10.</td>
<td>Frequency of service</td>
<td>22.</td>
<td>Ship working rate</td>
</tr>
<tr>
<td>11.</td>
<td>Length of Berth</td>
<td>23.</td>
<td>Number of straddle services</td>
</tr>
<tr>
<td>12.</td>
<td>Total cargo moved through docks</td>
<td>24.</td>
<td>Ship calls</td>
</tr>
</tbody>
</table>

The users are asked to rate the above said variables at five point scale according to the order of performance of the ports.

Information technology in the port terminal

A properly designed, computerized container control system increases the operating efficiency of the port. The main benefits are faster discharging and loading of containers, increased productivity through faster turn around of containers, better monitoring of the storage of container, high level of accuracy of information and high level of consistency of information given to various parties in the chain.
of transport (Kia, 1997\textsuperscript{74}, Kia, 1999\textsuperscript{75}). In the present study, the operational performance of the ports has been measured with the help of the variables, identified by the previous research works (Law, 1982\textsuperscript{76}; Radmilrich, 1992\textsuperscript{77}; Seeley and Griffth, 1992\textsuperscript{78}; Heffman, 1998\textsuperscript{79}; Shayan and Ghotb, 2000\textsuperscript{80}). These variables are listed in table 1.5.

\begin{table}
\centering
\caption{Variables in operational efficiency}
\begin{tabular}{|c|p{5cm}|c|p{5cm}|}
\hline
Sl.No. & Variables & Sl.No. & Variables \\
\hline
1. & Transport management & 7. & Faster turn around of containers \\
2. & Logistics management & 8. & Stocking area capacity \\
3. & Trade and transportation documentation & 9. & Accuracy of information \\
4. & International trade finance & 10. & Consistence of information \\
5. & Insurance & 11. & Monitoring of the storage of containers \\
6. & Discharging and loading of containers & & \\
\hline
\end{tabular}
\end{table}

\textsuperscript{74} Kia, M. (1997), “Large and fast containership and the perspective of Australian ports”, Proceeding of 13\textsuperscript{th} Australian Coastal and Ocean Engineering Conference and 6\textsuperscript{th} Australian Port and Harbor Conference, 7-11, September, Christchurch, New Zealand.


\textsuperscript{78} Seeley, D. and Griffith, T. (1992), “Objects used in Sionview”, \textit{Understanding systems with sion view}.


The respondents are asked to rate the above said variables at five point scale to measure the operational performance of ports with the help of information technology.

**Problems in exports and imports**

Commitment to export and import marketing is an element of the export and import marketing behavior of a firm (Cavusgil and Nevin, 1981)\(^8\). The managers, experienced in foreign markets, drive small to medium size enterprises (SME) to adhere to the greater internalization behaviors (Reuber and Fischer, 1997)\(^8\). Export orientation is the collective attitudes, opinions and perceptions of a firms’ management (Abdel-Malek, 1978)\(^8\) that determine the firm’s commitment to export activities (Crick and Chaudhry, 1997)\(^8\). The top management stability is more effective in export and import strategy (Solberg *et al.*, 2002)\(^8\).

The perception on export and import problems has attracted many researchers in international business (Kabsikeas and Morgan,\(^8\)).

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The conceptual structure of export barriers has been investigated by Leonidox (2000)\textsuperscript{86}. Morgan and Kabsikeas (1997) identified three groups of export barriers namely strategic barriers, operational barriers, and informational barriers. Bauerschmidt \textit{et al.}, (1985)\textsuperscript{87} categorized five factors. Leonidox (1995)\textsuperscript{88} classified export barriers into internal and external barriers. Leonidu (2004)\textsuperscript{89} identified the components of internal barriers as functional, unfu nctional and marketing barriers whereas external barriers are separated into procedural, governmental, task and environmental. Export problems are categorized into five mood areas viz financial, managerial, market based, industry specific and firm specific (Shaw and Darroch, 2004)\textsuperscript{90}. Thomas and Avaujo (1985)\textsuperscript{91} showed that the market based export problems to be the most important whereas Vivekanandan and Rajendran (2006)\textsuperscript{92} identified that the psychological barriers to be the most significant.

The export problems and the concerned problem of literature is given in the table below.

Table: 1.6

**Variables related to export barriers**

<table>
<thead>
<tr>
<th>Sl.No.</th>
<th>Export barriers</th>
<th>Concerned reviews</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>Sl.No.</th>
<th>Export barriers</th>
<th>Concerned reviews</th>
</tr>
</thead>
<tbody>
<tr>
<td>13.</td>
<td>Competition</td>
<td>O’Rourke (1990)\textsuperscript{114}; Karafakioglou (1986); Hook and Czinkota (1988)\textsuperscript{115}</td>
</tr>
<tr>
<td>17.</td>
<td>Limited information to analyst market</td>
<td>Yang et al., (1992); Leonidou (2000); Keng and Jiuan (1988)</td>
</tr>
<tr>
<td>18.</td>
<td>Transportation problems</td>
<td>Bauerschmidt et al., (1985); Yaprak (1985) and Arisrud (1990)</td>
</tr>
</tbody>
</table>


<table>
<thead>
<tr>
<th>Sl.No.</th>
<th>Export barriers</th>
<th>Concerned reviews</th>
</tr>
</thead>
</table>

**Frequency of foreign trade problems**

Foreign trade problems prevent the export and import development. Katsikeas and Piercy (1990)\(^{117}\) noted that Greek firms are opportunistic and non-methodological, which limit their capability to understand and solve problems, and therefore perform poorly. Katsikeas et al., (1996) showed a negative impact of export/import problems on performance. Ajjan (1988)\(^{118}\); Da Costa, (1995)\(^{119}\); Dass et al., (1995)\(^{120}\) identified the frequency of problems among the foreign traders in India. They used some variables to measure it. These are lack of communication on market and assistance, expensive information for overseas markets, difficulty to identify capable collaborators in host country, lack of information about overseas distribution, poor identification of firm’s international competitiveness, lack of personnel, qualified for foreign trade, lack of capable Indian foreign trade consultants, and strong international competition. The

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respondents are asked to rate the above said problems according to their order of frequency of occurrence, from never to always.

1.7.5 Framework of analysis

In order to process the data, the present study used the following statistical tools.

1. Annual and compound growth rate
2. Exploratory Factor Analysis
3. Confirmatory Factor Analysis
4. One way analysis of variance
5. Multiple regression analysis and
6. Two group discriminant analysis

1.8 LIMITATIONS OF THE STUDY

The present study is subject to the following limitations:

1) The present study is confined to the ports at Chennai, Tuticorin and Ennore, and the period of the study covers eight years i.e., from 2001-02 to 2008-09.

2) The performance of the ports had been measured on the basis of the traffic flows and also the users’ perception.

3) The variables related to the profile of the users, port facilities, performance of the ports, service quality of the port, performance of the port and import - export problems were drawn from the previous studies.

4) The linear relationship between the dependent and independent variables has been assumed.
5) Only the two group discriminant analysis was used for the comparative study on the three major ports and

6) The sample size and procedure is not a scientific one.

1.9 CHAPTERISATION

The present study is organized into seven chapters for a clear and neat presentation. They are

Chapter - I gives the introduction, need for the study, statement of the problem, related reviews, proposed research model, objectives, methodology, measurement of variables, limitations and chapterisation of the study.

Chapter - II presents the theoretical frame work of the study. It includes the history, performance, on going projects and facilities at the three major ports in Tamil Nadu.

Chapter - III explains the profile of the importers and exporters at the three ports, their relationship commitment in the international trade and also the discriminant profile of the respondents at the three major ports.

Chapter - IV explains the various performance indicators, their growth at the three major ports in Tamil Nadu.

Chapter - V includes the users’ perception on the facilities at the ports, service quality of the ports, usage of information technology at
the ports, performance of the ports and the impact of facilities, and service quality of the ports on their performance.

Chapter - VI throws light on the import and exports problems in the ports and also the impact of such problems on their performance.

Chapter - VII gives the summary of findings, conclusions and recommendation.