CHAPTER VII
COSTING SYSTEMS IN MUMBAI PORT TRUST: INSIGHTS
FROM ANALYTICAL STUDY (I)

7.1 INTRODUCTION

In the previous chapter, a complete picture of the present cost system of Mumbai Port Trust was given.

In the present chapter the researcher has analyzed the pitfalls of the existing cost system of Mumbai Port trust. As the existing system is fraught with deficiencies in the changing economic scenario, it is absolutely necessary to put a new improved cost system in place to enable Mumbai Port trust to face new challenges. This chapter concludes with a need for implementing Activity based costing in port sector especially in Mumbai Port Trust which has been discussed in detail.

7.2 PITFALLS OF THE PRESENT COST SYSTEM

Present cost system is based on Traditional or historical cost system. Though the system is simple and easy to implement, its application in the present business scenario is redundant. The existing system was developed 50 years ago. At that time Mumbai port was the only port on the western coast catering to the entire hinterland of Maharashtra, Goa, Gujarat and other northern states. The entire EXIM trade was routed through Mumbai port. The port is highly labour intensive and carries a huge labour force. This includes unskilled Majdoors and semi-skilled workers. Port has been handling cargo traditionally.

Mumbai port had a monopolistic position along the western coast till 1990. Other major ports along the west coast were single commodity ports handling only
specific commodities. Further, Mumbai had excellent rail and road connectivity for evacuation of goods. Many industries and infrastructural development was taking place in the hinterland. Mumbai port had carved a unique niche for itself in the EXIM trade of the country.

However, the scene changed drastically after 1990. Jawaharlal Nehru port was developed across Mumbai harbour. It was essentially developed as a satellite port. But it has unique advantages like restricted labour force, highly mechanized operations and higher productivity. Development of minor ports and privatization added to the woes of Mumbai port. Mumbai port was no longer a port favored by users for routing their cargo.

Lower productivity and congested rail road connectivity of recent times made Mumbai port unattractive.

The existing cost system of Mumbai port was ineffective to throw any light on the cost of various operations of the port. The present system was developed when the economic, social and business scene, operations and functions were traditional. Productivity and Efficiency of operations and functions were dismal. Profitability was dwindling and port was losing heavily on business.

From this point of view, pitfalls of the existing cost system of Mumbai port has been broadly classified into three areas. The following table shows the areas where the present cost system is deficient and cannot meet the requirements of Mumbai Port Trust.
### TABLE NO.7.1

### AREAS OF PITFALLS IN THE EXISTING COST SYSTEM

<table>
<thead>
<tr>
<th>AREAS OF PITFALLS</th>
<th>DESCRIPTION</th>
</tr>
</thead>
<tbody>
<tr>
<td>A Operational</td>
<td>Huge labour cost, Existence of huge overheads, Methodology for handling different types of vessels and cargo.</td>
</tr>
<tr>
<td>B Functional</td>
<td>Introduction of Regulatory authority for fixation of tariff, Tariff fixation over previous rates, Port functioning in a competitive scenario.</td>
</tr>
<tr>
<td>C Managerial</td>
<td>Decision making by Management-Concessional charges, Buying v/s hiring, Awarding of contracts, Privatization of specific activities. Management information reports.</td>
</tr>
</tbody>
</table>

#### A. Operational

Mumbai port is a traditional port and is 137 years old. Operational methods and systems are primitive and labour oriented. The existing system of costing was developed 40 years back when operations were manual and cost was not the main consideration for any decision making process. In the present system cost is just accumulated and allocated to services. Major pitfalls of the present system on account of the operations of Mumbai port are detailed below:
BOX NO 7.1

PITFALLS OF PRESENT COSTING SYSTEM OPERATIONAL

- Huge labour cost
- Existence of huge overheads
- Methodology for handling different types of vessels
- Methodology for handling different types of cargo

Huge labour cost

Mumbai port is highly labour intensive and carries a huge labour force. This includes unskilled Majdoors and semi-skilled workers. This work force was recruited for specific work of handling cargo. There are various categories of labour who are allotted to carry out specific jobs like Khalasi is a category of unskilled labour whose main job is to maneuver the ships through the lock gates with the help of thick ropes, drivers and operators of cranes and forklifts, unskilled labour allotted to do job on the tugs. The usage of labour is not variable with the traffic of the port. Labour cost directly attributable to services is allotted to that service. Though requirement of khalasis may not be there for every ship entering the port but the present cost system allot all expenses of Khalasis to composite towage and pilotage service. There is no method in the present cost system by which it is possible to ascertained which vessels require Khalasis.

The wage bill of Mumbai Port Trust is very high as compared to other ports. In Mumbai Port trust the wage bill is 65% of the total operating cost. The following
The table gives a glance at the wage bill as a percentage of operating expenditure of all major Ports during 2008-09.

**TABLE NO. 7.2**

PERCENTAGE OF WAGE BILL TO THE OPERATING EXPENDITURE DURING 2008-09

<table>
<thead>
<tr>
<th>PORT</th>
<th>PERCENTAGE OF WAGE BILL TO OPERATING EXPENDITURE</th>
</tr>
</thead>
<tbody>
<tr>
<td>KOLKATA</td>
<td>28.1</td>
</tr>
<tr>
<td>PARADIP</td>
<td>23.8</td>
</tr>
<tr>
<td>VISHAKAPATANAM</td>
<td>44.0</td>
</tr>
<tr>
<td>ENnore</td>
<td>6.6</td>
</tr>
<tr>
<td>CHENNAI</td>
<td>60.8</td>
</tr>
<tr>
<td>TUTICORIN</td>
<td>36.2</td>
</tr>
<tr>
<td>COCHIN</td>
<td>38.4</td>
</tr>
<tr>
<td>NEW MANGALORE</td>
<td>46.0</td>
</tr>
<tr>
<td>MORMUGOA</td>
<td>44.3</td>
</tr>
<tr>
<td>MUMBAI</td>
<td>66.3</td>
</tr>
<tr>
<td>J.N.P.T</td>
<td>24.7</td>
</tr>
<tr>
<td>KANDLA</td>
<td>39.8</td>
</tr>
</tbody>
</table>

*SOURCE: Indian Ports Association, Major Ports Of India-A Profile: 2008-09; pg-82*
Mumbai port has 19000 employees out of which 50% are unskilled labour. The average age profile of this workforce is 48 years. They were recruited to physically handle cargo both on board the vessel and shore. Though mechanization has been introduced to a great extent, this work force continues to do work manually. This has heavily affected the efficiency and productivity of the port. Further there is great resistance to change. Over a period of time, with periodic increase in wages, the cost of labour has become very high. This coupled with inefficiencies and lower productivity is making port operations expensive for the users.

The following graph gives the composition of labour force in Mumbai Port trust during 2008-09.
GRAPH NO 7.2G

COMPOSITION OF EMPLOYEES IN MUMBAI PORT TRUST DURING 2008-09

SOURCE: Major Ports Of India-A Profile: 2008-09, Indian Ports association; pg-87

GRAPH NO 7.3G

COST PER EMPLOYEE AT MUMBAI PORT TRUST

SOURCE: Major Ports Of India-A Profile: 2008-09, Indian Ports association; pg-86

Existence of huge overheads

Though labour cost is variable in manufacturing industries, it is semi-variable in service industries. However, in Mumbai port labour cost is fixed in nature. As explained above, Labour force cannot be redeployed as most of the labour is unskilled and the workforce is ageing. Labour policies too are not conducive for redeployment.
Operations of the port are becoming more and more mechanized requiring skilled labour. The cost of carrying this large unskilled labour is difficult to ascertain from the existing cost system. The cost of carrying the redundant labour does not only consist of their regular wages, it includes piece rate of the cargo handled at the port, productivity linked bonus which has no connection with the actual productivity, future liability in the form of pension, etc. All these make up into huge overheads and the existing cost system has no methodology to measure these costs.

**Methodology for handling different types of vessels.**

Vessel profile has undergone lot of changes with the advent of containers. Earlier vessels used to carry bulk cargo. They were not huge and could easily be accommodated within the dock area. The new container vessels are huge and can occupy two berths at Indira dock. Indira dock was constructed in 1914 almost 100 years ago. No major improvements have taken place in Indira dock. The new generation vessels have to be docked with utmost care. In Harbour wall, maneuvering of vessels is highly skilled as it involves a very narrow passage with handshaking distance clearance for over dimensional vessels. Inside Indira dock, which is a sheltered basin, the distances between the quay walls are minimal and docking and undocking has to be done with great expertise. In Pir Pav where chemicals are handled, vessels have to approach the berths with small keel clearance and are negotiated with an artificially created channel. In Jawahar Dweep, (JD) which handles POL, crude the maneuvering of vessels is highly skillful. This area experiences strong tidal currents whose directions are at an angle to the line of the jetties. Vessels have to be berthed gently as there is a combination of two tides, one from the Nhava sheva and the other from the JD channel.
The following pie diagram depicts vessel traffic: category-wise handled at Mumbai Port Trust during 2008-09.

**GRAPH NO.7.4G**

**VESSEL TRAFFIC: CATEGORY –WISE HandleD AT MUMBAI PORT TRUST**

**DURING 2008-09**

![Pie Diagram](image)

SOURCE: Major Ports Of India-A Profile: 2008-09, Indian Ports association; pg-50

The berths are protected from impacts of the vessels while berthing with fenders. These fenders bear the impact of the huge vessels and thus the berth wall is protected. The impact of huge vessels directly on the berth wall can cause great damages and repairing the same can be very expensive. Further there are exclusive berths which handle specific commodities like JD which handles POL and crude. Different types of fenders are used at different locations. This depends upon the type and size of vessels handled at different locations. Huge vessels are berthed at JD. Here special pneumatic Yokohama fenders are installed. These fenders besides being exorbitantly expensive are difficult to procure. These have to be imported and take considerable time to procure. This can cause great loss of revenue to the port as oil vessels cannot be handled. This can also have wider repercussions affecting the oil import/ export and functioning of the oil refineries and affecting the supply of fuel to the country.
The cost of the vessels is huge running into crores of rupees. It is the responsibility of port pilots to maneuver the vessels and ensure safe docking and undocking. It is a highly skilled job and with constraints that exist in it all the more becomes challenging. Any damage to the vessel can not only involve huge expenses to the port, it can be damaging to its reputation.

The existing system of costing does not throw any light on the additional expenses incurred for different maneuverings of vessels at different locations or additional expenditure on the installation of specific infrastructure. Charges for towage and pilotage or berth hire charges are generally fixed without considering these special features of various berths.

**Methodology for handling different types of cargo**

**BOX NO.7.2**

<table>
<thead>
<tr>
<th>TYPE OF CARGO</th>
<th>METHODOLOGY OF HANDLING</th>
</tr>
</thead>
<tbody>
<tr>
<td>a) Food grains</td>
<td>Manual operations with ship and wharf cranes</td>
</tr>
<tr>
<td>b) Fertilizers</td>
<td>As bagged cargo with ship and wharf cranes</td>
</tr>
<tr>
<td>c) Petroleum and crude</td>
<td>through pipelines</td>
</tr>
<tr>
<td>d) Containers</td>
<td>With Quay side gantry cranes</td>
</tr>
<tr>
<td>e) Vehicles</td>
<td>Directly driven into RO-RO vessels.</td>
</tr>
<tr>
<td>f) Mid stream cargo</td>
<td>Discharged on barges</td>
</tr>
</tbody>
</table>

Mumbai port is a multi commodity port. Commodities are handled either as bulk or break bulk. Mumbai port being an ancient port has really experienced the revolution in shipping industry with the advent of containerization. Containers
enabled the cargos to be handled faster and easily. The methodology adopted for handling bulk, break-bulk and container cargos are entirely different from each other. While bulk, Break-bulk are labour oriented, container handling has to be highly mechanized. The equipments required for handling containers are Quay side gantry cranes. The efficiency of container handling is dependent on the effective utilization of these cranes. Commodities like POL, crude, chemicals are handled through pipelines which are laid under the sea directly to the refineries. The overhead cost in these operations is very high.

Present cost system is unable to trace the cost involved in the operation of different methodologies of handling cargo. Cost incurred are allocated to the three services namely, cargo handled at docks, cargo handled at bunders and POL. This does not give any indication about the true cost of handling a particular commodity.

B. Functional

Mumbai port was established under the administrative control of Government of India. Board of trustees from various fields connected with port operations has administrative control. Various functions are executed by the respective functional heads.

After the introduction of the present cost system in Mumbai port, there have been changes in the functioning of the port.
Introduction of Regulatory authority for fixation of tariff

Before the constitution of Tariff Authority for Major Ports (TAMP) Tariff of the port was fixed as and when felt necessary. No justification or cost details to support revision of tariff were required to be given to any authority or approval to be sought. Whenever the port felt that any service is not generating surplus, with Board approval tariff was revised. There was no regulatory authority to control the tariff charged by the ports. The only principle followed and considered by the port while fixing tariff was “What the traffic can bear”. This resulted in least importance to the costing system and the service cost statement prepared annually became only a procedural requirement.

TAMP was constituted in 1996 to regulate the tariff charged by the major, minor ports and terminal operators. Guidelines issued by TAMP for fixation of tariff is detailed in 6.4. Tariff fixed by the port requires approval of TAMP. Comprehensive proposal for revision of charges have to be submitted to TAMP every three years. This needs to be supported with cost details of preceding three years and projections of next three years. TAMP circulates the proposal to all users of the services of the
port and invites their comments. A joint hearing is held and TAMP approves the proposal considering the cost of the port and what the users can bear.

TAMP adopts cost plus approach which necessitates the ports to justify the levy of charges with adequate cost data and details. The present cost system of Mumbai port is redundant and is unable to ascertain cost to suit the details required to be given to TAMP for justifying levy of charges.

As Mumbai port’s present cost system allocates overheads on the basis of direct cost and direct labour, true cost of rendering services is not reflected. Services which have high labour cost get a higher share of overheads making them more costly. Though, TAMP allows cost plus return approach for fixation of tariff, the services are already priced high and traffic will not be able to bear any further increase in tariff. Thus, because of the inadequate system of proper cost ascertainment, Mumbai Port Trust is unable to fix tariff rationally and continues to incur losses on most of its operations.

Two case studies are given below, where TAMP rejected proposals from Mumbai port for introduction of new charge/additional charge as Mumbai port could not substantiate the proposals with adequate cost details.

**CASE STUDY**

(a) **Handling of over-side cargo.**

Over-side discharge – This refers to cargo discharged over-side from a vessel/barge at berth to another vessel/barge or over-side cargo received on a vessel/barge at berth. This cargo consists of plant and machinery required for setting up factories and industries. Industries are developing at a great pace in Maharashtra and other neighboring states. Further there is huge infrastructure development taking place in the country. Vessel is placed alongside the berth and cargo is loaded or
unloaded from berth to vessels. Big project cargos having huge dimensions are handled over side i.e. on the other side of the vessel. These cargos are placed directly on to the barges from the vessel and transported to the project site.

GRAPH NO.7.5G

OVER-SIDE DISCHARGE HANDLED BY MUMBAI PORT FROM 2006 TO 2009

SOURCE: Report on traffic handled at Mumbai Port

A new cargo i.e. over-side cargo is increasingly being handled in Mumbai Port Trust in recent times. This is mainly due to the fact that Mumbai Port has become one of the preferred ports for movement of project machinery and other infrastructure. Presently no wharfage is fixed in the scale of rates of Mumbai Port Trust. TAMP allows rate to be fixed only when supported with adequate cost data. A large amount of data was required to be collected quantitatively and qualitatively. The information in terms of such statistics is not readily available in the absence of cost database. There is no provision to collect information on the number of packages handled over-side or the activities involved or the cost incurred for handling the cargo. Present cost system is unable to give information about the cost involved in this activity. Present
cost system collects cost for each service rendered in Mumbai port. It does not
distinguish between commodities.

The main costs involved in handling over-side discharge cargo consist of
Supervisory staff deployed for carrying out these operations on board the vessel. In
addition labour gang is deployed for preparation of slings.

Though the direct cost involved is only the labour, the major cost component
involved in handling the over-side cargo is the utilisation of Mumbai Port
infrastructure of dock basins. The barges are docked and undocked and at times
additional movement for the vessels as well as the barges are required to be carried
out for the convenience and safe handling of the cargo for over-side discharging.
These operations are required to be done very smoothly and carefully which slows
down the operations considerably thereby affecting turnaround of the ships and
incurring additional expenditure. Extraordinary operations involved in navigation of
such vessels also put some onus on the cargo interest who is engaging these vessels.
Delivery of heavy packages by waterways is also necessary. However there is no
method in the present cost systems to ascertain the cost of utilisation of dock basins
by barges, measuring loss of revenue on account of shifting of vessels for
convenience of over-side discharge, loss on account of lower turnaround of vessels,
etc.

Present system cannot measure these costs and in the absence of cost details
for justifying the loss of revenue and the cost involved in the operations of over-side
discharge of cargo, TAMP has rejected the proposal of Mumbai port for levy of
charges on over-side discharge of cargo. The handling of this cargo is on increase and
no charge can be levied by Mumbai Port for handling these cargos in the absence of
sanction of rate from TAMP.
Coal at Bunders.

Traffic of coal to Mumbai Port is of recent origin. The following graph gives the coal traffic at Mumbai Port Trust over last four years.

GRAPH NO.7.6G
COAL TRAFFIC IN MUMBAI PORT TRUST FROM 2005-06 TO 2008-09

SOURCE: ADMINISTRATIVE REPORT 2005-06 TO 2008-09, MUMBAI PORT TRUST

Another commodity where Mumbai port is unable to justify additional charges is for handling of coal at bunders. The area of Bunders are located away from the main dock area. These are small areas where generally small boats and Dows are handled. These areas do not have much facilities or infrastructure. As a measure of cargo diversification, Port management decided to handle coal at Bunders for Tata power plant near Trombay till their captive jetty is constructed. Handling of coal at bunders needs additional care and cost almost like hazardous cargo due to its high potential to cause environmental pollution. Considerable investment was required in the form of better housekeeping, frequent asphalting of roads in handling areas, strengthening of jetties, concretizing of roads and erection of tall boundary walls.
Also port had to invest in preventive measures including air monitoring equipments, vacuum cleaning system, etc. for the entire yard. Besides, extra care and additional personnel were posted for fire and safety concerns.

However, in the absence of adequate cost system to trace costs to handling of coal at bunders, Port could not justify additional charge for handling coal at bunders. Though, port incurred additional cost to the tune of Rs.2 crores for better housekeeping, frequent asphalting of roads in handling areas, strengthening of jetties, concretizing of roads, erection of tall boundary walls, preventive measures including air monitoring equipments, vacuum cleaning system, etc. for the entire yard, posting of additional personnel for fire and safety concerns, only Rs.25 lakhs could be directly attributable to the facilities created at bunders for handling coal. Other facilities created came under common user facilities and there is no proper cost measurement and ascertainment system to apportion this cost to coal handling at bunders. As TAMP adopts cost plus approach, port was unable to justify additional charge with cost details and TAMP rejected Mumbai port’s proposal for additional charge for handling coal at bunders.

**Tariff fixation over previous rates**

The present system of costing of Mumbai port was developed 50 years back. There has been a sea of changes taking place in both port operations and functioning. Tariff is also periodically revised on the principle of “what the traffic can bear”.

In the absence of adequate system to ascertain costs, port has been fixing tariff as a percentage increase over the previous tariff. No detailed exercise to measure cost is undertaken before fixing tariff. Rather tariff is fixed randomly. While approving tariff, TAMP eliminates cross subsidization and approves tariff for those services which can be supported with cost details. In the process, certain services which cannot
be substantiated with cost details are rejected by TAMP. It is not that there is no cost involved in these services; it is only the present system cannot reflect the cost properly.

**Port functioning in a competitive scenario**

The major ports in India were holding monopolistic position till recently. Mumbai port being one of the oldest ports on the western coast of India had faced no competition till 1990. Mumbai port had always retained its number one position among the port sector as there was no competition to the port till recently.

Jawaharlal Nehru Port Trust (JNPT) was constructed in 1990 and initially it was to function as a satellite port. The labour force of JNPT is 1900 as against Mumbai port’s labour force of 19000. JNP is a modern port with high level of mechanization and high productivity levels. JNPT concentrates on container handling. Container handling is faster, efficient and the evacuation is speedier. The development of JNPT has adversely affected container being handled at Mumbai Port and there is complete diversion of containers to JNP.

The following table gives a comparative details about the container traffic handled by Mumbai Port Trust vis-à-vis JNPT from 1996-97 to 2008-09.

**TABLE NO 7.3**

| CONTAINER TRAFFIC AT MUMBAI PORT TRUST AND JNPT FROM 1996-97 to 2008-09 |
|----------------|----------------|
| YEAR           | MUMBAI PORT TRUST | JNPT |
| 1996-97        | 583              | 423  |
| 1997-98        | 601              | 504  |
| 1998-99        | 509              | 669  |
| 1999-00        | 429              | 889  |

317
<table>
<thead>
<tr>
<th>Year</th>
<th>JNPT</th>
<th>Mumbai Port Trust</th>
</tr>
</thead>
<tbody>
<tr>
<td>2000-01</td>
<td>321</td>
<td>1189</td>
</tr>
<tr>
<td>2001-02</td>
<td>254</td>
<td>1573</td>
</tr>
<tr>
<td>2002-03</td>
<td>213</td>
<td>1930</td>
</tr>
<tr>
<td>2003-04</td>
<td>197</td>
<td>2269</td>
</tr>
<tr>
<td>2004-05</td>
<td>219</td>
<td>2371</td>
</tr>
<tr>
<td>2005-06</td>
<td>156</td>
<td>2667</td>
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<tr>
<td>2006-07</td>
<td>138</td>
<td>3298</td>
</tr>
<tr>
<td>2007-08</td>
<td>118</td>
<td>4060</td>
</tr>
<tr>
<td>2008-09</td>
<td>92</td>
<td>3953</td>
</tr>
</tbody>
</table>

SOURCE: Indian Ports association, Major Ports Of India-A Profile: 2008-09; pg-97

GRAPH NO.7.7G

CONTAINER TRAFFIC AT MUMBAI PORT TRUST AND JNPT FROM 1996-97 TO 2008-09

SOURCE: Indian Ports association; Major Ports Of India-A Profile: 2008-09, pg-97
EMERGENCE OF MINOR PORTS

Minor ports under the administrative control of the state Government have emerged along the coast line of India. Since 1995, the share of the minor ports has been increasing and presently they handle around 22% of the total import export traffic of the country.\(^1\) The state of Gujarat has the highest number of minor ports contributing to 70%\(^2\) of the minor port traffic. Minor ports have the following distinct advantages over the major ports:

(i) The State Government is giving number of initiatives to develop minor ports using private sector participation.

(ii) The tariffs of the minor ports are outside the purview of the regulator. This gives them an unfair advantage wherein they have the freedom to fix tariffs based on commercial pricing whereas the tariff of major ports is regulated.

(iii) On account of smaller scale of operations and higher productivity levels, the private ports have a lower cost structure, which enables them to charge lower tariffs from the users.

<table>
<thead>
<tr>
<th>TABLE NO.7.4</th>
</tr>
</thead>
<tbody>
<tr>
<td>TOTAL TRAFFICHandled BY MINOR PORTS IN 2007-08 AND 2008-09</td>
</tr>
<tr>
<td>YEAR</td>
</tr>
<tr>
<td>2007-08</td>
</tr>
<tr>
<td>2008-09</td>
</tr>
</tbody>
</table>

SOURCE: Indian Ports Association, Major Ports Of India-A Profile: 2008-09, pg-106

\(^1\) Major Ports Of India-A Profile: 2008-09, Traffic handled at Minor and Intermediate ports, Indian Ports association; pg-106

\(^2\) Major Ports Of India-A Profile: 2008-09, Commodity-wise traffic at Non-Major ports, Indian Ports association; pg-107
Mumbai port is facing high level of competition from the minor ports as majority of them are located on the western coast. The advantage enjoyed by minor ports especially of smaller scale of operations and higher productivity is absent in Mumbai port. Further, the cost systems of Mumbai port, does not reflect the cost of inefficiencies and lower productivity.

C. Managerial

The most important function of management is decision making and framing of policies. In this process they are facilitated by cost details and cost data. Timely and appropriate decisions enable any organization to face competition and improve its profitability.
BOX NO.7.4

PITFALLS OF PRESENT COSTING SYSTEM

MANAGERIAL

- Decision making by Management
  Concessional charges
  Buying v/s hiring
  Awarding of contracts
  Privatizations of specific activities.
- Management information reports.

Decision making by Management

(a) Concessional charges.

The tariff fixed by TAMP are ceiling rates and the ports are free to offer concessional rates to the users to promote traffic to the port or retain a particular traffic. There is great competition to Mumbai port both from other major ports and minor ports. Other Major ports are no longer single commodity port. They have diversified and have started handling multi commodities in a mechanized manner. This definitely reduces the cost of handling, speedier discharge of cargo and thereby lesser waiting/berthing time for the vessels. The users find this economical and have started moving away from Mumbai port. This has compelled the management of Mumbai port to offer higher concessions without considering the cost involved in the actual operations.

The present system of costing does not reflect cost involved in handling a particular commodity which results in concessions being given randomly without cost considerations just to retain cargo.
(b) **Buying v/s hiring**

Many types of equipment like tugs, dredgers have outlived their life and need replacement. Cost benefit analysis of buying v/s hiring needs to be carried out to arrive at right decision. While analyzing the cost involved for buying, reliance is placed on the present cost of operation. This does not reflect correct cost as most of the costs are allocated including fuel consumption. This completely distorts the cost of operation of the equipment. Further there is no mechanism in the present cost system to ascertain the cost involved during the laid up time of the equipment. Different costs are involved in the operation of the equipments. Exact ascertainment of cost involved in each of the activity of the operation of the equipment will facilitate correct analysis and right decision.
(e) Awarding of contracts

Mumbai port is spread over vast area and various operations are carried out throughout the entire breadth and width of Mumbai port. However certain areas are located strategically to perform certain operations. POL and crude are handled at JD which is located at a distance away from the main dock area. It is located closer to refineries and can be approached through sea via launches. JD and Pir Pav are high security areas and the movement to these areas is restricted. There are launch services at periodic intervals and restrictions on working time.

Continuous maintenance need to be carried out at JD and Pir Pav where POL, crude and chemicals are handled. Operations at these berths cannot be laid up for want of maintenance otherwise there will be tremendous loss of revenue to the port. Hence, contracts for maintenance are awarded even at very high rates justifying that work is constrained with many factors unique due to location disadvantage. In the absence of ascertainment of costs involved on account of the location disadvantage, contracts for maintenance are awarded disregarding the exact cost involved thereat.
BOX NO.7.6

SALIENT FEATURES OF AWARDING CONTRACTS

- Preparation of estimates based on budgeted quantities applying schedule of rates or market/rate analysis applying inflated rates for contracts to be carried out at Jawahar Dweep or PirPav.

- Advertisement of tenders in local newspapers and on Mumbai port trust web site.

- Scrutiny of tender

- Awarding the contract to the lowest bidder.

(d) Privatisation of specific activities.

There are various activities involved in a port’s functioning and operations. The labour force of the port is aging and there is a ban on recruitment in the port. Port wants to downsize its employees to the minimum required. Most of the employees in the category of electricians are retiring in the next two years. There are various installations in the port which requires electrical maintenance. With the retirement of these electricians, there will be acute shortage of electricians to maintain these installations.

The port has the option to privatize this activity. However, there is no cost detail available to compare the cost of employing v/s privatizing this activity. The decision to privatize or employ will be more situation oriented rather than cost determined.
Management Information Reports.

The present system of costing is based on historical costing system. Costs are ascertained after the finalization of annual accounts. There is no methodology by which costs can be ascertained on an on-going basis. Only service cost statement is prepared annually and submitted to the Board for information. Because of the inadequacy of the existing system of costing, Management too does not give any importance to this statement. Management’s perception is that all costs incurred are unavoidable so there is no reason to bother about the same. The main reason for this is that the present system cannot reflect the cost of any specific activity for the management to come to a logical conclusion whether to continue the activity or privatize the same or introduce cost effective measures.

As the service cost statement is historic, by the time the same is made available, the business situation has changed drastically.

As explained above, the present cost system of Mumbai port is fraught with inadequacies and redundancies. The system introduced 50 years back has lost its essence and is not relevant in the present scenario of port sector. Globalization has changed the global trade and it is essential for Mumbai port to review its cost system in the present business and economic scenario.
7.3 CHANGING SCENARIO OF INDIAN ECONOMY AND ITS IMPACT ON THE PORT SECTOR

BOX NO 7.7

CHANGING SCENARIO OF INDIAN ECONOMY AND ITS IMPACT ON THE PORT SECTOR

- Increasing International Trade
- Foreign Exchange crisis
- Liberalization of Indian economy
- New Economic policy of 1990
- Privatization and Globalization
- Tremendous growth in GDP
- Increasing importance of Port sector
- New Projects and modernization of Indian Ports

Until the liberalization of 1991, India was largely and intentionally isolated from the world markets, to protect its fledging economy and to achieve self-reliance. Foreign trade was subject to import tariffs, export taxes and quantitative restrictions. India's exports were stagnant for the first 15 years after independence, due to the predominance of tea, jute and cotton manufactures, demand for which was generally inelastic. Imports in the same period consisted predominantly of machinery, equipment and raw materials, due to nascent industrialisation. Since liberalisation, the value of India's international trade has become more broad-based and has risen to Rs. 63,080,109 crores in 2003–04 from Rs. 1, 250 crores in 1950–51. India's major trading partners are China, the US, the UAE, the UK, Japan and the EU-The exports
during April 2007 were $12.31 billion up by 16% and import were $17.68 billion with an increase of 18.06% over the previous year.

India opened up the economy in the early nineties following a major crisis that led by a foreign exchange crunch that dragged the economy close to defaulting on loans. The response was a slew of Domestic and external sector policy measures partly prompted by the immediate needs and partly by the demand of the multilateral organisations. The new policy regime radically pushed forward in favour of a more open and market oriented economy. The liberalisation of the domestic economy and the increasing integration of India with the global economy have helped step up GDP growth rates, which picked up from 5.6% in 1990-91 to a peak level of 7.8% in 1996-97. A Global comparison shows that India is now the fastest growing just after China. The pick up in GDP growth has helped improve India's global position. Consequently India's position in the global economy has improved from the 8th position in 1991 to 4th place in 2001.

Prior to the introduction of the new economic policy in the early 1990s, India had followed an inward looking development strategy of import substitution and self reliance, here trade and exports received very little attention. Imports were largely restricted to oil, fertilizers and essential foodstuff, imported in years of crises, while equipment and machinery, as well as other intermediate goods, were subject to strict import-licensing requirements. Thus, Indian ports handled mainly bulk cargoes transported in full shiploads. With the ushering in of the era of globalization and liberalization in India in the early 1990s and a gradual shift to a more outward oriented trade regime, there was not only a massive expansion in the volume of India’s sea borne trade, but also a change in the composition of Indian port traffic from break bulk to liquid bulk (due to industrial growth and declining domestic
production of POL) and containerized cargo (driven by trends in global logistics). The Indian port sector was supply-constrained to handle such massive demand expansion due to inadequate and inappropriate capacity, and capacity underutilization.

In 1991 India went ahead with Liberalization, Privatization and Globalization, famously called as LPG. With Globalization, India went ahead with an ongoing process by which regional economies, societies, and cultures became integrated through a globe-spanning network of communication and exchange. Globalization enabled India to integrate the national economy into the international economy through trade, foreign direct investment, capital flows, migration, and the spread of technology. However, globalization is usually recognized as being driven by a combination of economic, technological, sociocultural, political, and biological factors. Globalization is largely the result of planning to break down borders hampering trade to increase prosperity and interdependence.

With Globalization, there was emergence of worldwide production markets and broader access to a range of foreign products for consumers and companies. There was increased movement of material and goods between and within national boundaries. International trade in manufactured goods increased more than 100 times (from $95 billion to $12 trillion) in the 50 years since 1955. China’s trade with Africa rose seven-fold during 2000-07 alone. India’s foreign trade also showed remarkable progress.

Ninety percent of India’s foreign trade in volume takes place through sea route. Sea transportation is the cheapest mode of transportation. Thus with globalization and liberalisation, the ports gained lot of importance. India’s industrialisation and infrastructural programmes were gaining great momentum which necessiated import of raw materials for construction. India’s GDP growth was also
showing great strength and growth. There was tremendous growth in the consumer goods industry and India was viewed internationally as a country to reckon with. India along with China, Brazil, South Africa was considered as a growing economies and accordingly its trade saw a big growth. Since 90 percent of international trade takes place through sea route, the importance of ports also grew with time. Liberalisation led to increased private players in the port sector and there was a sudden surge of minor ports along the 7517Kms long coast line. Presently there are more than 200 minor ports and many more are in the process of development.

This compelled the major ports to awaken and they were compelled to review their existing infrastructure facilities and services. New projects and facilities were conceived and huge investment under Plan works was committed. The ports have to gear up not only with respect to infrastructural facilities and services but also with respect to proper pricing policies to adequately tackle competition. This has necessiated the ports, who till now are dependent on traditional costing methodologies for cost ascertainment, to review their cost systems and emerge with a system which will give correct ascertainment of cost and right pricing policies.

Increasing mechanization in ports and allied services are bringing about great changes in the methodologies of handling cargo. To ensure economies of scale of operations, the size of vessels are becoming bigger and bigger. Modern ports in Western countries are already geared up to face these new challenges of changing maritime trade and hence are able to handle new generation ships. New minor ports are also adequately geared for the drastic changes in the maritime trade. But the major ports under Government control are still in the process of tacking the new changes.

Many new projects and infrastructural developments are in offing in all most all major ports. However, this will take some time to become operational. In the
meantime, Government has adopted certain policies like ban on recruitment in order to trim the huge labour force in older ports like Mumbai Port Trust and Kolkata port.

7.4 CHANGING ECONOMIC AND OPERATIONAL SCENARIO IN MUMBAI PORT

The Port of Mumbai has been the principle Gateway of India handling about 20% of the country’s EXIM trade. Located strategically on the West coast of India and blessed by nature with calm and sheltered waters, the Mumbai Port Trust acts as a powerful magnet for international shipping. Lying close to the main shipping lanes, the Port easily and quickly connects to all parts of the world from the Gulf to Far East to Europe to America. Mumbai Port Trust has carved a niche in the maritime trade of India.

Mumbai Port Trust has always been a traditional port handling almost all types of commodities. Most of the operating assets of Mumbai Port Trust have outlived their useful economic life. Though a natural harbour, the draft near the harbour is not deep enough to accommodate deep drafted new generation vessels. Thus there is a great constraint in Mumbai Port Trust to receive deep drafted vessels. There are only two berths which can accommodate deep drafted vessels. Mumbai Port Trust has three enclosed wet docks, namely Prince’s, Victoria and Indira Docks, having a total area of 46.30 hectares and quay age of 7,776 meters inside the wet basin and 853 meters along the harbour wall. Indira Dock is formerly known as Alexandra Docks was commissioned in 1914. Indira Dock has an entrance lock 228.6 meters long and 30.5 meters wide through which vessels can enter or leave the dock at any state of tide. There are 21 berths inside the basin and 5 berths along the harbour wall. The maximum draft inside the basin is 9.15 meters. The maximum draft at the Harbour
Wall berths is 8.1 meters. To the South of Indira Dock, along the extended arm, there are two open berths, Ballard Pier and Ballard Pier Extension, each of 240 meters length with a draft of 9.8 meters and 10.4 meters, respectively. Ballard Pier extension berth handles passenger vessels as well as container/general cargo vessels and is provided with a modern passenger terminal building.

Mumbai Port Trust under the guidance from Indian Ports Association has prepared the Business Plan, which delineates the growth plans of Mumbai Port Trust. The primary aspect of business plan is to continually promote the development of port infrastructure and services with active participation of Private Sector. The Private Sector participation is expected to result in reducing the gestation period for setting up new facilities or upgrading the existing facilities. It is also expected to bring in the latest technology and improved management techniques.

The Globalisation and Liberalisation policies of the Government of India have necessitated Mumbai Port Trust to reassess its position in the Indian maritime trade. Mumbai Port Trust in the Business plan has envisaged the futuristic plans of the port. All modern and latest concepts and technologies have been considered for taking the port to new heights and to face new challenges. The present scenario at Mumbai Port Trust is very encouraging and full of development opportunities. There is a spurge of projects and infrastructural development. The main areas where Mumbai Port Trust is concentrating its development programmes and improvements are as follows:
BOX NO 7.8

CHANGING ECONOMIC AND OPERATIONAL SCENARIO IN MUMBAI PORT

- HIGHER MECHANISATION
- INCREASED COMPETITION
- PRIVATISATION OF PORT OPERATIONS
- EFFECT OF GLOBALISATION
- CHANGE IN THE CARGO MIX
- NEW PROJECTS

HIGHER MECHANISATION

The cargo handled in Mumbai Port Trust includes various commodities like foodgrains, fertilisers, coal, iron and steel, sulphur, oilcakes, vehicles, and containers. Presently, the cargo is handled manually with the help of wharf cranes and fork lifts. Mumbai Port Trust currently handles an average of just 1400 Tonnes per day. For the average parcel size of 13000 tonnes, the minimum turnaround time of minimum 10 days will be required to unload/load cargo. In a typically modern all weather port a medium large size vessel (at least of Handymax size) is fully loaded or unloaded in 5-8 days with an average loading/unloading rate of 4000-8000 tonnes per day. Whereas in a mechanized setup the loading rates of 40000 tonnes per day are quite common with maximum touching close to 100000 tonnes per day.

Thus it is clear that the port needs to upgrade its berths and install the modern equipments to handle and sustain the growth. The berth-hire charges i.e. charges paid by ships for their waiting time in the docks for loading/unloading operations are very high. Larger the vessel higher the cost as the berth hire charges are based on the Gross
Registered Tonnage of the vessels per hour of occupying the berth. With low productivity in discharge of cargo, the cost on account of berth hire charges can be huge. This works negatively on the economies of handling the cargo through Mumbai Port Trust. Many users do not find it viable to handle cargo especially containers through Mumbai Port Trust and have shifted operations to other modern ports.

The port under its privatization document has stated that all cargo coming to the port will be handled by multipurpose shore cranes. Further to increase the productivity of its main cargo like fertilizers, food grains and sugar conveyor type loading or pneumatic unloading equipment are proposed to be installed to increase the productivity many folds. With higher productivity, there will requirement of increased storage space of cargo. The port has nearly good berth structure with smooth surface and hence on civil side only building of short term storage space would be required in the initial stage to handle the cargo.

Mumbai Port Trust is aggressively working towards this end. Already five (ELL) wharf cranes have installed. These cranes can handle 10000 tonnes of cargo per day. These cranes have better mobility and hence can be used to handle cargo in many berths. With the introduction of these cranes, the port can handle ships of larger parcel size. An average parcel size of 25000 tonnes will take 3 days to discharge reducing the turnaround of the ship drastically.

INCREASED COMPETITION

Mumbai Port Trust on the West coast of India is the oldest port established in 1873. The port has a natural harbour and ideally suited to port related activities. The port is well protected from natural calamities. The city of Mumbai developed around it and is now the financial capital of the country. Till 1990, Mumbai Port Trust was
enjoying a monopolistic position with no competition from other ports. Other ports on the western coast mainly Marmagao, new mangalore, kandla and Kochi ports hardly gave any competition to Mumbai Port Trust. These ports were basically single commodity ports catering to limited users within the immediate hinterland. Mumbai Port Trust caters to hinterland of not only Mumbai but also Maharashtra, Gujarat, Madhya Pradesh and the Northern states.

In 1989, Jawaharlal Nehru port trust (JNPT) was commissioned as a satellite port to Mumbai Port Trust. JNPT is the second youngest and one of the most modern major ports of the country. Certified an ISO 9002 port, it was initially planned to be a "satellite port" to the Mumbai Port Trust with the purpose of decongesting traffic at the latter. It is the only port built to international standards with a high level of automation and computerized functioning. The port is equipped with state of the art equipments and technology with efficient, professional and computer integrated terminal operation systems. The port's operations and functions are conforming to international standards and they offer competitive rates for their services. Further, Jawaharlal port continues to strive at sustained development.

Although JNPT was initially being planned as a "satellite port" to Mumbai under the Mumbai Port Trust, eventually however, the JNPT was developed as an independent port on its own right and it became the country's largest container port, presently handling about 60% of India's container cargo. The main factors which make JNPT highly competitive to Mumbai Port Trust are as follows:
FACTORS FAVOURING JAWAHARLAL NEHRU PORT TRUST

- MODERN CONTAINER AND BULK HANDLING FACILITIES
- MODERN INFORMATION TECHNOLOGY
- BETTER CONNECTIVITY WITH HINTERLAND
- LOWER HANDLING AND STORAGE CHARGES.
- RELATIVELY YOUNG AND EDUCATED WORKFORCE
- VERY LOW WAGE BILL

JNPT is equipped with modern container and bulk handling facilities, with a separate terminal dedicated to each type of cargo. The container terminal of 680 meter quay length (three berths) is designed and equipped to handle large container vessels. JNPT is also provided with adequate liquid cargo berth, shallow draft berth and multipurpose berths.

JNPT enjoyed better communication through intensive use of information technology. Right from its inception, it has made ample use of the container tracking and management system as well as the vessel traffic management system (VTMS). The port also has the most advanced Electronic Data Interchange (EDI), which ensures unhindered and efficient interaction between the port, the port users and the customs.

Better connectivity of JNPT with its hinterland, facilitated faster clearance of cargo from the port, due to close proximity to National Highways 4B and 17 and other state highways that directly link JNPT to Thane, Nasik and Ahmedabad. The port also enjoyed road connections with 23 inland container depots (ICDs) as well as with the Konkan, Central and Western railway systems. The primary mode of container cargo

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movement was through road, but railways, operating through the Container Corporation of India (CONCOR), also accounted for about 33% of the same.4

The terminal charges, including shore handling, storage, delivery etc. at JNPT are the lowest among all major Indian ports.

JNPT is also fortunate to have a relatively young and educated workforce and does not have to carry the baggage of huge labor supply (resulting in massive overstaffing) like Mumbai or Kolkata Ports or problems of militant and unreasonable trade union activities. Unlike some of the other major ports in India, JNPT does not have a Dock Labor Board for recruitment of its workforce to work on board the vessels. The following graph gives a comparative position of employees of Mumbai Port Trust and JNPT.

Both of these points worked in favor of the JNPT authority and helped them avoid the problems of overstaffing which plagued the older ports. Moreover, since selective liberalization of the various sectors had already been initiated in the Indian economy from

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4 KPMG(2007), ibid
the mid 1980s, there had been a change in the mindset of the government and the policy makers and there was less pressure on public sector units, especially the new ones, to employ labor in excess of requirement just to fulfill social objective of employment generation. Thus, on the whole, it is quite apparent that on several accounts, JNPT was different from most of its sister ports right from the beginning and enjoyed distinct advantages.

Thus in 1989, a more efficient and modern port just across Mumbai harbour was operational. Though initially, JNPT was envisaged as a satellite port to facilitate and decongest Mumbai Port Trust, over last 20 years JNPT has siphoned off majority of the container traffic from Mumbai Port Trust. Efficient handling of cargo, lesser turnaround time of ships, quicker evacuation of cargo, larger storage capacity, competitive port charges and lesser delays in JNPT have made this port a favourite amongst users. JNPT's interconnectivity by road and rail has further added to its advantage.

Additionally, emergence of minor ports along the western coast of India has added to the woes of Mumbai Port Trust. Minor ports are highly cost efficient, higher productivity, competitive pricing strategy and modern technologies. During 2008-09, Mundra port, a minor port has handled 28 million metric tonne of cargo. Minor ports are emerging and growing faster. The older ports like Mumbai Port Trust face severe competition from these minor ports.

However, over last 3 years, Mumbai Port Trust has started gearing up by improving the handling methodologies, new projects with private participation, improving rail and road connectivity and measures to attract traffic. But all these will take considerable time.
CHANGING PROFILE OF LABOUR FORCE

Mumbai Port Trust has a huge labour force since most of its operations are manual. Mumbai Port Trust has a labor force of 20000 employees against just 1200 at JNPT. Most of the labour force in Mumbai Port Trust is labourers who work in the docks for loading and unloading cargo. They are employed both on the wharves as well as on board the vessels. They have fixed hours of work and the handling rate is very slow.

With a ban on recruitment by the orders of Government of India to reduce the huge labour force, the age profile of the labour force in Mumbai Port Trust has changed. Average age profile of the labour is 48 years. The handling operations of port are very heavy and strenuous which requires younger people to handle. This has severely affected the productivity of the port. The port users find operations of the port very costly because of lower rate of handling, longer breaks for tea and lunch, stoppage of operations during shift change, etc.

Mumbai Port Trust is the process of phasing out the labour through retirements. It is expected that by 2013 the work force will be reduced to half of the existing strength.

Mumbai Port Trust is envisaging many new projects and modernisation of its operations. However, majority of the work force are unskilled or semi-skilled. Further, these people are much older and put up a lot of resistance to change of any kind. They are unwilling to learn new skills and there is tremendous interference of union. Thus Mumbai Port Trust is in the transitional phase from manual oriented operations to complete mechanisation. This process could take at least 7 to 8 years.

PRIVATISATION OF PORT OPERATIONS

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The Government of India has opened up the port sectors to private players as a part of its liberalisation policy. Under this policy, the Government has allowed private players to set up minor ports and to join hands with Major ports in their various projects. Private participation can take place through various routes like Private Public participation (PPP), Joint venture (JV), Built Own Transfer (BOT), Built Own Operate transfer (BOOT), etc. The projects of ports are capital intensive and require huge investment and have a long gestation period. Participation of private players with provision of finance and active participation in the project enables the port to complete the project within the time frame.

Mumbai Port Trust has not had any major developments or projects for at least last 5 decades. The last major project was construction of Jawar Dweep Jetty No.4 in 1960. Thereafter the port has been functioning with its existing facilities with negligible improvements. With increasing competition and changed scenario of the maritime activities, Mumbai Port Trust has realized the need for privatisation to bring about the required developments to sustain its position and growth.

**EFFECT OF GLOBALISATION**

As discussed above, Globalisation has opened the markets and no longer India is functioning in a closed economy. This has resulted in increasing movement of goods between countries. Further liberalisation of EXIM policies have improved the international trade to a great extent. The international trade is expected to grow tremendously and reach 1020 MMTA by 2011.

Mumbai Port Trust being a premier port and catering to vast hinterland should gear up with improved methodologies of handling cargo, improved productivity measures, speedier evacuation of cargo, adequate storage facilities and other user
friendly facilities to actively participate in the growth of Indian economy and increased maritime trade. Globalisation has presented a wonderful opportunity to the ports to improve their profitability by actively participating in the growing international trade.

CHANGE IN THE CARGO MIX

As stated earlier, Mumbai Port Trust is a traditional port which has been in existence since 1873. It is also a pioneer port and being strategically located has always handled all types of cargo. Traditionally Mumbai Port Trust has been handling foodgrains, pulses, sulphur, coal, cotton, oil cakes, etc either in bulk or break bulk form. With the evolution of containers, the cargo which was carried in bulk was containerised. Containers made carrying cargo easier, safer and smoother. Containerisation has changed the entire scene of maritime trade.

With globalisation and liberalisation, the cargo mix of the port also went in for a dramatic change. All cargoes including foodgrains are now containerised. With the opening of markets it made sense to import goods from abroad at cheaper rates. Indian goods also found newer markets. The advent of information technology brought the world within reach and the exports of India zoomed.

All these have brought about a great change in the cargo mix of Mumbai Port Trust. Iron and steel, vehicles, project cargo and containers are dominating the scene today at Mumbai Port Trust. Methodology for handling these cargos cannot be manual. High mechanisation is required for higher productivity.

NEW PROJECTS
Mumbai Port Trust is in the process of implementing and finalising new infrastructural and development projects to augment its capacity and improve its operations. These projects are:

- OFF SHORE CONTAINER TERMINAL
- HARBOUR WALL BERTHS
- SECOND LIQUID CHEMICAL BERTH
- FIFTH OIL JETTY AT JAWAHAR DWEEP
- IMPROVING THE ROADS
- RAIL CONNECTIVITY BETWEEN WADALA AND KURLA
- CRUISE TERMINAL
- DRY DOCK FACILITIES
- CAPITAL DREDGING TO IMPROVE DRAFTS
- ELECTRICAL WHARF CRANES
- PORT COMMUNITY SERVICE
- VESSEL TRAFFIC MONITORING SYSTEM
- INTERNATIONAL STANDARDS PORT SECURITY SYSTEM
- ISO 9001 CERTIFIED PORT

All these projects are taken up with an aim to improve the capacity of the port from 60 MMTA to 95 MMTA by 2012. Off shore container terminal which is a PPP project is already underway and will become operational by 2011. A revenue share of 35% will be received from the private operator of this project for next 30 years. Harbour wall berths with drafts upto 14 meters is expected to be completed by 2012 which will enable the port to handle deep drafted vessels which is one of the biggest constraints faced by Mumbai Port Trust today. With the increase in the demand for chemical, crude and petroleum products, Mumbai Port Trust’s decision to
construct a second liquid chemical berth and fifth oil jetty is appropriate to meet the additional requirements of petroleum products of the country. These projects are expected to be completed by 2013.

Capital dredging is one of the important requirements of any port. This enables the channel to be maintained with required depth. Also, the new projects like the Off shore container terminal and Harbour wall berths envisage deep drafted vessels to visit the port loaded with cargo. This will require deep draft of at least 15 metres to accommodate large Suez max vessels. Mumbai Port Trust has already awarded contract for capital dredging and draft in Mumbai Port Trust harbour will be deepened to 15 metres by 2010.

With a view to improve the handling operations of the port, new electrical wharf cranes have been commissioned. These cranes will improve the productivity of the port.

While improving port capacity it is equally important to ensure that adequate facilities for evacuation of the cargo are also taken care of. Mumbai Port Trust has sufficiently addressed this issue by improving the roads through concretisation and allowing Mumbai Metropolitan Road Development (MMRD) to construct a free way over the port roads to ensure smooth flow of traffic. Further, with a view to improve the rail connectivity, Mumbai Port Trust has entered into an agreement with Central Railway to construct a rail link between Wadala and Kurla. This will be a dedicated corridor for movement of port cargo.

Information technology of the port is also showing a sea of changes. Port Community Service (PCS) is the latest introduction in the port. There will be online service and the users can assess for all services through PCS which will be assessed
All monetary transactions will take place online through banks. Also the Vessel Traffic Monitoring System will ensure that all vessels entering the port are properly tracked and ensuring that all charges are billed and paid before the vessel is permitted to leave the port. With increased security threat, the port has introduced international standards security arrangements. Further, Mumbai Port Trust has got ISO 9001 certificate for its cargo related operations.

With the operation of all these projects by 2013, the entire operations of the port will undergo dynamic changes. The traditional and ancient port will become ultra modern. There will be dynamic changes in the functioning of the port. All these changes involve high capital investment and long gestation period. Port has to earn revenue commensurate with the investment made in these projects. Though all these improved facilities and development will attract traffic to the port, the main factor which attracts users to a port is its tariff structure.
7.5 FACTORS INFLUENCING THE NEED TO CHANGE THE EXISTING COSTING SYSTEM.

BOX NO.7.9

FACTORS INFLUENCING NEED TO CHANGE THE EXISTING COSTING SYSTEM.

- MODERN HIGHLY MECHANISED METHODOLOGIES
- MODERN INFORMATION TECHNOLOGY
- PRIVATISTION OF PORT OPERATIONS
- DIFFERENTIAL PRICING
- REMISSION FOR IMPROVING BUSINESS
- PRICE FIXATION FOR SERVICES RENDERED UNDER NEW PROJECTS.

Over last twenty years, the Indian economy has undergone dynamic changes and has become a growing economy. The role of ports in a growing economy need not be emphasised. Mumbai Port Trust has also undertaken various development and improvement programmes in its operations to participate in the growing economy. All these projects are highly mechanised and involve high tech information technology.

The present costing system of the port was introduced in 1969, when the operation and functions of Mumbai Port Trust was manual and to some extent primitive. The existing has been elaborated in chapter V and the pitfalls of the existing costing system have been detailed in previous section of this chapter. From this it is clear the present costing system is totally inadequate in the future improved scenario.
of Mumbai Port Trust. The following factors in the changed scenario of Mumbai Port Trust necessitate a change in the costing system of Mumbai Port Trust.

MODERN HIGHLY MECHANISED METHODOLOGIES

Mumbai Port Trust in its development programme has included high level of mechanisation in its handling activities. Modern high tech cranes, conveyor belt systems and other improved measures have been introduced to improve productivity. These facilities have been introduced in specific berths which are commercially viable.

The present costing system of the port cannot reflect the cost of operations at a particular berth. The system can throw light only on the cargo operations in the docks. In order to arrive at the cost of operations at a particular berth, it is essential to arrive at the cost of operating at the berth with the facilities provided at that berth. Then only differential pricing depending upon the facilities offered at that berth can be arrived at. The existing system is inadequate to provide this information.

MODERN INFORMATION TECHNOLOGY

Mumbai Port Trust has taken a great leap with the introduction of modern high level information technology for its operations as well as functioning. Port community Service has been introduced to enable the users to deal with port on line. Services required from the port can be requested on line and all remittances from banks can also be done on line. Secondly, Mumbai Port Trust has highly efficient and modern Vessel Traffic Monitoring System. Thirdly, all port functions like payroll system, tendering system, bill payments, designing; financial accounting, etc are all computerised and interfaced with main systems. Fourthly, Port being highly sensitive to terror threats, port security has received increased attention even on the national level. Various
modern security devices and measures have been introduced in recent times in the port.

All the above high technology measures for operational, functional and security requirements of the port are highly expensive. They involve not only high capital investment but also need highly qualified professionals to manage these systems. These costs are overheads required to render various services of the port. These costs are common to all services. Allocation of these overheads on an equitable basis is not possible in the existing system of costing. Allocation of costs in the present system is based on labour cost or direct cost. Both these allocation bases are irrelevant while allocating these overheads, an improved system of costing is essential to ensure that these overheads are allocated equitably to all services rendered by the port.

PRIVATIZATION OF PORT OPERATIONS

With opening of Indian economy, Government of India has liberalised its policies. Private players are allowed to operate port operations. Mumbai Port Trust is also seeking opportunities and is in the process of giving out its operations to private players. As a first step towards this, it is in the process of giving out berths and dry dock activities to private players to operate. Mumbai Port Trust will get revenue share from the operators. The revenue share should commensurate with the cost and revenue generated in a situation where Mumbai Port Trust operates these activities. By giving out to the private players for operation the port is looking at opportunities to effectively utilise the available resources.

Under such circumstances it is essential to arrive at the accurate cost of operating the specific berth. Also it is important to arrive at the revenue earned in that
berth. This will enable the port to decide the percentage of revenue share acceptable
by privatising the activity.

However the present system is unable to reflect the accurate cost or revenue of
any particular activity or area. Service cost statement prepared annually reflects the
cost of main activities and cannot throw light on specific area. All berths in Mumbai
Port Trust handle cargo and the service cost statement gives costing of cargo handled
at docks without giving out information about a particular berth or particular
commodity handled.

DIFFERENTIAL PRICING

Mumbai Port Trust handles different types and sizes of vessels. Also it handles
different cargoes. Further, port renders different services as per customer
requirements. Port has different areas where operations take place. There are different
constraints at different areas. Even within the same dock basin, there are constraints
for handling different sizes of vessels.

Differential pricing policy is required to ensure that operations which are
simpl and easier are not unnecessarily loaded with the extra burden of the overheads
of operations which are complicated and involve dedicated cost. For example,

CASE STUDY

Maneuvering of ships within the Indira dock basin

Indira dock consists of 21 berths with different facilities at each of the berth.
Berth no.1. and 2 are placed in such a manner that it is easy to maneuver vessels both
while berthing as well as unberthing. There is no need to shift any vessels in the
adjacent berths for the movement of vessels placed in these berths. However, these
berths can handle vessels up to a particular parcel size only. When larger vessels come they have to be berthed alongside the harbour wall berths which are longer. But though ordinarily such berths can occupy three ships of normal size, when a large vessel is placed in these berths, it cannot accommodate any other vessels because of the constraint of turning circle of the large ship. Further inside the Indira dock basin, very often shifting of vessels from one berth to another takes place to accommodate larger vessels or shifting takes place to facilitate berthing or unberthing of another vessel or when the cargo of a particular ship is very large shifting of vessels takes place due to constraint of storage area.

Under such circumstances, where shifting takes place on account of port constraints, no charge is levied. Shifting of vessels is an elaborate and expensive operation involving pilots, tugs and considerable time lost on operations. The present cost system does not facilitate appropriate allocation of overheads involved in these operations and thus differential pricing for simple handling and complicated handling of vessels is not possible. Vessels which require simpler operations get unnecessarily loaded with additional overhead burden thus making their operations cost ineffective.

REMISSION FOR IMPROVING BUSINESS

Mumbai Port Trust is facing extreme competition both from JNPT as well as from Minor ports. In order to attract cargo to the port, at various times different schemes and attractive packages are offered to the port users. The tariff fixed by TAMP is only the ceiling rate. Ports are permitted to charge any rate lower than the rate fixed by TAMP for fostering its business.
In recent times, in order to attract as well as retain cargo with the port, Mumbai Port Trust has been giving attractive schemes and packages to its port users. These include concessional rates in cargo handling charges, additional storage time at no extra cost. To promote car exports, additional time was granted for aggregation of cars.

However, while giving out such concessions and incentive packages, the port is unable to arrive at the exact cost incurred on account of these concessions. Further since exact cost ascertainment is not possible in the present costing system, the port is unable to tap the right opportunities and are constrained to take measures only considering the market forces.

**PRICE FIXATION FOR SERVICES RENDERED UNDER NEW PROJECTS.**

As stated in the previous section, Mumbai Port Trust is in the process of implementing various new projects and support projects for smooth functioning of these projects.

The projects of the port are highly capital intensive and require huge financial investments. Further, their gestation period being longer recovery of investments also cannot be in short period of time. The support and ancillary services are essential for all the projects but not in equal proportion. For example, in case of second liquid chemical berths and fifth oil jetty, though may not utilise the facilities of roads and railways, as they are transported through pipelines, the improvements in rail and road will definitely have an indirect benefit to these projects. The refineries located can benefit from this improvement for the movement of their refined cargo.

New pricing for the services rendered will have to done in respect of the services rendered at these new projects. The support and ancillary services cost are
huge. These are the overhead cost to be allocated to the services rendered at these projects. Allocation of these overheads has to be carefully done to price the services aptly else the services may be over-priced or under-priced. The present costing system is full of pitfalls rendering it to be ineffective in such situations.

6 COST METHODOLOGY APPROPRIATE TO MUMBAI PORT TRUST

In today's economic and highly competitive marketplace, the ability to identify costs of product and operation/activities has become crucial. Without accurate costing information, organizations lack the ability to make informed decisions. The current challenge in cost management is the ongoing change in the proportion of direct and indirect costs in the total cost. Over the last 10 to 20 years, the nature of manufacturing and services rendered has undergone drastic changes and, consequently, costs have evolved. Till 20 years back, port operations were largely manual. So at any point of time, wharves at Mumbai Port Trust were crowded with people basically mazdoors and laborers. Whereas Jawaharlal port which is highly mechanized, the wharves have a deserted look. All one can see are trucks and trolleys for transporting containers.

Traditional costing methods grouped automation, information systems and other technologies into allocation pools, such as overhead. Since labor was the most significant and most measured element of the overall service cost, this cost was allocated to services based on labor. However, labor is now the least significant cost in many cases.

The emergence of automated processes and information systems in manufacturing and service sectors has changed the face of costing considerations.
New costs, such as energy and systems maintenance, have emerged as significant elements in product and service costing. In these instances, closely measuring labor, while allocating other costs like energy based upon percentages of labour, can lead to a highly distorted and inaccurate picture of product and service costs. Decisions made based on these practices and cost arrived there from can reduce profit.

The evolution of cost systems has not been a linear and continuous process (Johnson and Kaplan, 1987). Indeed, by the 1920s, companies had developed almost all the management accounting procedures that have been used up to the present day. Furthermore, between 1925 and 1980, virtually no new ideas have affected the design and use of cost management systems. The same concepts always appear: break-even analysis, cost-volume-profit analysis, direct costing, and fixed and variable cost estimates. The idea that conventional accounts are only finance oriented and simply describe historical inputs is shared among other authors of costing methodology (Bellis-Jones and Develin, 1995).

Traditional cost allocations are arbitrary and cannot be proven correct (or incorrect) because they depend on subjective judgment and not on a verifiable cause/effect relationship. The situation at the beginning of the 1980s was that the actual management accounting systems provided few benefits to organizations. Normally, the reported information not only inhibited good decision making by managers, but actually encouraged bad decisions (Johnson and Kaplan, 1987). The main reason was the use of an obsolete tool in an extremely different and more complex and competitive environment.

Traditional methods of cost accounting showed some other weaknesses. (Bellis-Jones and Develin, 1995) That is, companies do not know whether their products or services are profitable and they cannot distinguish profitable from unprofitable customers. In addition, traditional methods focus on the short term at the expense of the long term.

The methodology for making cost allocations involves two separate issues:

1. The pools or categories of indirect costs that should be identified, aggregated and allocated together
2. The basis over which the costs in any given pool should be allocated.

It is the second issue that gives rise to the search for cost drivers or allocation bases.

A number of criteria are used by companies for evaluating cost allocation methods. Most authorities agree allocations should be made on the basis of the factors that caused the cost to be incurred. This criterion is most useful for variable costs like direct labor. It is less useful for fixed costs—like office rent or building depreciation—that represent a capacity decision by the firm to provide facilities for a particular level of service. The main problem that conventional cost models faced was the allocation of overhead by products on the basis of either direct labor or machine hour content in the manufacturing environment. This problem was growing at the same time that direct labor and machine hour contents of many products and services fell, while overhead costs increased. Conventional costing ignores important differences between products and services, markets, and customers, which incur different overhead costs.

This was the starting point in carefully analyzing the conventional cost models and in

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8 Bellis-Jones, R.; Develin, (1995), ibid
criticizing them because of their uselessness in accurately explaining the cost of products. Lately, the fact that the same issues apply to the service sector has been noticed.

As a result of the changed economic scenario in the country and its impact on Mumbai Port Trust and further as a result of the development programmes of the port, it is high time that the traditional costing system of the port is completely revamped to cater to the needs of the current scenario. Also as stated above, the present system of costing is totally ineffective to ascertain correct cost and fix appropriate tariff. There is an urgent need to explore newer cost methodologies and adopt an appropriate methodology for cost ascertainment.

Activity Based Costing is a recent evolution of cost methodology and has proved effective in many areas. The problems that conventional costing methodologies raised were the main reason for developing a new theoretical approach to this subject. Johnson and Kaplan are considered the inventors of ABC, although they do not use this terminology at the beginning of their studies [Johnson and Kaplan, 1987]^9. The first time the concept of ABC appears is in a later article [Cooper and Kaplan, 1988a]^10. The analysis of cost and profitability of individual products, services, and customers represents a critical issue that companies were concerned with and one where ABC tries to help. The primary focus was to ask what is important for the organization, and what information is needed for management planning and control functions. Finally, useful information for managerial purposes should not be extracted only from a system designed primarily to satisfy external reporting and auditing requirements (financial information). It is necessary to design systems

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consistent with the technology of the organization, its product strategy, and its
organizational structure.

In literature there are several definitions of ABC. The definition here shows the ABC philosophy [Hicks, 1992] briefly and clearly:

"Activity-based costing is a cost accounting concept based on the premise that products (and/or services) require an organization to perform activities and that those activities require an organization to incur costs. In activity-based costing, systems are designed so that any costs that cannot be attributed directly to a product flow into the activities that make them necessary. The cost of each activity then flows to the product(s) that make the activity necessary based on their respective consumption of that activity."

Main Differences between Conventional Cost Models and ABC

- Treatment of non-volume-related overhead costs.
- Treatment of unused capacity

The most important difference between conventional cost models and ABC is the treatment of non-volume-related overhead costs. The use of direct labor-based overhead allocation methods was appropriate in the past when direct labor was the principal component of manufacturing cost, but not today. In the ABC approach, many overheads are related to specific activities to avoid distortions in product and service costs.

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Another difference is the treatment of unused capacity. ABC describes resources that are used by activities, but conventional accounts describe resources that are supplied. The difference between the two is excess capacity. If excess capacity is allocated to products, services, or customers, there is risk of a "dead spiral," as defined by Bellis-Jones, R.; Develin,(1995)\(^2\). This means that the company should be aware of which costs their customers really generate and not allocate the excess of capacity to avoid the risk of overpricing its products or services.

Advantages and Benefits of the ABC Approach

BOX NO 7.10

<table>
<thead>
<tr>
<th>Advantages and Benefits of the ABC Approach</th>
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<tbody>
<tr>
<td>• Accurate product and service costing</td>
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<tr>
<td>• Analyze costs by areas of managerial responsibility and customers.</td>
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<tr>
<td>• Better understanding of cost behavior</td>
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<td>• Focuses on the activities that add value</td>
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<tr>
<td>• Useful in performing capacity analysis</td>
</tr>
<tr>
<td>• Reduces uncertainty and provides a more solid basis for strategic decisions.</td>
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</tbody>
</table>

Several authors have described the main advantages and benefits of using ABC [Innes and Mitchell, 1990;\(^3\) Malmi, 1997\(^4\)]. The most important are as follows:

\(^2\) Bellis-Jones, R.; Develin,(1995), ibid

\(^3\) Innes, J. and Mitchell. F. (1990), Activity-Based Costing: A Review with Case Studies, Chartered Institute of Management Accountants, London.

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1) ABC provides more accurate product and service costing, particularly where non-volume-related overheads are significant.

2) By using ABC, it is possible to analyze costs by areas of managerial responsibility and customers. ABC helps to recognize the way in which customers directly affect the cost structure of the business and therefore helps to analyze customer profitability.

3) ABC provides a better understanding of cost behavior as well as identifying the costs of complexity, variety, and change inherent in both the kind of service offered and customer-specific requirements.

4) ABC focuses on the activities that add value, which are those activities that create value from the customer's point of view. On the other hand, the company should focus on those non-value-added activities and try to eliminate them, although some of the non-value-added activities are necessary to enable value-adding activities to occur.

5) ABC is useful in performing capacity analysis. ABC measures the costs of resources used rather than the costs of resources supplied, the difference being excess capacity. It would be wrong to allocate unused capacity to the customers. To perform this analysis, the use of practical capacity is suggested, which means the capacity reflecting the maximum level at which the organization can operate efficiently.

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6) ABC reduces uncertainty and provides a more solid basis for strategic decisions. Therefore, the success of ABC might not depend only on the results of the analysis, but on its ability to provide a correct diagnosis of the company's situation.

7.7 JUSTIFICATION FOR INSTALLATION OF ACTIVITY BASED COSTING METHODOLOGY IN MUMBAI PORT TRUST

First it is necessary to understand the importance of a cost model. The main functions which a cost model should perform need to be understood. The main functions of a cost model can be generalized as follows:

1) Valuation of inventory and measurement of the cost of goods and services sold for financial purposes;

2) Estimation of the cost of activities, products, services, and customers; and

3) provide economic feedback to managers and staff in general about service efficiency.

From this it can be understood that a cost model might be analyzed as the tool that companies use in order to have a proper understanding about the cost to run their businesses. One of the purposes of a cost model is to gather and analyze data generated in the company in order to gain useful information for making decisions. Therefore, the usefulness of a cost model may be evaluated depending on its capacity to generate the right information to make the right managerial decisions.
Mumbai Port Trust in the recent developments and changed economic scenario is in urgent need of a methodology like ABC to enable it to arrive at correct cost of its services. Huge investments are proposed to be incurred by the port for its various developmental activities. It is essential to recover all costs and ensure profitability of the projects. ABC methodology will be the cost methodology which can enable the port to achieve these objectives. The main reasons and justification for installation of ABC in Mumbai port are broadly discussed below:

ACCURACY IN COSTING OF SERVICES.

The cost of each services rendered is essential to arrive at correct pricing and recovering the investment. In the present system of costing overheads are allocated arbitrarily resulting in distortions of cost of services.

Performance measurements play an important role in providing strategic directions and developing corresponding operational policies and methods. The activity-based costing (ABC) method calculates the cost of activities and helps in making decisions on service mix and price for improving the utilization of resources and minimizing the cost of rendering the service. Even now Mumbai Port Trust employs traditional costing methods depending upon their market forces and characteristics. One of the most important decisions to be made is about the type of costing system that would be suitable for an organization. The role of direct labour in current environment of Mumbai Port Trust is slowly diminishing, but at the same time the level of support and ancillary services has increased. Traditional methods of cost calculation do not take into account this increased complexity and still allocate overhead costs by their diminishing labour base or even do not take into account the new overhead costs. Hence, there is a need for a more accurate service costing method, viz. ABC. ABC can be introduced with the objective to provide information
to the management and its suitability for improving the overall operational effectiveness of Mumbai Port trust.

ACCURATE ANALYSIS OF COST

Ports can no longer treat all customers uniformly. Mumbai Port Trust needs to recognize the requirement of different customers and cater accordingly. Services rendered by the port can be user specific. For example, project cargo handling is not standard and the cargo received under this category varies with the requirements of the project cargo.

Under these circumstances, it is essential to ascertain costs of handling a specific cargo or catering to customers specific requirements.

BETTER UNDERSTANDING OF COST BEHAVIOUR

It is essential to understand the behavior of cost for proper cost ascertainment. Further complexities of cost, its varieties need to be understood especially when modern and high technology projects are under implementation. Though the port has high fixed cost in the form of labour cost, in these changing economic scenario overheads are also undergoing a sea change in Mumbai Port Trust. Thus it is essential to understand the cost behaviour of these overheads in order to allocate the costs appropriately to the activities.
In this chapter, researcher has identified various pitfalls of the existing cost systems of Mumbai Port Trust and factors influencing the changing economic scenario both of the economy and those particularly influencing Mumbai Port Trust. Thus researcher has analysed the existing cost systems of Mumbai Port Trust and concluded that there is an urgent need to install a new and improved cost system for the port to tackle the complexities of the changing economic scenario for its survival and sustenance. With this in view, researcher has proposed Activity Based Costing methodology as an appropriate cost methodology for Mumbai Port Trust. In order to further substantiate her findings, researcher has elicited the responses of the officers of Mumbai Port Trust through a structured questionnaire. The responses of the officers to the implementation of Activity Based Costing in Mumbai Port Trust has been analysed in detail in the next chapter.