

Impact of Port Efficiency and Productivity on The Economy of Bangladesh- A Case Study of Chittagong Port

Halima Begum*

Abstract

A port becomes the wheel of an economy if it runs efficiently. Presently the function of a port is not only limited to an interface but has expanded to a logistical platform. Being the 'Gateway of Bangladesh', Chittagong Port still acts as a first generation port. This paper evaluates the performance of the Chittagong Port to find out its impact on the economy. It identifies its direct contribution and also the improved efficiency benefit and inefficiency cost to the economy.

1. Introduction

The efficiency of a port is the mode (fad) of the present international trade since a seaport is the nerve centre of foreign trade of a country. A seaport is the compulsory transit point for the bulk of this trade, permitting the import of goods, which the country does not itself produce in sufficient quantity, and the export of items which the country has a surplus or has a competitive edge to produce contributing to the development of its economy. Besides, a port is also a place for the provision of further services, which add value to the products transported and thus helps the increasing demand of trade.

The globalisation of world economy has brought about a tremendous increase in the exchange of goods across the world. The world trade has also accelerated as the cost of shipping has fallen due to the introduction of economies of scale and the development of technology in shipping. To cope with the ever-growing world

* Senior Training Officer, Chittagong Port Authority.

trade, ports of every country will no doubt continue to play a critical and indispensable role in providing the cheapest mode of transportation.

Dr. Mahathir, former Prime Minister of Malaysia rightly commented, “No matter how information technology advances, the world trade cannot be materialized without ports. This is exactly why every country needs to develop much more advanced and efficient ports for its prosperity”.

2. Relationship between macroeconomics, port economics and port performance

Port performance and port economics are closely related with macroeconomics. Hence, any change in port traffic or operation and port organization has an impact on the national economy particularly on the hinterland. This relationship is shown in Figure 1.

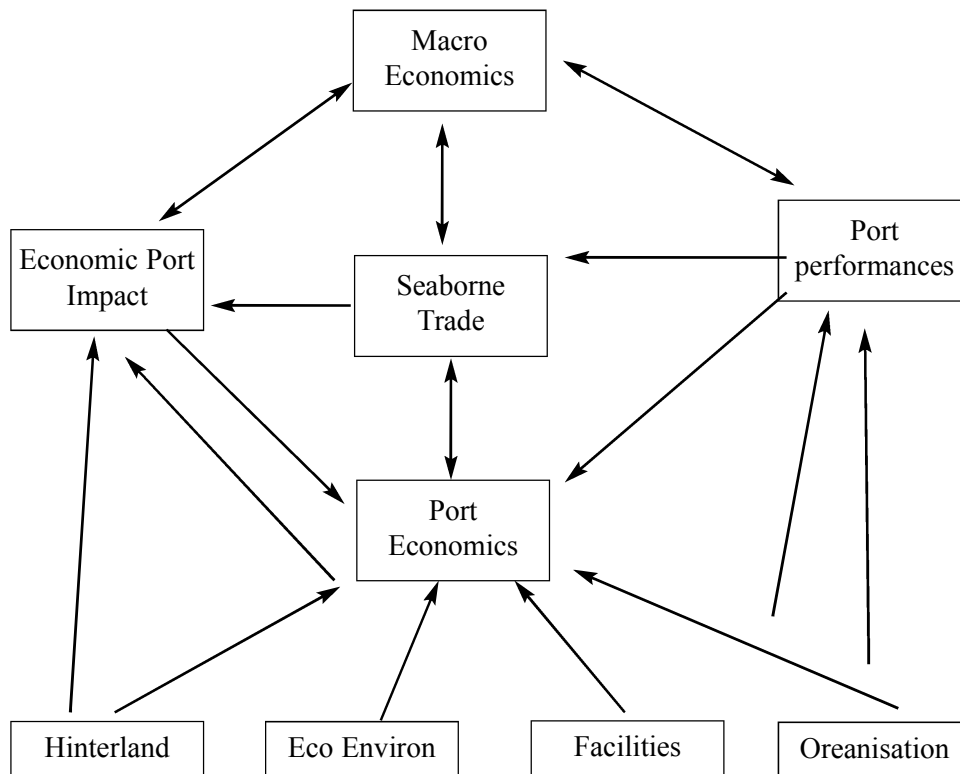


Figure 1: Relationship of port economics and macroeconomics

3. Performance Measurement

Productivity in any system is the output in relation to input and is a measure of efficiency in the utilization of resources. In turn, efficiency is one of the three basic output dimensions of the organizational performance, i.e.,

Performance = effectiveness, efficiency and participant satisfaction.

Effectiveness is concerned with the accomplishment of explicit or implicit goals, whereas efficiency refers to the ratio of output to input or benefit to cost. In case of port, the ratio of time, cost, capacity etc. constitutes the overall efficiency. This efficiency has a considerable impact on the national economy. In this analysis inefficiency cost is considered the cost, which could be saved by improving operational performance utilizing the potential facilities.

4. Impact on the export and import prices

The export and import trade include more and more a logistical component. On the other hand, a port is a vital part in the logistic chain. Specialists estimate the port cost to an average 10% of the total supply chain cost. If the port is inefficient, the direct port cost as well as the freight increases due to high turn around time of vessels at the port, which contributes to increasing the FOB export and import price. The consequences are that import prices become high and exports face tougher competition in the international market. To survive in the competitive market exporters have to reduce their profit margin.

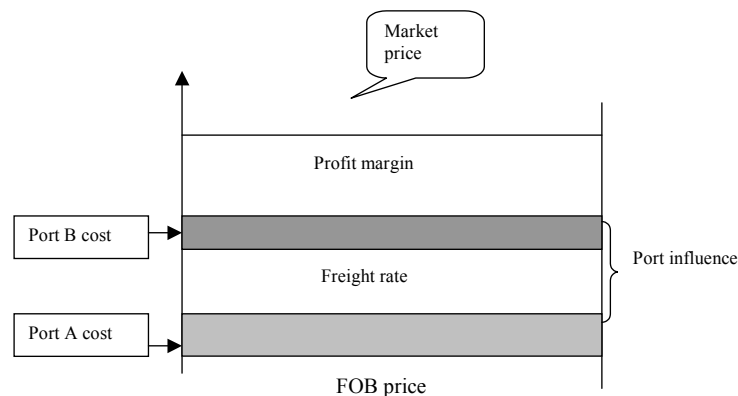


Figure 2 : Impact on export and import price

Figure – 2 describes why the country needs an efficient port. In a situation where raw materials or industrial goods have to be imported for export of finished products, the need for port efficiency for export competitiveness becomes all the more important, since the cargo has to pass through the port twice. Apart from the port and freight costs, the inefficiency and the consequent uncertainty in the delivery or shipment of the goods at the port results in longer lead-time for the export goods, which raises the inventory costs of the manufacturers/exporters. Port services are essentially intermediate to goods. As congestion/inefficiency causes under-utilisation of resources, declining of the productivity and prolonging of the ship turnaround time raise the cost per ton. According to Oram and Baker (1971, p.2), “No single cause directly affects the costs of living of a maritime country than the speed with which ships are turnaround in her ports”.

5. MDF (Maritime Dependency Factor) of Bangladesh

Of the two seaports (Chittagong and Mongla), Chittagong Port is not only the principal port of Bangladesh, but has gradually grown to be almost the sole port catering for about 95% of the country’s maritime import and 94% export trade. It is situated in the lower end of the river Karnaphuli, with the commercial port facilities located on the right bank about 9 nautical miles away from the river’s outfall in the Bay of Bengal.

In order to know the MDF of the Bangladesh economy, the country’s international seaborne cargo (in value) is compared with the GDP.

Generally, the level of MDF is affected mainly by the difference in the type of the economy, the size of the economy, the level of the economy, alternative transport modes, and geographical location. The MDF of Bangladesh for the last few years is shown in Table 1:

Table 1 : Maritime dependency factor

FY	MDF
2000-01	31.84%
2001-02	29.27%
2002-03	29.87%
2003-04	32.55%
2004-05	39.34%
2005-06	39.68%

Source: Bangladesh Bank & Compilation.

With the increase of development activities of the country, the movement of export-import cargo through seaports also increases. Table 1 shows that the maritime dependency of the country on average (2001 to 2006FY) is 34.14%.

6. The role of port in the national economy

In Singapore, Hong Kong, Taiwan and South Korea, ports were able to play a catalytic role in economic expansion, because they were allowed to function freely and efficiently. The economies of Singapore and Malta are mainly based on port. About 11% of GDP of the Netherlands is generated by the activities of the port of Rotterdam alone. Spanish ports provide an added value ranging from 6.78% to 7.7% of total GNP and generate an amount ranging from 8.2% to 8.95% of Spanish employment in 1993.

There is no doubt that Chittagong port acts as the lifeline to the sustenance and development of trade, commerce, transport and industry of Bangladesh. The economy is heavily import dependent. As can be seen in Table 2, during 2005-06, Chittagong Port handled 260.96 M/T of cargo, comprising 231.70 lakh M/T of import and 29.26 lakh M/T of export, which is worth (about) Taka 66,444.00 crore and 58,172.00 crore respectively. Chittagong Customs House collected (about) 10,711.00 crore taka as Duty, Tax & VAT. On average only 30% of the import items are dutiable, which fetches about 37% of tax revenue of the economy. The direct, indirect and induced impact of the CPA on the national economy can be assessed as follows:

6.1 Direct impact

With the growth of economic activity the cargo handling growth rate is also increasing.

Table 2 : Cargo, Container and Vessel handled during last five years

FY	Cargo (000MT)	Vessel handled (Total No.)	Container (TEU)	Container Vessel (No.)
2001-02	18080	1573	496343	593
2002-03	23140	1683	560486	649
2003-04	24070	1748	654116	665
2004-05	24387	1983	746008	718
2005-06	26096	2019	827174	822

Source: Chittagong Port Authority (CPA)

A port is a good source of earning direct foreign currency as some tariff items on cargo and ship handling are charged in \$. The heads are Port dues, Pilotage, Mooring/berth hire, Berthing/unberthing, loading/discharging etc. About 47% of the earnings of Chittagong port are in hard currency (Table 3).

Table 3 : Direct Foreign Currency earned by CPA

Year	Foreign Currency Earned (in crore taka)	Earning of CPA (in crore taka)	% of total earning
2000-01	219.42	477.00	46%
2001-02	260.37	531.37	49%
2002-03	260.00	530.66	49%
2003-04	256.38	557.36	46%
2004-05	311.89	649.78	48%

Source: CPA

Chittagong port provides value added services in the form of salary, taxes (income tax, corporate tax & municipality tax, land tax etc) and profit. Employees' income tax is borne by the authority. In addition to those taxes, CPA contributes to Value Added Tax (Table 4).

Table 4 : Value Added Tax paid by CPA

FY	Value Added Tax paid (Crore TK)
1999-00	24.00
2000-01	48.00
2001-02	55.00
2002-03	53.00
2003-04	55.00
2004-05	72.11

Source: CPA

Chittagong port is the only self-financing organization in Bangladesh, which meets all the development expenditures from its revenue surplus. The annual development expenditure of the port during the last few years is shown in Table 5.

Table 5 : Annual Development Expenditure

FY	Expenditure (Crore Taka)
2000-01	60.18
2001-02	19.27
2002-03	30.72
2003-04	62.44
2004-05	147.7

Source: CPA

Port is a hub of multidimensional economic activities specially in developing countries It generates employment opportunities for white and blue colour labour. Only 25 organizations which are directly involved with the day to day operation of the Chittagong Port provides about 56000 employment opportunity (Table 6).

Table 6 : Employment Opportunity and salary

Category	Employment (average numbers)	Salary & allowances (Crore Taka)
Port Employee	6000	70.00
Dock workers (including DWMB officials)	4300	40.00
Merchant Labours (including C&F Agent)	5300	34.00
Stevedoring Worker (/Berth Operator)	5000	60.00
Hatch Worker, Lighterage/ IWT, Trucking /Transport worker (including transport organization), Insurance, Bank, ICD service, Shipping Agent/ MLO, FF, Ship supplies, Ship repairs/ maintenance, Bunker, Tanker service, Answar, Coast guard, Customs, Classification Society/ Surveyor etc.	30000	400.00
Total :	56000	604.00

Source: CPA, DWMB & relevant organizations & compilation.

6.2 Indirect impact

Ready made garments/knitwear sector, EPZ, cement industry, oil refinery, dry dock, fisheries, truck service, railway, IWT, ICD, Customs, shipping agent, C&F agent, freight forwarder, importers, exporters, banks, and insurance companies benefit directly from the port. Their survival and prosperity depend on the port's existence, activities and expansion. These sectors provide job opportunities for millions of people and contribute to the GDP of the country.

6.3 Induced impact

The induced impacts are the effects of the direct and indirect activities on the other sectors of the economy. Most importantly there is a multiplier effect as the incomes generated among port professionals and workers and those working in the related business services take care of expenses, and these expenditures in turn become revenues to others. One estimate shows that in all mature economy countries the induced revenues in other sectors amount to about 50% of the newly created revenue.

Since Bangladesh economy is not a mature economy, as it is highly based on agriculture, the degree of induced impact may be more than 50%.

7. Operational System at CPA

Performance indicators are the tools of measurement of the efficiency. The measurement of efficiency of port operation is important because the freight & port costs are determining the major part of the maritime transport chain. Therefore, the port plays a vital role in the supply chain but the question of efficiency and productivity arises. This is simply because port costs today account for a significant proportion of international sea transport costs. According to several studies, two-thirds of the total maritime cost are incurred in the ports, mainly on account of wharfage, handling and storage. Besides, cost is also incurred for the ship and cargo time in port and the quality of services in addition to port dues. Hence, the survival of a port in a competitive situation or the survival of the economy of the country in case of the port having a monopoly, rests on the efficiency of the port. Port performance indicators measure efficiency, which is influenced by a host of such factors as the infrastructure facilities, layouts, equipment, storage facilities, work organization, management, wages and labour policy, customs procedures and practices, local customs/ethics and work practices, level of use of IT, trade unionism, politics etc.

7.1 Aquatorium, Berthing System

The port operation system consists of the Aquatorium, Berthing and Infostructure System. The berth system has four major sequences of activities.

They are:

- Ship operation
- Quay transfer operation
- Storage operation
- Receipt/delivery operation.

The performance and efficiency of the port is fully dependent on the balancing and harmonisation of the above activities as they are interlinked and inter-dependent, Therefore, the slowdown of one will inevitably affect the speed of others. Similarly improvement made on any one operation will not bring fruit unless the same is matched by corresponding improvements made on other operations and all are tied together by a computerised container terminal management system.

At Chittagong Port, three categories such as bulk, break-bulk and containerised cargoes are handled and different kinds of equipment are required for handling each category. As the operation system is different for each category, the indicators of productivity/ performance are also different. There are a total 49 berths inside the port and about 22 vessels can be berthed at a time (depending on the size of vessel).

The port started container handling in the late 1970s, but in the absence of multi-modal transport system the economy is yet to reap the benefit of containerisation. After the advent of container, about 30 years have passed but the port is not connected with the capital Dhaka by a good motorable road. Though Bangladesh is a riverine country, no facility for the transportation of the container from the port to the hinterland has been developed. Only 11% containers are transported to Dhaka by rail.

7.2 Infostructure

Information is the lubricant that smoothens the operations between all the partners of the supply chain. Shippers want to know where the goods are. Shipping agency needs to know the nature and volume of cargo to prepare the call and handling operation. Master of the ship needs information on the port condition and cargo to be loaded. Port needs information on cargo, time of arrival to schedule operation. Customs and freight forwarders need information to finish formalities in advance for quick clearance of cargo. In this case, IT is the only solution, which enables easy communication, correct and timely flow of information among the players.

In case of Chittagong Port there is no network information system between the port and users. Every organization has stand-alone computer operation system. Even intranet networking system is not developed within the organization. All the documents are handled manually and there is no effective container terminal Management System (CTMS) in place to manage and control the operation. The computers installed inside CCT/CPA are only being used for the payroll, accounts billing, and inadequate container position tracking system. In the absence of computerised MIS, the billing and invoicing is an extremely labour intensive, paper based system replete with recursive multiple layers of checking and cross checking where as many as 25 steps and 18 signatures are required to clear a consignment from the port. The store rent billing is lagging behind about one year.

8. Performance indicators of Chittagong Port

The productivity figures and performance indicators are low: 4-7 days vessel turn around time, berth occupancy rates of over 60%, 22 days container dwell time for import, 10 days average for cargo throughput in the Container Freight Station (CFS), and about 1 year arrear in invoicing.

The operational performance of the Chittagong port is shown in the following Table

Table 7 : Performance Indicator

	1999-00	2000-01	2001-02	2002-03	2003-04	2004-05	2005-06
Container handled (TEU)	4,07,000	4,90,000	5,23,000	5,30,140	6,54,116	7,46,008	8,27,174
Cargo handled (Including Containerised cargo Million Ton)	15.13	16.91	18.09	20.58	21.38	24.39	26.10
Turn around time of vessel (Days)	5.90	6.15	5.10	4.77	4.24	4.57	4.93
W ratio(Container vessel-Waiting time/ Service time)	55%	62%	44%	43%	32%	27%	80%
Berth Occupancy Ratio	86.95%	87.30%	63.51%	67.93%	71.76%	68.23%	69.38%
Equipment Availability	48.87%	45.24%	59.26%	66.08%	68.98%	66.76%	49.94%

Source: CPA and compilation

9. Development Programme

9.1 Container Projection

The port of Chittagong has been experiencing average growth rate in container traffic of 15% annually during the last decades. The container throughput in 2005-06 was 827174 TEUs and it is projected in the Chittagong Port Trade Facilitation Project Study Report, 2004 that the volume will increase to 1.5 million TEUs by 2015 and 1.25 million TEUs by 2020.

9.2 Project

Bangladesh Govt. has undertaken steps to implement the recommendations of Chittagong Port Trade Facilitation (Technical Assistance) Project undertaken by The TERA International group Inc, USA in 2004. The project was financed by the ADB. The outgrowth of that project is the “Chittagong Port Trade Facilitation Project”, which is being implemented by the Chittagong Port Authority, Custom House Chittagong & Roads and Highways Department. This investment project is also being financed by ADB (30.6 million US dollar). The objectives of the project are to increase port capacity for cargo/container handling and ensure an international management practices and standards in the Port of Chittagong. The project is scheduled to be completed by 2009. The project, if implemented successfully, will make a breakthrough not only in the international trade but also to the economy of Bangladesh.

10. Efficiency benefit / Inefficiency cost to the economy

10.1 Benefit to ships during 2001-2002, 2002-03 and 2003-04.

Due to lack of authentic data, only 3-4 major factors (cost to ship, opportunity cost of capital goods & Textile, Lighterage cost) have been considered to calculate the performance efficiency/inefficiency of Chittagong Port.

10.1.1 Cost to ship (2001-2002, 2002-03, 2003-04)

During 2001-2002, 2002-03 and 2003-04 an amount of \$ 11.00 Million, \$7 Million and \$ 20 Million were saved by the shipping lines due to the improvement of the turn-around time of vessels, but the benefits from the savings did not trickle down to the customers. Absence of good governance, transparency and accountability in the government organizations have encouraged the shipping lines to manipulate the market. The regulatory mechanisms are in a very weak position to manoeuvre the market economy. Hence the final consumers are always deprived from the benefit of port efficiency.

10.2 Inefficiency cost to ship and cargo

10.2.1 Cost to ship

For the last few years the average turn-around time of vessel is 5 days. Considering the limitations of Chittagong Port it is found that the average turnaround time should be 3 days instead of 5 days. In that case, the ship owners could save about \$54 million per year.

10.2.2 Dwell time cost of cargo

The costs of delaying cargo cause a great loss to the importer and exporter. The goods that take longer transit time cost higher insurance premium. The goods in transit are financed by working capital and it has an opportunity cost. Regardless of the extent and terms of the finance, the social opportunity cost of capital is about 11% in the public sector. Because of lack of information the author considered manufactured goods for import and RMG for export as these two are important items in the international trade of Bangladesh.

10.2.2.1 Import Dwell Time

On an average Bangladesh imports of manufactured goods are worth US\$ 800 million per year. Just a delay of one day in the port costs US\$0.24 million in interest. Therefore, for 25 days delay the opportunity cost to the society is \$5 million per year on account of manufactured imported goods.

10.2.4 Export Dwell Time

The main share of foreign exchange earnings comes from exporting garments. For one day delay in port, the opportunity cost to exporter is \$2 million, and for 4 days delay it is \$8 million.

10.2.5 Cost of lighterage

Due to draught restriction, bulk cargo carriers e.g., POL, cement clinker, and food grain are lightered, which costs \$52 million per year to the importer.

11. Constraints

- ❑ The constraints of Chittagong Port are not different from any other developing countries. The planned handling capacity is 100 lac MT cargo and 3,00,0000 TEU Container, whereas it handles \pm 3 times higher than the planned capacity. Hence, the performance is undeniably poor.
- ❑ Though CPA is an autonomous organization, it cannot exercise its power in case of manpower planning, compensation & wages, recruitment & training, operation and development, mainly due to interference of the Ministry of Shipping.
- ❑ In the absence of a proper Human Resource Management and compensation scheme, professionalism in port management & operation including quality

of manpower suffers badly. The average allocation for training is about 0.14% of revenue budget of Chittagong Port.

- Though the forces of change are obvious in port operations the authority is yet to take strategic planning to cope with the situation. Always ad hoc solutions are taken on expediency basis.
- Trade Unions, Dockworkers and Customs are the stumbling blocks to improving port operations and performance. Also there are other strong vested interests in Stevedores, C&F Agents, and Importers etc.
- In the absence of a trade facilitation system, many steps are required to clear an imported consignment. Besides, attitude of importer to use port as storage place aggravates the situation. Hence, the average dwell time of containers is 22 days, which is very long.
- Though the port operations are open for 24 hours but the co-ordinated working hours with other organizations like govt. organizations, bank, custom, shipping agent, FF, C&F agent, railway, and trucking company is on average 8 hours.
- Above all, the political influence like strike adds more inefficiency as the total operation halts even days after days.

As a consequence, congestion of ships and cargo arises.

12. Recommendations

The short-term recommendations are given under three headings. They are: Institutional, Labour/employment and logistics.

12.1 Institutional

- There should be a comprehensive National Port Policy.
- Port Act 1908, Port Ordinance of 1976, and Customs Act 1969, which provide the legal framework for administration, should be revised/updated for restructuring/reforms of the port management, operation and development.
- The port authority should be truly autonomous and accountable to the Government for its performance. Port operations should be unitised under separate terminal managements for a commercially oriented competitive performance.

- A shift is required from the civil service type employment and compensation practices for the port employees and managers to recruitments / appointments on more commercial terms and compensation scheme.
- A holistic approach to Human Resources Development is needed. A system of motivation would have to be developed. Staff needs would have to be individualised instead of en-masse approach. Training schemes would have to be rejuvenated and adequate budgetary allocation made. Above all, there is a need for attitudinal change and the chain of command would have to be avoided to provide a unity of purpose i.e. team spirit. All these would lead to an improvement of the working conditions through a multi-faceted approach.

12.2 Labour/ employment issues

- The co-ordination of administrative and physical operations is one type of efficiency. The target is the simultaneous opening hours for all the services.
- Unionised workers would have to be multi-disciplinary in their skills to prevent the creation of a vacuum in the event of absenteeism. The gang size would have to be minimized proportionate to the task performed. This will provide high productivity.

12.3 Logistics

- Drought restriction would demand dredging. The port would have to invest in research and development because the modern trend is to locate the port towards the sea to be able to accommodate larger vessels to reap economies of scale.
- The hinterland connection needs a rapid development. Road, rail and inland waterway facilities in general and particularly waterways need to be upgraded. The under-developed nature of this facility is largely responsible for the stripping of FCL containers in the port. The creation of ICDs would need an effective infra-structural network. The storage needs should not be overlooked. The ground strength will have to be re-constructed as well as the necessary handling equipment procured for effective stacking. Tariff structure would have to be revised to discourage use of port yards and sheds for long storage by importers. This will facilitate a reduction in dwell time. A concerted approach to

equipment inventory and maintenance together with other logistic requirements will help prevent the decay.

- Despite the fact that some offices are equipped with computers, this is not enough. A networking of the system is what is needed. Communication and information flow would have to be transparent with all actors (port users) participating fully. In this context the feedback is a forgone conclusion. The benefits of the Electronic Data Interchange (EDI) cannot be over emphasised. The perceived advantages as regards productivity to be derived from container tracking using electronic means are enormous.
- Customs documentation and internal port procedures should be simplified by introducing a computerised system, which would help in reducing dwell time of cargo. Scanning Machine should be installed to eliminate manual checking and side by side the port security system should be modernised. These would help to implement the ISPS Code in true sense.
- Coherence in operation is the most important need of the day. About 58 Stevedoring Companies are enlisted with the port and about 2200 C&F Agents are licensed by Customs and enlisted with CPA. For efficient port operation these numbers may be restricted to ensure healthy competition.
- Govt machineries and the trade should be equally trustworthy to each other and to the Govt. Mistrusting has given rise to so many steps of checking that it has been a stifling factor for the trade.

12.2 Long-term measures - Commercialisation

- Commercialisation of the port operation is necessary for efficiency and increased productivity. A change in the management system to that akin to a private enterprise, without necessarily changing the public port status of CPA, will lead to accountability and responsibility for operational performance and financial results. This will in effect lead to the gradual introduction of decentralised decision making and increasing control of management over purchasing, budgeting and hiring of skilled workers.
- It should be kept in mind that without streamlining the regulatory instruments and good governance, abrupt and mass level privatisation

of port infrastructure on the pretext of inefficiency of port may harm the the economy.

- Finally there is the need for establishing a third sea port (Deep sea port) to meet the growing trade needs of the country.

13. Conclusion

Sustainable development of the country can be achieved by improving the transport sector including seaports. In the present millennium the port acts not only as an interface but also as a very vital part in the supply chain management. In this backdrop, the desired new economic strategy of the port is that it should be evolved as a trade facilitator and not as income or employment generator. One can recap that an improvement in the turn around time of ship and dwell time of cargo through investment in the necessary infrastructure, superstructure, documentation and info structure stands as the litmus test for facilitation. Side, by side, other external stakeholders should be encouraged to come forward with equal/simultaneous pace. GOB has an important and significant role to play on various aspects and issues. Above all, the general attitude of port professionals should contain minimum morality and ethics. Otherwise, the hue and cry for the upgradation of port efficiency will remain a mirage. Hence, the objective should be to expedite the movement of the nation's international merchandise trade as efficiently and inexpensively as possible.

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