Performance Evaluation Report

Bangladesh: Chittagong Port Trade Facilitation Project

Independent Evaluation ADB

Raising development impact through evaluation

Performance Evaluation Report
December 2018

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Project Number: 36105-013
Loan Number: 2147
Independent Evaluation: PE-815

Independent Evaluation ADB

NOTES

(i) In this report, "$" refers to United States dollars.
(ii) The fiscal year (FY) of the government ends on 30 June. FY before a calendar year denotes the year in which the fiscal year ends, e.g., FY2016 ends on 30 June 2016.
(iii) For an explanation of rating descriptions used in Asian Development Bank evaluation reports, see Asian Development Bank. 2016. *Guidelines for the Evaluation of Public Sector Operations.* Manila.

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Abbreviations

ADB	–	Asian Development Bank
ASYCUDA	–	automated system for customs data
CHC	–	Customs House of Chittagong
CCT	–	Chittagong Container Terminal
CPA	–	Chittagong Port Authority
CTMS	–	container terminal management system
DMF	–	design and monitoring framework
EIRR	–	economic internal rate of return
FY	–	fiscal year
GDP	–	gross domestic product
ICD	–	inland container depot
IT	–	information technology
MARPOL	–	Marine Pollution and Prevention Convention
MOC	–	Ministry of Communications
NMCT	–	New Mooring Container Terminal
O&M	–	operation and maintenance
RHD	–	Roads and Highways Department
RTG	–	rubber-tired gantry crane
TA	–	technical assistance
TEU	–	20-foot equivalent unit
USTDA	–	United States Trade and Development Agency

Currency Equivalents

Currency Unit–taka (Tk)

		At Appraisal (1 November 2004)	**At Program Completion** (23 January 2013)	**At Evaluation** (15 June 2018)
Tk1.00	=	$0.0169	$0.013	$0.012
$1.00	=	Tk59.30	Tk77.645	Tk84.562

Contents

Acknowledgments

The Independent Evaluation Department (IED) team that prepared this study consisted of Franklin De Guzman (team leader), Elizabeth Li-Mancenido, and Joselito Supangco (consultant).

Tomoo Ueda, Principal Evaluation Specialist, provided comments and the report was peer reviewed by Barry Hitchcock. It was prepared under the overall guidance of Marvin Taylor-Dormond, Director General, IED and Nathan Subramaniam, Director, Sector and Project Division.

The team would like to thank Asian Development Bank staff, the Government of Bangladesh, and various stakeholders who were interviewed for their time and opinions.

IED retains full responsibility for this report.

Basic Data

Chittagong Port Trade Facilitation Project (Bangladesh)
(Loan 2147-BAN)

Borrower	People's Republic of Bangladesh
Executing Agencies	Chittagong Port Authority
	Roads and Highways Department
	Customs House of Chittagong

Key Project Data	Per ADB Loan Documents ($ million)	Actual ($ million)
Total project cost	41.30	27.84
ADB loan	30.60	18.13
Borrower	10.70	9.71
Others	0	0
Loan amount cancelled		12.47

Key Dates	Expected	Actual
Appraisal		17–26 August 2004
Loan negotiations		21–22 November 2004
Board approval		20 December 2004
Loan agreement		12 January 2005
Loan effectiveness	12 April 2005	23 May 2005
First disbursement		15 June 2005
Loan closing	1 January 2009	23 August 2013

Mission Data

Type of Mission	No. of Missions	No. of Person-Days
Appraisal	1	10
Inception	1	68
Review	8	150
Special project review	2	5
Midterm review	1	33
Project completion review	1	4
Independent evaluation	1	9

Source: Asian Development Bank.

Executive Summary

This project performance evaluation report assesses the performance of the Chittagong Port Trade Facilitation Project and highlights the lessons that can be learned from it. The evaluation is intended to be a contribution to a forthcoming review of transport operations of the Asian Development Bank (ADB), a sector-wide evaluation study.

The project's targeted impact of facilitating trade was met through improvements to facilities and the introduction of modern container tracking and management information systems. These have reduced delays for port users, service providers, and consignees. Chittagong Port's strategic location make it an appropriate alternative to other ports in the region. However, much work still needs to be done before the full potential of Chittagong Port's gateway function for third-country trade with Bhutan and Nepal can materialize. The project's envisaged outcome of increased container capacity was achieved. However, the project's enhanced facilities were not able to accommodate the boom in international trade. Chittagong Port is still beset with lingering congestion problems and the new facilities have not been able to keep abreast with the growing demand for port services. Nonetheless, the project helped Chittagong Port transition from paper-based terminal management to modern electronic terminal operations and document processing. On the whole, the project is assessed *successful*.

Regarding future operations in Bangladesh, the evaluation recommends that ADB should explore further complementarities between Chittagong Port Authority and the private sector in port operations and related services. Future port development should also include increasing the number and capacity of off-dock facilities. Both of these would help raise port productivity and ease port congestion.

Background

Bangladesh's economy expanded at an average annual rate of more than 5% for the period fiscal year (FY) 2000–FY2004. Total imports increased by 6.7% a year, on average, during the same period while total exports grew at an average of 7.4% a year. The focal point of Bangladesh's international trade has been the Dhaka–Chittagong corridor. Three modes of transport have been serving this corridor—road, rail, and inland waterway. Together, these moved about 20 million tons of freight in 2004, a figure that has been expanding steadily since then due to the boom in the exports of ready-made garments.

Chittagong Port is the national gateway and handles over 90% of Bangladesh's exports and imports and about 98% of container trade. It plays a vital role in the country's logistics chain and is an integral part of the subregional transport system. Container throughput and the number of container vessels at Chittagong Port have increased considerably in recent years, in line with the boom in garment exports and growth in gross domestic product. However, productivity remained low during the period 2004–2005. Port stay was estimated at about 2.9 days, while berth productivity per day was only about 184 twenty-foot equivalent units. Vessel turnaround time was 12 days, while container dwell time in the port, which has been almost unchanged, averaged about 18 days.

These conditions provided a strong rationale for upgrading and modernizing Chittagong Port's capacity and facilities. There was a need to speed up container-handling and to lower vessel turnaround time (i.e., to reduce the waiting time for vessel loading and unloading). Procedures and environmental management had to be improved. The port is owned and operated by the Chittagong Port Authority (CPA), with the government overseeing its planning, expenditure, and human resource management. The government felt that improving operations at the port would help facilitate trade, hence its request for ADB support.

The Chittagong Port Trade Facilitation Project was designed to increase the capacity and efficiency of the port, and to enable it to meet international port security and environmental standards. The project was approved on 20 December 2004 and became effective on 23 May 2005. The envisaged impact was trade facilitation. The expected outcome was increased container terminal capacity. The project was structured around seven related outputs (i) automation of the manifest system at the Custom House of Chittagong (CHC), (ii) installation of a computerized container terminal management system (CTMS) at CPA, (iii) installation of a container scanning system at CHC, (iv) improved access through a connector road, (v) improved terminal traffic circulation and gate house system, (vi) establishment of an oil-waste reception and treatment facility and implementation of a spill management system, and (viii) establishment of a port service improvement committee.

Overall Assessment

On the whole, the project helped to facilitate vessel and cargo movements within the port area by providing support facilities. It improved access to the port and contributed to meeting international environmental standards. However, Chittagong Port is still beset with lingering congestion problems, the causes of which could not all be directly addressed by the project's initial design, such as the upsurge in international trade. Overall, the project is assessed *successful*.

Project design was generally appropriate since it considered not only interventions to enhance Chittagong Port's productivity, but also environmental and urban traffic mitigation measures. Strategically, the project was aligned with the government's and ADB's development thrusts. The project is assessed *relevant*.

The intended outcome of an increase in container terminal capacity was achieved. Of the three targeted outcome performance targets, the most relevant, sustained annual growth in container throughput, was met. Another target pertaining to vessel turnaround time was partially met, and the third on reduction in port charges was not achieved. In terms of outputs, three out of nine indicators were achieved. Nonetheless, the completed outputs taken together facilitated an increase in Chittagong Port's container terminal capacity. In particular, the project helped Chittagong Port to transition from paper-based terminal management to modern electronic terminal operations and document processing. The project is assessed *effective*.

The economic benefits were cost savings in vessel turnaround costs and user charges. The economic reevaluation yielded an economic internal rate of return (EIRR) of 19.4%, which indicated efficient use of project and non-project investments in achieving the intended outcome and outputs. In terms of process efficiency, the project incurred a delay of about 4 years and 7 months, but this delay was already taken into account in the EIRR re-estimation in terms of delayed project benefits. Thus, the project is assessed *efficient*. In terms of financial sustainability, CPA has been in good financial health. However, there is still scope for the institutional arrangements among various agencies to be strengthened. This could be done through the establishment of a permanent inter-agency and private sector joint council or body. The project is assessed *likely sustainable*.

The project's improved facilities have facilitated trade flows by reducing delays for port users, service providers and consignees through the introduction of modern container tracking and management information systems. Chittagong Port's proximity to neighboring countries makes it an appropriate alternative other ports in the region. However, much work is still needed before the full potential of Chittagong Port's gateway function for third-country trade can be realized. Development impact is assessed *satisfactory*.

ADB deserves credit for undertaking a project which was strategically important to the national economy and which helped reduce a key constraint on growth. It identified the project implementation risk and sought to mitigate it by approving advance procurement and by providing a considerable amount of consulting services to support the executing agencies. ADB's performance is assessed *satisfactory*. The government's ownership of the project was strong and the project was well integrated with the national agenda although implementation arrangements could have been simplified. The performance of the borrower and executing agencies is assessed *satisfactory*.

Key Issues

The provision of port facilities did not keep pace with the growing demand for port services. Chittagong Port has increased and expanded its facilities since project completion. However, this expansion has proved inadequate due to the higher than anticipated growth in the volume of containers and cargo tonnage during the past few years. Chittagong Port operates at almost full capacity and there is a need for commensurate investments in facilities and services to match the increasing container and cargo traffic demand. In particular, the number of off-dock facilities is insufficient.

Private sector participation through port operations contracts is weak. The government, through CPA, has sought to engage the private sector through port operations contracts, under which the private contractor operates the cargo-handling equipment and ship-to-shore cranes used in its assigned port areas. CPA remains responsible for the CTMS and the acquisition and maintenance of the cargo-handling equipment and ship-to-shore cranes; the private contractor merely implements the operational instructions of CPA. This contractual arrangement does not bind the private contractor to performance indicators and productivity targets. The government could explore a scheme whereby a private port concessionaire bears all the costs for providing cargo-handling services, equipment needed, fuel and other operating and maintenance expenditures, administrative costs, and port management costs. The concessionaire would be responsible for collecting all fees and charges, just paying the port authority the agreed concession fee.

Limited interface between port and customs information technology (IT) systems. CPA's CTMS and CHC's automated system for customs data (ASYCUDA) World links should be enhanced to improve the processing of the increasing volume of transactions. CHC provides the import general manifest information details to CPA by e-mail and this information is then inputted to the CTMS to coordinate vessel unloading of containers and slot assignments in the storage and back-up area. However, CHC does not provide CPA with the export general manifest (EGM) details, which would allow it to expedite positioning and loading of export containers to the designated vessels. This sometimes results in delays in the departure of assigned vessels. The EGM module under ASYCUDA World has been developed only recently and is undergoing pilot testing before roll-out and installation in other border points.

Key Lessons

Future port project designs should consider intermodal connectivity. The design of future port projects should take into account entry and exit to the port area. As cargo volumes have increased because of economic and population growth, port areas have expanded while local transport networks have failed to keep pace. There is a need to fully utilize existing and potential intermodal connectivity to accommodate existing and future cargo growth. Roads, rail and water transport development should coincide with the growth in cargo traffic, with each mode providing its share of transport capacity. In hindsight, Chittagong Port would have benefited from a more holistic approach that would have considered the evolving demands of the trade logistics chain in Bangladesh and adjacent landlocked countries and matched the capacity of various modes with Chittagong Port's traffic volume. Future project designs should take into account the need for better integration with intermodal networks.

Urban areas adjacent to port developments should anticipate the growth of port traffic in their urban plans. City development efforts should consider the impact of the growth in port traffic on both intra- and inter-city traffic. Port and city authorities should draw up coordinated short- and medium-term infrastructure plans to accommodate urban and port growth. Chittagong City has been experiencing increased urbanization and its population, the number of commercial establishments and industries, and the number of vehicles on the road have all grown. Chittagong Port's cargo traffic, the lack of container off-docks, the limited capacity of rail, and the number of port-related vehicles contribute to traffic congestion within the city and hinder traffic flow to and from the port. Future investments in port capacity should carefully take into account investments in intra-city circulation roads to avoid urban traffic congestion.

A review of the port's IT system is imperative. The CTMS capacity has already been exceeded by the container cargo volume currently being handled. Although a prolonged operational standstill has not occurred, the risk of system breakdown will grow as further increases strain the CTMS capacity. The rapidly-changing nature of the IT environment requires that the IT infrastructure (e.g., operating systems, core data processing applications, the network, and telecommunications technologies) have enough flexibility in terms of their compatibility, connectivity, and modularity to reflect advances in technology. The lifespan of the port's system needs to be assessed and, if necessary, the system upgraded.

Data collection, especially of baseline data, is critical. Greater priority should have been given to ensuring that socioeconomic and baseline data were collected and reported, especially during the appraisal period. Data that should have been collected included: (i) benchmarking figures to provide objective reference points for evaluation corresponding with the needs of the port management and users; (ii) socioeconomic benefit monitoring data to ensure that the project benefits actually accrue to port users; and (iii) post-project performance evaluation data to assess overall project performance.

Recommendations

Explore further complementarities between CPA and the private sector in port operations and related services, including development activities. This could help realize potential gains in capacity and productivity, and ease port congestion. The private sector has been increasingly involved in a variety of operations in Bangladesh (e.g., cargo-handling and off-dock facilities). There is still scope for a greater push for private sector participation, especially in port development activities, to allow expansion and improvements to terminals and berths, the purchase of modern cargo-handling equipment, and the installation of the latest management and information systems. There is a need to explore the feasibility of various management and public–private participation models to enhance the enabling environment and maintain regional and international operating standards.

Future port development should include increasing the number and capacity of off-dock facilities (ICDs). The number of off-dock facilities in Chittagong and Dhaka should be increased in line with the capacity requirements for the unstuffing and stuffing of less than container loads, including storage of containers for auction. Increasing the number and capacity of ICDs will also allow better handling of future increases in cargo volumes. Increasing the number and capacity of ICDs will allow better handling of future increases in cargo volumes.

CHAPTER 1

Introduction

A. Evaluation Purpose and Process

1. The Chittagong Port Trade Facilitation Project was designed to assist the Government of Bangladesh in its efforts to increase the capacity and efficiency of Chittagong Port, and to enable it to meet international port security and environmental standards. It was also aimed at lowering shipping and port charges in the medium term to facilitate international trade and foster economic growth.

2. This project performance evaluation report was included in the 2018 work program of the Independent Evaluation Department so it could provide inputs to a forthcoming review of transport operations of the Asian Development Bank (ADB), a sector-wide evaluation. It was undertaken 4 years after the project completion report (PCR) in 2014, allowing sufficient time for the outputs and outcomes to be reassessed and for the project's sustainability and impact to become apparent. Following ADB's evaluation guidelines,[1] the report assesses the performance of the project and highlights lessons.

3. The PCR indicated that the project had achieved its principal objective of increasing the capacity of Chittagong Port's container terminal and enabling Bangladesh to meet international port security and environmental standards. It reported that port users had benefited from the greater capacity and streamlined port operations, which had reduced the time required to load and unload vessels.[2]

4. The PCR was validated in February 2015.[3] The validation indicated that the project design formulation was appropriate. It noted that the cancellation of the financing allocation for the container scanners for the Customs House of Chittagong (CHC) had not affected project implementation. It also noted that the project had still registered an economic internal rate of return (EIRR) of almost 25%, despite an implementation delay of 42 months. However, the validation observed that the repair and maintenance of the project roads was dependent on the government allocating the required financing.

B. Summary of Expected Impact, Outcome, and Outputs

5. In the project's design and monitoring framework (DMF),[4] the envisaged goal or impact was trade facilitation.[5] The expected outcome was increased container terminal capacity. The project had seven outputs: (i) automation of the manifest system at CHC, (ii) installation of a computerized container terminal management system (CTMS) at the Chittagong Port Authority (CPA), installation of a container scanning system at CHC, (iv) improved access through a connector road from the Chittagong Port Access Road to the New Mooring Container Terminal (NMCT) and the Chittagong Container Terminal (CCT), (v) improved terminal traffic circulation and gate house system, (vi) establishment of an oil-waste reception and treatment facility and implementation of a spill management system, and (vii) establishment of a port service improvement committee.

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[1] ADB. 2016. *Guidelines for the Evaluation of Public Sector Operations*. Manila.
[2] ADB. 2014. *Completion Report: Chittagong Port Trade Facilitation Project in Bangladesh*. Manila.
[3] IED. 2015. *Validation Report: Chittagong Port Trade Facilitation Project in Bangladesh*. Manila.
[4] ADB. 2013. *Report and Recommendation of the President to the Board of Directors: Proposed Loan and Technical Assistance Grant to Bangladesh for Chittagong Port Trade Facilitation Project*. Manila.
[5] The project goal stated in both the RRP and the PCR was equated with project impact, while the project purpose was equated with project outcome.

CHAPTER 2

Design and Implementation

A. Rationale

6. During the project preparation stage, the economy of Bangladesh expanded at an average annual rate of more than 5% for the period fiscal year (FY) 2000–FY2004. Total exports grew at an average of 7.4% a year while total imports increased by 6.7% a year, on average, during the same period. Ready-made garment's share of exports grew from about 40% in FY1990 to over 75% in FY2002. This was boosted by foreign direct investment, which took advantage of Bangladesh's textile export quotas and preferential access in the major markets (i.e., the European Union and the United States), as well as the abundance of low-cost labor.[6]

7. The focal point of Bangladesh's international trade has been the Dhaka–Chittagong corridor. Three modes of transport serve this corridor—road, rail, and inland waterway. Together, these carried about 20 million tons of freight annually during the appraisal period but this has since been expanding due to the boom in exports of ready-made garments. Chittagong Port is the national gateway and handles over 90% of Bangladesh's exports and imports and about 98% of container trade. It plays a vital role in the country's logistics chain and is an integral part of the subregional transport system connecting northeastern India, Bhutan, and Nepal to Europe, North America, and Southeast Asia. Geography suggests that Chittagong Port has the potential to play a larger role in intra-regional trade. However, a range of factors will determine whether this potential is realized. These include the port's capacity, government policy toward facilitating transit trade, the capacity of the national transport infrastructure to move goods efficiently beyond the port, and the port's efficiency and cost competitiveness.

8. Chittagong Port is owned and operated by the CPA, with the government overseeing its planning, expenditure, and human resource management. During project preparation, port facilities consisted of the CCT which had two multipurpose berths (container[7] and general cargo) spanning 450 meters, and two general cargo berths (used mostly by container vessels). A dedicated general cargo terminal handled break-bulk cargo,[8] clinker, and fertilizer. A 1,000-meter container quay—the NMCT with a capacity of 500,000 20-foot equivalent units (TEUs)[9]—became operational in 2006, with a 220,000-square meter back-up area.

9. Container throughput at Chittagong Port increased considerably during the project preparation phase, commensurate with the boom in garment exports and with gross domestic product (GDP) growth.[10] In 2003, the port handled about 21 million tons of bulk cargo and over 600,000 TEUs, compared with over 121,000 TEUs in 1992, an increase of about 15%. Likewise, the number of container

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[6] International Monetary Fund. 2003. *Bangladesh: 2003 Artilce IV Comsultation Report*. June 2003. IMF Country Report No. 03/205. Washington, DC.

[7] Container cargo is general cargo stored in standardized containers, generally 20 or 40 feet in length without wheels – i.e., as a 20-foot equivalent unit.

[8] Break-bulk cargo traffic is defined as all general cargo that is not containerized (i.e., in loose, palletized, bagged, or pre-slung packing form).

[9] TEU is a unit to count container volume.

[10] Throughput is the number of containers (or tons of cargo) being moved through a given port.

vessels increased by 6.7% per annum during the same period.[11] Despite these increases, productivity remained low during the period 2004–2005. Port stay was estimated to be about 2.9 days, while berth productivity per day was only about 184 TEUs. Vessel turnaround time was estimated at 12 days, while container dwell time[12] in the port, which remained almost unchanged throughout the period, averaged about 18 days.

10. There was a strong rationale for upgrading and modernizing Chittagong Port's capacity and facilities. There was a need to speed up container-handling and to lower vessel turnaround time (i.e., less waiting for vessel loading and unloading) to improve the port's operations. Likewise, additional procedural and organizational changes were needed, such as modernization of selected procedures (paras. 12–13) and reform and improvement to environmental management (paras. 14–15) to enhance Chittagong Port's operational performance. The government felt that improving operations at the port would help facilitate trade and improve revenues, hence its request for ADB support.

11. Congestion at Chittagong Port is a seasonal occurrence, as container import volumes normally increase significantly before holidays. Importers usually store up on food and other goods to cope up with the substantial demand during this period. This expected increase in container throughput results in longer vessel turnaround times and higher vessel operating costs, which are passed on to shippers through the Chittagong Port congestion surcharge on inbound containers—$150.00 for 20-foot containers and $200.00 for 40-foot containers.[13] Typically, ports are built to meet such peaks in demand at any given time in its design or economic life (Box 1).

[11] Chittagong Port's traffic was largely captive since Mongla, Bangladesh's other seaport, cannot serve containerized exports and imports due to lack of infrastructure and its geographic location.

[12] Container dwell refers to the time a container spends at a port. Typically, this time is spent loading and/or unloading containers, shuffling containers for temporary storage, and customs inspection prior to withdrawal from the port. Vessel dwell time refers to the time a vessel spends at a port without moving. This time is spent loading and/or unloading containers or cargo. Dwell time is one common measure of efficiency in transport, with shorter dwell times being universally desirable.

[13] https://www.anl.com.au/news/501/chittagong-port-congestion-surcharge?cat=tariffandsurchargeupdates.

Box 1: Physical Congestion in Chittagong Port

Chittagong Port was built along the Karnaphuli River. It occupies a thin strip of land and its draught is shallow. It is surrounded by commercial and residential areas of Chittagong City. The congestion in the port is severe, resulting in increases to logistics costs and delays. The port has been physically expanded from time to time to meet the growing export and import demand. For instance, in view of the port's shortage of container-dedicated facilities, container cargo is handled at two container terminals, New Mooring Container Terminal and Chittagong Container Terminal, and at the General Cargo Berths, which were originally developed for conventional non-container cargo in the 1960s to 1970s.

Chittagong Port's nominal cargo handling capacity is 1.7 million 20-foot equivalent units (TEUs). However, this is expected to increase to 2.94 million TEUs by 2020. The port has a significant shortage of berth length. Any expansion on the north bank of the river is constrained by urban areas of Chittagong City. Meanwhile the south bank has poor connections to the urban areas. The narrow width, curvature, and draught of the Karnaphuli River (about 9.5 meters) limit the size of the vessels calling at the port, which has a maximum vessel length of 195 meters. The port has inadequate cargo handling equipment, e.g., ship-to-shore cranes, rubber-tired gantry cranes, spreaders, and container tractor-trailers. These constrain the speed of container vessel loading and unloading, including container movement and stacking at the port. The port's container storage or back-up area is inadequate, which means containers have to be stacked four to six high.

The limited storage area is further limited by the unstuffing of less-than-container-load containers within the port area. A large number of small single axle trucks need to enter the port area in order to transport the unstuffed commodities from the covered storage areas and warehouses to their consignees. Customs processing for the release of cargo takes time, resulting in high container dwell times.

Other causes of Chittagong Port congestion include inadequate container capacity, the limited number of trips by the Bangladesh Railway trains on the Chittagong–Dhaka inland container depot route and the insufficient capacity of inland container depots in the Chittagong City area.

Source: Asian Development Bank (Independent Evaluation Department).

1. Computerized Container Terminal and Management Information Systems

12. In 2004, container dwell times at Chittagong Port were long and sharply increasing, partly because of the port's manual operations management and document processing. The paper-based container tracking system slowed down container movements in the yard; documents had to be manually moved through various stages, requiring about 48 endorsements. These increased dwell times and created opportunities for rent-seeking activities. In the absence of information technology (IT), there was a danger that berth productivity could further decline and add to shipping costs. A container tracking system and a management information system that would improve Chittagong Port's cargo-handling through computerized tracking of the loading, unloading, and movement of containers within the port area were urgently needed.

13. The CHC introduced a computerized customs management system, the automated system for customs data (ASYCUDA),[14] developed by the United Nations Conference on Trade and Development (UNCTAD) at four inland ports, the National Board of Revenue's headquarters, and CHC. However, only one of its six modules was activated, with the system permitting only about 50% of importers to clear cargo within 24 hours. The government sought to move the existing manual, paper-based operational system to a more transparent and faster IT system. The system would interface with CPA's CTMS through the activation of other ASYCUDA++ modules. There was also a need to meet national and international security standards through the installation of container scanners. There was a compelling case for ADB support for these efforts to speed-up operations by helping enhance the terminal capacity utilization.

[14] It was envisaged that the version to be used would be ASYCUDA++. Its modules covered most foreign trade procedures, and it was capable of handling manifests and customs declarations, accounting procedures, and transit and suspense procedures.

2. Port Environment and Capacity Management

14. Discharges and accidental spillages of oil and other substances from ships were an almost weekly occurrence in the port waters and the water quality of the portion of the Karnaphuli river within CPA's jurisdiction was poor. Strong currents, winds, and waves usually dissipated the oil, but it frequently reached the riverbanks, and stained the riverside vegetation. At appraisal, the concentration of oil and grease content in the water samples taken in the port area exceeded the international allowable limits.

15. The concentration of pollutants (including grease and oil) was not routinely monitored. The International Convention for the Prevention of Pollution from Ships Marine Pollution and Prevention Convention (MARPOL) 73/78,[15] which the government had ratified in 2003, required all ports to have a management plan for maritime waste, including the presence of adequate reception and treatment facilities for oil and noxious liquid substances. During the appraisal period, CPA did not have enough equipment, facilities, or staff to comply with MARPOL 73/78. The port environment needed to be improved through the provision of facilities for receiving and separating oil waste from ships, plus other ancillary equipment. ADB support for initiatives to improve environmental standards (e.g., water quality) and regulations covering maritime pollution discharges was therefore appropriate.

3. Roads and Ancillary Facilities

16. Limited road access impeded the flow of cargo. The inland container depot (ICD) in Dhaka[16] was the only inland facility allowed to handle both import and export containers, but it was poorly connected to Chittagong Port. At project appraisal, only about 10% of import containers were being processed in Dhaka's ICD and the average transit time by rail between the port and Dhaka ICD, including port-handling time, was about 30 hours, with import containers having to remain at the port for another 2 days on average from the time of arrival before being assigned a slot on the train (footnote 4). Chittagong Port had to be properly integrated with the national transport network and access to and from the Dhaka–Chittagong transport corridor had to improve.

17. Within Chittagong Port, upgrading intra-port roads and bridges would improve port access and the internal circulation of vehicles. The policy that unstuffing activities[17] had to be done inside the port area for security reasons meant that additional vehicles entered the port. Given the limited and poor internal road network, the increasing container traffic, the unstuffing of containers within the port area, and overstaying containers, vehicle congestion within the periphery of the port area was bound to increase. Intra-port traffic flow had to be eased by the construction and upgrading of internal service roads, including bridges.

B. Time, Cost, Financing, and Implementation Arrangements

18. At appraisal, the estimated total project cost was about $41.3 million. ADB provided a loan from its ordinary capital resources of $30.6 million, accounting for about 74% of the total cost, to fund the entire foreign exchange cost. Counterpart financing from the government was estimated at $10.7 million

[15] MARPOL is the main international convention covering prevention of pollution of the marine environment by ships from operational or accidental causes. The MARPOL Convention was adopted on 2 November 1973. However, as the 1973 MARPOL Convention had not yet entered into force, the 1978 MARPOL Protocol absorbed the parent convention. The combined instrument entered into force on 2 October 1983. In 1997, a protocol was adopted to amend the convention and a new Annex VI was added which entered into force on 19 May 2005. MARPOL has been updated by amendments through the years. http://www.imo.org/en/About/Conventions/ListOfConventions/Pages/International-Convention-for-the-Prevention-of-Pollution-from-Ships (MARPOL).aspx.

[16] An off-dock facility or inland container depot (ICD) is a physical cargo facility separated geographically from the port where goods are received for loading into export containers, and where import goods are received in bulk or unloaded directly from sealed import containers, and where containers are held and stored. Each of these facilities is in itself a large cargo terminal where both import and export break bulk and containers are handled on a daily basis.

[17] Unloading of goods from a packed container.

equivalent to finance the entire local currency cost. The actual project cost of $27.84 million was about 67% of the estimated cost at appraisal, and comprised $18.13 million in foreign exchange cost and $9.71 million equivalent in local currency costs. There were two reasons for the decrease in loan utilization of about $12.47 million. First, during project implementation, CHC decided to use its own funds to carry out the refurbishment of the automation system and to procure four container scanners valued at $7.0 million. Second, the 30.9% depreciation of the taka against the US dollar contributed to the lower loan utilization, although its effect could not be easily quantified. It is standard practice that, at appraisal, the total project cost is estimated within an accuracy band of +15% at least, subject to refinement during the project design stage. The actual cost is eventually determined by such factors as the result of the competitive bidding, contract price adjustments (if any) during implementation, cost of delays and the exchange rate of the taka against the US dollar during implementation. Overall, apart from the $7.0 million cancelled during implementation, an additional $5.47 million of the loan was undisbursed at loan closing: $3.4 million was unallocated loan amount and $2.07 million in savings. On the local currency cost side, savings of $0.99 million were realized at project completion.

19. The project was prepared during an appraisal mission on 17–26 August 2004, and the loan was negotiated with the government on 21–22 November 2004. The project was approved on 20 December 2004 and became effective on 23 May 2005. The loan was disbursed in nine installments, with a total disbursement of $18.13 million equivalent. The disbursement of ADB funds was slower than planned at appraisal, mainly due to problems relating to procurement of the CTMS and consulting services, the increase in international prices of steel, and delays by the road contractor and in clearing the land for the access road.

20. The implementation period was envisaged to be about 48 months, from 2005 to 2008, including procurement and pre- and post-construction activities. The planned date of completion of civil works and equipment installation was July 2008. The original loan closing date was 1 January 2009 but this was delayed by 4 years and 7 months due to delays in recruiting loan consultants for the design and in procuring equipment for waste reception and oil spill protection. ADB approved four extensions of the loan closing date.[18]

21. CPA, CHC, and the Roads and Highways Department (RHD) were the executing agencies. The United States Trade and Development Agency (USTDA) provided about $500,000 in grant funds for a detailed assessment of needs, including preparation of technical specifications, and training on law enforcement and procurement of container scanners. The grant was to enable the security management measures of CPA and CHC to be integrated with the scanner system in order to maximize the utility of CHC component.

C. Technical Assistance

22. ADB provided $700,000 in an attached advisory technical assistance (TA) grant for the project, which was financed by the Japan Special Fund.[19] The TA aimed to provide technical and administrative support to Chittagong Port and the connecting transport network. It had two components: the CPA component and the Ministry of Communication component. The CPA component was to assist in the implementation of a human resources plan and the preparation of a strategic plan for the CCT, assist the Ministry of Shipping and CPA in introducing tariff and regulatory reforms, and assist CPA in complying with the milestones of the planned actions.

23. For the Ministry of Communications component, the scope of work was to conduct an assessment of the performance of the three modes of transport in the corridor, including a comparative

[18] Loan closing date extensions were granted on 9 February 2009 for 18 months, on 23 May 2010 for 1 year, on 14 February 2011 for 6 months, and on 22 February 2012 for 6 months.
[19] ADB. 2009. *Technical Assistance Completion Report: Chittagong Port Efficiency Improvement in Bangladesh*. Manila.

modal analysis, and to recommend institutional, operational and infrastructural improvements for these modes. However, the TA was beset by lengthy start-up delays and was rated partly successful. The terms of reference for the CPA component were revised, as requested by the government. The reports prepared by the consultants were informative and provided the basis for future improvements to port operations and corridor transport logistics.

D. Procurement, Construction, Consultants, and Scheduling

24. The project originally envisaged 141 person-months of international consulting services and 180 person-months of domestic consulting services. The actual amounts were 333 person-months of international consulting services and 538 person-months of domestic consulting services. The increases were due to the extended supervision time required for the CTMS and port connector roads. The recruitment and fielding of the consultants was delayed by about 33 months in view of insufficient advance actions by the executing agencies and the government's protracted recruitment procedures. As a result, the procurement of goods and services was delayed by about 24 months. Procurement of civil works on the connector road, and the supply of goods for computerization, environmental protection, and container scanning equipment followed international competitive bidding procedures.

E. Safeguard Arrangements and Gender Action Plan

25. The project was classified category B under the ADB environmental category requirements. The initial environmental examination showed no major adverse environmental impacts associated with the project. The independent evaluation mission did not find any project-related environmental issues as civil works were carried out within the existing port jurisdiction and Chittagong City road alignment. These did not encroach on the adjacent coastal areas. A mitigation and monitoring plan was designed, which required measures to be put in place to address minor, localized, and temporary impacts such as soil erosion and vegetation damage, and the possible spread of potentially hazardous materials and waste in the project area.

26. At appraisal, land acquisition and other resettlement impacts were considered not significant. About 112 individuals in 19 households, six businesses, and three community buildings, which were located on 9.5 hectares of land belonging to CPA, would be affected. The affected persons were mainly informal dwellers who did not have land titles to the property that they were occupying. At completion, 117 individuals were affected by the project but were properly compensated. Affected establishments, including a petrol station, were likewise compensated. The project did not have any impact on indigenous peoples. Indigenous populations are concentrated in Chittagong's Hill Districts and were not engaged in employment activities associated with the project. The independent evaluation mission did not find any impact on indigenous peoples or any involuntary resettlement. There were no indications that women were disproportionately affected. There was no opposition to the introduction of IT since its effect on port workers was minimal.

F. Design Changes

27. There was a major change of scope regarding the CHC component, as CHC decided to buy the scanners using its own resources and to use a more recent version of ASYCUDA (ASYCUDA World) for its automation program, also using their own resources. Some minor design variations were also implemented for the RHD components, such as building additional protection works for piers 20 to 30 of the flyover, a boundary wall around the graveyard, and wooden piles to prevent slope failures on the foundation excavation.

G. Loan Covenants, Monitoring, and Reporting Arrangements

28. The loan agreement included 34 covenants. Thirty covenants were complied with, one was not complied with, two were generally complied with, and one was not applicable. The covenant that was not complied with pertained to the project's implementation schedule while the two covenants that were generally complied with concerned the port efficiency improvement plan and the establishment of the port service improvement committee . The covenant that was not applicable concerned indigenous people (para. 26). However, the baseline data, as required under a loan covenant, were not prepared. Data from ADB's project preparatory TA were utilized to monitor and assess the project's impacts.

CHAPTER 3

Performance Assessment

29. The evaluation criteria focused on the project's performance and development results and not on the performance of the executing agency or ADB. The Independent Evaluation Department's guidelines identify four core criteria: (i) relevance of the project to the government and ADB development strategies and relevance of the design to achieve project objectives, (ii) effectiveness of project outputs and outcome, (iii) efficiency of the project's utilization of resources, and (iv) sustainability of the project outputs and outcome (footnote 1). Other assessments were made of the project's development impact and the performance of ADB and the borrower.

A. Relevance

30. On strategic alignment, the project was consistent with the government's development objectives as stated in its fifth five year plan (FY1997–FY2002). One of the plan's objectives was the development of necessary infrastructure, utilities and other services needed to promote growth.[20] The government also emphasized enhancing Chittagong Port's productivity, in view of its vision to become a competitive regional transport hub in the near future, as articulated in the sixth five-year plan.[21] Development of infrastructure at Chittagong Port has continued under the seventh five-year plan (FY2016–FY2020), which includes increasing container-handling capacity through the expansion of terminal and/or yard facilities, acquisition of modern container-handling equipment and procurement of harbor vessels to ensure an improved operating system, setting-up ICDs and/or container freight stations by the public or private sector at all potential cargo distribution centers across the country to decongest the port, and involving the private sector in port management and port infrastructure development under build-own-operate, build-operate-transfer, and public–private partnership models.[22] Hence, the project remains aligned with the current priorities and strategies of Bangladesh.

31. The project was in line with various ADB strategies. ADB's Bangladesh country strategy and program update (2004–2006) indicated, as one of ADB's strategies in the transport sector, the need to enhance and improve the productivity of Chittagong Port and, in particular, to reduce vessel turnaround time and container dwell time.[23] ADB's regional cooperation strategy and program for South Asia (2006–2008) recognized that improved physical infrastructure and regional connectivity would reduce transport costs and increase the region's competitiveness. For landlocked countries such as Bhutan and Nepal, transit through India and Bangladesh via Mongla and Chittagong ports is essential if these countries are to increase trade and promote economic development.[24] The project is also aligned with the South Asia Subregional Economic Cooperation Program's objective of facilitating trade within the subregion and with the rest of the world.

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[20] Planning Commission, Ministry of Planning.1998. *Bangladesh Fifth Five Year Plan 1997–2002*. Dhaka, Bangladesh.
[21] Planning Commission, Ministry of Planning. 2010. *Bangladesh Sixth Five Year Plan FY2011–FY2015 Accelerating Growth and Reducing Poverty, Strategic Directions and Policy Framework*. Dhaka, Bangladesh.
[22] General Economics Division, Planning Commission, Government of the People's Republic of Bangladesh. 2015, *Seventh Five Year Plan – FY2016-FY2020, Accelerating Growth, Empowering Citizens*. Dhaka.
[23] ADB.2003. *Bangladesh: Country Strategy and Program Update (2004–2006)*. Manila.
[24] ADB. 2008. *Regional Cooperation Strategy and Program for South Asia (2006–2008)*. Manila.

32. The Bay of Bengal Initiative for Multi-Sectoral Technical and Economic Cooperation (BIMSTEC) Transport Infrastructure and Logistics Study of 2008[25] identified the transport infrastructure and logistical bottlenecks in the BIMSTEC region and their root causes. Among the issues identified with respect to Chittagong Port were its draught restrictions; low operational productivity resulting in congestion, delays and higher costs; poor road and rail connectivity; and the lack of port communication systems resulting in inefficiency, duplication, and delays, directly raising transaction costs. Given Chittagong Port's role in regional trade, addressing the critical issue of port operational productivity could result in significant savings in avoided delay and transaction costs, making cargo transport times more reliable, shortening vessel turnaround times and increasing port capacity for domestic and regional port users.

33. A container port achieves efficiency by minimizing the time containers stay within its premises, i.e., reducing the number of times containers are moved and the storage time while they are in the port, including a vessel's turnaround time. Alongside its strategic location, its efficiency will determine Chittagong Port's competitiveness with other ports in the region and its ability to attract container transit shipments to an expanded hinterland that includes Nepal, Bhutan and adjacent northeastern Indian states. Compared with the performance of other ports in South Asia,[26] in 2012 Chittagong Port lagged the average turnaround time of South Asian ports by 1.15 days, matched the average pre-berthing waiting time of 0.57 days, and had a lower percentage of idle time at berth (8.6%) than the average (18.7%). Specifically, in comparison with nearby ports,[27] in 2012 Chittagong performed better than Kolkata Port in terms of vessel turnaround time, had longer pre-berthing times than Haldia Port, and performed better in terms of average percentage of idle time at berth than Haldia, Kolkata, and Visakhapatnam ports.[28]

34. The project was formulated during a period in which Chittagong Port's importance in Bangladesh's economy was growing. The government sought to ease the container yard congestion by modernizing the port facilities. The government's firm ownership of the project and its position in the national agenda were well established. Given the nature of identified development constraints (paras. 9–17) and the forms of interventions needed (paras. 10, 12, 15, and 17), an investment type of operation was the appropriate instrument to address these problems.

35. However, the project's DMF had a few shortcomings. First, the output indicators were improperly specified. The output performance targets (e.g., a 20% reduction in average container dwell time, a 30% reduction in vehicle waiting time, a 50% reduction in number of vehicles inside the port at any given time, among other targets) would have been more suitable as outcome targets. The DMF could have simply indicated the deliverables under the project.

36. Second, in terms of outcome indicators, the performance targets did not directly lead to the attainment of the outcome statement ("increase container terminal capacity"). The DMF did not specify the quantitative target for the envisaged increase or how this could be meaningfully measured. Also, there was no clear indicator for measuring the extent of the targeted capacity increase. It was not clear how the combination of growth in container throughput, reduction in port charges, and improvements in vessel turnaround time and berth occupancy could have led to increased container terminal capacity. The design could have been clearer and more specific on the indicators that were selected.

37. Third, the DMF lacked monitorable indicators. There were no numerical targets or time frames for the impact indicators. The baseline data were not specified for either the outcome or impact indicators, against which the achievements against the targets could be compared. These could have

[25] Kellogg Brown & Root Pty Ltd. 2008. *Technical Assistance Consultant's Final Report on the Bay of Bengal Initiative for Multi-Sectoral Technical and Economic Cooperation (BIMSTEC) Transport Infrastructure and Logistics Study (BTILS)*. South Australia.
[26] Chennai, Chittagong, Cochin, Colombo, Haldia, JNPT, Kandla, Karachi, Kolkata, Mumbai, Tuticorin, and Visakhapatnam.
[27] Haldia, Kolkata, Chennai and Visakhapatnam.
[28] World Bank Group. 2016. *Competitiveness of South Asia's Container Ports: A Comprehensive Assessment of Performance, Drivers, and Costs*. Washington, DC.

provided benchmarks for comparative performance. Fourth, the DMF indicated the annual percentage change in national GDP after project completion as one of the impact targets. This impact indicator was too broad as a measure of trade facilitation. At the time of project formulation in 2004, ADB's own thinking on DMFs in general was not very evolved and staff were not as familiar with the concepts and their application as they are today.

38. Nonetheless, the project's underlying logic was generally coherent. It recognized that the port's capacity, through more efficient utilization, could be significantly enhanced if the operational issues that were restricting vessel and cargo movements within the port area were addressed. The project design was generally appropriate as it considered not only interventions to enhance Chittagong Port's productivity, but also environmental measures. However, in retrospect, the project's relevance could have been further enhanced if its design had anticipated the rapidly growing trade volumes and the consequent need to enhance both the port's and the intermodal system's capacities. The project is assessed *relevant*.

B. Effectiveness

39. The intended outcome of an increase in container terminal capacity was achieved. Of the three outcome performance targets, one was achieved, another was partially achieved, and the third was not achieved. The target that was achieved was the most relevant indicator: sustained annual growth of over 6% in container throughput in the first 6 years after project completion. The outcome target that was partially achieved was a 20% reduction in vessel turnaround time and berth occupancy rate within 2 years of project completion. The outcome indicator that was not achieved was a 20% reduction in port charges within 2 years of project completion. However, given the weaknesses of these outcome indicators, it was difficult to directly tease out information on the extent to which the project's outcome was attained.

40. In terms of outputs, three out of nine targets were achieved, while four were partially achieved. One target was not achieved while another could not be reasonably assessed due to insufficient evidence. However, the shortfalls could be attributed to the improper specification of the targets rather than to the degree of their completion (para. 35). Of the completed outputs, the CTMS allows proper mapping of the container back-up area, including the numbering of container slots. This enables better identification of slot occupancy and container capacity, which was not possible under the manual system.[29]

41. However, other outputs, beyond those envisaged under the project, needed to be delivered to fully realize the envisaged increase in container terminal capacity. For example, the acquisition of container-handling equipment, which was not one of the project's outputs, enabled higher container stacking and an increase from four to six–eight containers per ground slot.[30] Stacking to six levels translates to a 50% increase in container capacity per slot, while eight levels of container stacking per slot would mean a 100% increase in container capacity. This increased the container-handling capacity from 0.6 million TEUs in 2003 to over 2 million TEUs in 2017. The information is inputted in the CTMS, which makes identification of the occupied and available slots easier.

42. A 1,000-meter, 500,000 TEU capacity container quay (NMCT) started operations at Chittagong Port in 2006 (para. 8). Its 220,000-square meter back-up area, which is equipped with additional gantry cranes, has speeded up container-handling and improved vessel turnaround times. All these undertakings have collectively brought about an increase in usable container slots and therefore in container terminal capacity. The exact magnitude of the project's contribution to the increased container terminal capacity

[29] Convenient identification of a specific container's location saves time in customs processing of specific containers and their eventual transport out of the port area.

[30] CPA acquired four ship-to-shore gantry cranes, terminal container tractor-trailers, rubber-tired gantry cranes (RTGs), reach stackers and other cargo handling equipment during project implementation.

could not be estimated with reasonable accuracy, but the departure from paper-based terminal management alone through the CTMS represented huge improvement in Chittagong Port's operations. The project is assessed *effective*.

1. Project Outcome

43. Of the three outcome targets, the project exceeded the targeted growth in container throughput of 6% and above in the first 6 years of project operation. Chittagong Port realized an 8.2% average annual growth in container throughput from 2005 to 2013 and about 10.4% annual growth from 2005 to 2017, against the target of above 6% growth. For the period 2012–2017, the growth in container throughput was 12.2% in metric tons up to the present after project completion. While the project outputs resulted in the easing of port congestion somewhat, high container traffic growth is largely driven by the rapidly growing international trade, especially in garments. Despite the continuing congestion, the volume of container traffic continues to grow at a higher rate than expected at appraisal.

44. On the 20% reduction in container vessel turnaround time and the decrease in the container berth occupancy rate 2 years after project completion, CPA statistics show that this indicator was only partly achieved (Table 1). For the period 2012–2014, container vessel turnaround time decreased by 0.77% per year or 1.5% within 2 years of project completion. For the period 2012–2016, container vessel turnaround time increased by 16.7% per year. In general, Chittagong Port was far from achieving the desired reduction in container vessel turnaround time. On the targeted decrease in berth occupancy rate, the actual decrease from 2012 to 2014 was 10.7%. For the period 2012–2016, the berth occupancy rate actually increased by 14.3%, which shows improved berth efficiency as more vessels were serviced by each berth. In the case of port charges, these have not decreased as CPA continues to implement the 2007 tariff schedule.[31] Any revision in the port tariff schedule would have to be approved at the national level.

Table 1: Vessel Turnaround Time, Berth Occupancy Rate, and Container Dwell Time, FY2009–2017

Fiscal Year	Vessel Turnaround Time (days)	Berth Occupancy Rate (%)	Container Dwell Time (days)
2008–2009	5.51	62.21	16.94
2009–2010	4.31	66.05	16.59
2010–2011	3.21	81.98	17.13
2011–2012	3.24	64.68	16.05
2012–2013	3.39	64.17	17.15
2013–2014	3.19	57.75	15.64
2014–2015	3.99	65.04	17.48
2015–2016	6.01	73.95	11.88
2016–2017	6.94	…	10.99

… = not available, FY = fiscal year.
Source: Chittagong Port Authority. 2018.

45. While not an outcome target in the DMF, container dwell time could be used as a proxy indicator. Dwell time is a common measure of efficiency in transport, with shorter dwell times being universally desirable. At Chittagong Port, dwell time has decreased somewhat.[32] For the period 2012–2017, it declined by 8.0% annually, although there is still scope for further improvement in view of delays in

[31] The Chittagong Port Authority continues to implement the Schedule of Charges on Goods and Vessels, of 25 April 2007. Available: www. portal.cpa.gov.bd/home.php?option=rules_regulations.
[32] In contrast, vessel dwell time or terminal dwell time refers to the time a vessel spends at a port without moving. Typically, this time is spent loading and/or unloading containers or cargo.

customs processing and in the release of import containers.[33] A time release study's key finding was that the time taken in Chittagong CHC for release of cargo for imports was about 12 days, while for exports it was about 5 days (footnote 35).

2. Project Outputs

46. Of the seven outputs envisaged under the project, physical completion was largely achieved, including the setting-up of the port service improvement committee. The Navis-based CTMS, the most important output, was procured and installed, and it became operational in 2012. The existing management information system was upgraded, and CPA staff were trained in the use and upkeep of the CTMS and the management information system. The CTMS was designed for container traffic of up to 1.0 million TEUs; the substantial increase in container traffic to 2.57 million TEUs by 2017 put a heavy load on the system and its supporting hardware, leading to intermittent down times. The server capacity, 64 gigabytes (GB), has been found inadequate as the current capacity requirement is about 128 GB or higher. The existing work stations have random access memory of about 512 MB, while current models now have 2–16 GB. The CTMS was designed to interface with CHC's ASYCUDA++ and subsequently ASYCUDA World systems.

47. Improvements to the port environment and the environmental management capacity of CPA involved: (i) installation of facilities for receiving and separating oil waste from ships; (ii) purchase of equipment to handle oil spills as part of the oil-spill contingency plan; and (iii) construction of a building to store spill-management equipment and material, and to house the port's environment monitoring office and a laboratory. The laboratory is part of the waste-oil separation plant and is being used to analyze water samples from routine monitoring activities. CPA is now compliant with the requirements of MARPOL 1973/78. The new facilities and equipment mean that the port now satisfies the requirements of the International Maritime Organization (IMO). The recently purchased oil skimmers and solid waste collection vessels and barges and booms[34] are in good operational condition, and are used about six times a year during actual vessel oil spill incidents to mitigate any negative impact on the port waters and environment. CPA created an environmental management unit to operate, manage, and maintain the equipment and facilities provided under the project, and those that were subsequently acquired. The unit undertakes periodic monitoring of the port waters to ensure their quality.

48. The reconstruction and upgrading of internal roads and the additional bridge linking the CCT, NMCT, and the general cargo berths, and the improvement of two gates to expedite traffic flow after implementing the new CCT yard configuration and the NMCT were completed. These are in good condition and heavily trafficked by trucks, cargo-handling equipment and light vehicles that operate or have business inside the port.

49. The construction of the 1.7-kilometer access-controlled road (Chittagong Port access road) by RHD was completed and opened to mostly port truck traffic on 28 March 2012. This road provides a faster link between the Dhaka–Chittagong Highway and the CCT and NMCT, thus contributing to speedy movement of the export and import cargoes between Chittagong Port, Dhaka, and the port hinterland, and the decongestion of Chittagong City roads.

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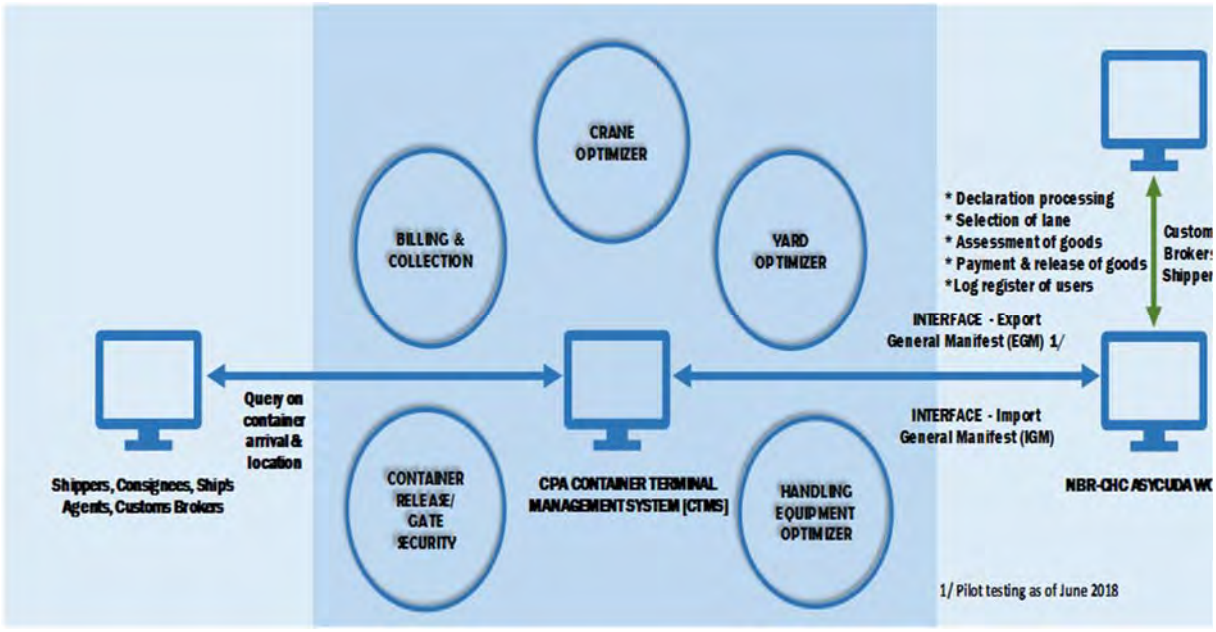
[33] These delays at customs were attributed to: (i) delays in the submission of inbound manifests by the shipping lines; (ii) delays in the arrival of original documents required for submission of bills of entry; (iii) wrong description of goods in the manifest; and (iv) disputes over the applicable tariff rate on the commodity or of its value for duty. National Board of Revenue. 2014. *Bangladesh Time Release Study. Customs House Chittagong and Chittagong Port* http://www.academia.edu/36678581/BANGLADESH_TIME_RELEASE_STUDY_CUSTOM_HOUSE_CHITTAGONG_AND_CHITTAGONG_PORT

[34] Oil Skimming Vessels or Skimmers are boats and other devices that can remove oil from the sea surface before it reaches sensitive areas along a coastline. Sometimes, two boats will tow a collection boom, allowing oil to concentrate within the boom, where it is then picked up by a skimmer. Booms are floating, physical barriers to oil, made of plastic, metal, or other materials, which slow the spread of oil and keep it contained. https://response.restoration.noaa.gov/oil-and-chemical-spills/oil-spills/spill-containment-methods.html

50. Two outputs were supposed to be implemented under CHC. At project completion, only one of these had been fully completed. For the first output, ADB acceded to the government's request to delete the acquisition and installation of a system of container scanners to enable CHC to meet international security standards and expedite customs clearance of import containers. CHC opted to use its own budget to buy these scanners with technical assistance provided by the consultants contracted by the USTDA. The four container scanners became operational on June 2010. These scanners enable CHC to limit manual inspection of import containers to those suspected of under- or mis-declaring their contents and to suspicious cargoes, which has greatly reduced container processing time. This enables CHC to cope with the increased volume of imports, although data on the container customs clearance period before and after the project were not available (footnote 35).

51. The second CHC output was the activation of the manifest module of the ASYCUDA ++ system to replace the current manual processing procedure, including the provision of workstations with a connection to the CTMS. This was only partially implemented. The National Board of Revenue (NBR) delayed the implementation of the activities under the contract signed with the United Nations Conference on Trade and Development (UNCTAD) for the implementation of the remaining modules of ASYCUDA ++. This was intended to allow the NBR and CHC to implement an updated version—ASYCUDA World—which became available in 2004 and which is an ASYCUDA++ based version that is web-compatible. However, the agreement between the ASYCUDA organization and the government on the implementation of ASYCUDA++ at the NBR had yet to be fully executed. The current interface between the CTMS and ASYCUDA World is only on the import general manifest (IGM), which CHC sends to the CTMS via e-mail. However, CHC does not provide CPA with the export general manifest (EGM) since this module has only recently been developed and is still at the pilot testing stage. ASYCUDA World was adopted by the NBR for simplicity and compatibility with the country system, and to avoid any duplication. The provision of consulting services for the supervision of supply of goods and services, contract administration, and on-the-job training on use and maintenance of ASYCUDA++ was implemented. A snapshot of the planned and existing interface between CTMS, ASYCUDA++ World and users is provided in Figure 1.

Figure 1: Planned and Existing Interface between CTMS, ASYCUDA++/World and Users



Source: Asian Development Bank (Independent Evaluation Department).

52. These project and non-project funded investments have increased customs revenues, including the collection of value-added taxes on imports and exports, as CHC is in Chittagong Port. In FY2015, customs collections, including value-added tax, were Tk314,629 million ($3,718.91 million) with the annual growth in customs collections estimated at 8.7% for the period FY2009–FY2015 (Table 2).[35]

Table 2: Customs and Value-Added Tax Collections on Exports and Imports, FY2009–FY2015

	Customs			VAT		
Fiscal Year	Imports (Tk million)	Exports (Tk million)	Subtotal (Tk million)	Imports/ Exports (Tk million)	Total	Increase from Previous Period (%)
2009	95,700		95,700	94,550	190,250	
2010	104,300		104,300	103,050	207,350	9.0
2011	108,880		108,880	119,550	228,430	10.2
2012	126,340		126,340	138,440	264,780	15.9
2013	145,684	400	146,084	159,816	305,900	15.5
2014	146,290		146,290	162,850	309,140	1.1
2015	145,905		145,905	168,724	314,629	1.8

Source: Government of Bangladesh, Ministry of Planning, Bangladesh Bureau of Statistics, Statistics and Informatics Division. 2016. *2015 Statistical Year Book Bangladesh*. Dhaka.

C. Efficiency

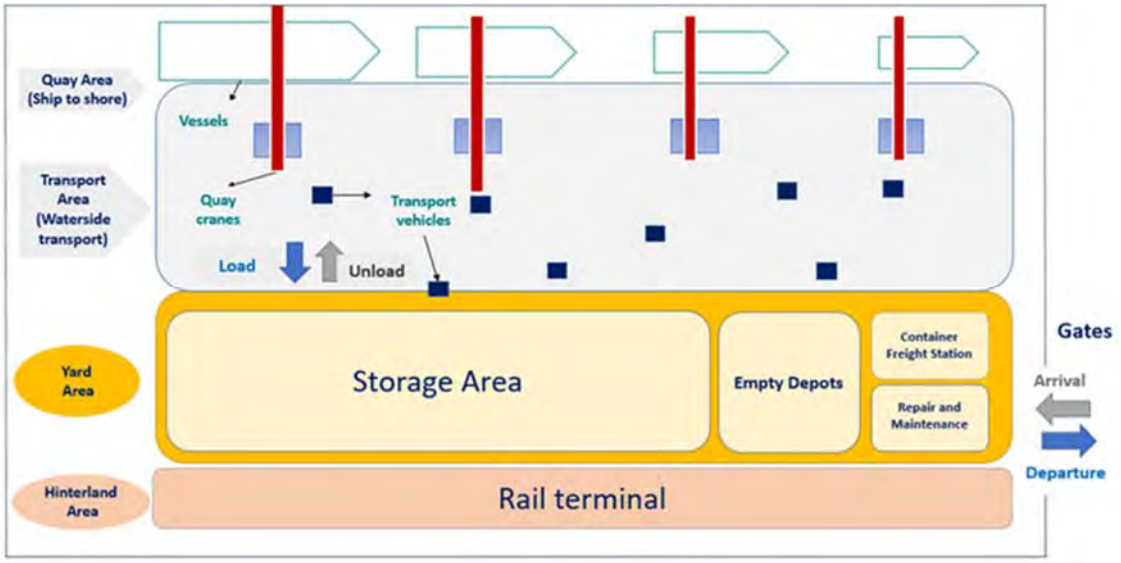
53. Both the RRP and the PCR estimated two types of economic benefits. First was the significant reduction in vessel turnaround time. This benefit accrues to vessel owners through savings from reduced vessel waiting and service times. Second was the significant reduction in the capital cost of cargo owners, shippers, and consignees due to the need to maintain less inventory and the quicker return of containers to shipping agents. The evaluation mission considered the project's economic benefits to be the reduction in vessel turnaround time and CPA's adjusted operating income from dues and charges on vessels and cargo as the willingness to pay by port users for the facilities and services provided.

54. The mission's measurement of the project's benefits and costs considers that project outputs alone were not responsible for the improvement in container vessel turnaround time, berth occupancy rate, and average container dwell time at Chittagong port. It was clear that other investments contributed to the improvement as well. The acquisition of ship-to-shore cranes decreased container vessel time at berth by providing more efficient unloading and loading of containers compared to just using the ship's gear. More cargo-handling equipment was also bought, including rubber-tired gantry cranes (RTGs), reach stackers and container tractor-trailers to transport containers to their assigned slots in the back-up area for customs processing (para. 40).

55. To discourage overstaying of containers, CPA provides 7-day free storage for 20-foot containers, $6.00 per day from the 8th to the 20th day, and $12.00 per day thereafter. For 40-foot containers, the free storage period is the same, but the succeeding charge is twice that for 20-foot containers. Nevertheless, average container dwell times have remained high. Figure 2 gives a typical container terminal layout showing its various components. There is no standard procedure to allocate benefits to the equipment and infrastructure of the port due to the lumpiness of these benefits. For example, while the CTMS improves port productivity overall, it is difficult to estimate what percentage of that improvement can be allocated to the CTMS. Another difficulty is how much of the lumped port benefits can be allocated to the port access road or cargo-handling equipment. Allocating all lumped port benefits to the project alone greatly overstates the actual share of project investments to port benefits.

[35] Bangladesh Bureau of Statistics, Statistics and Informatics Division (Sid) Ministry of Planning. 2016. *2015 Statistical Year Book Bangladesh*. Dhaka

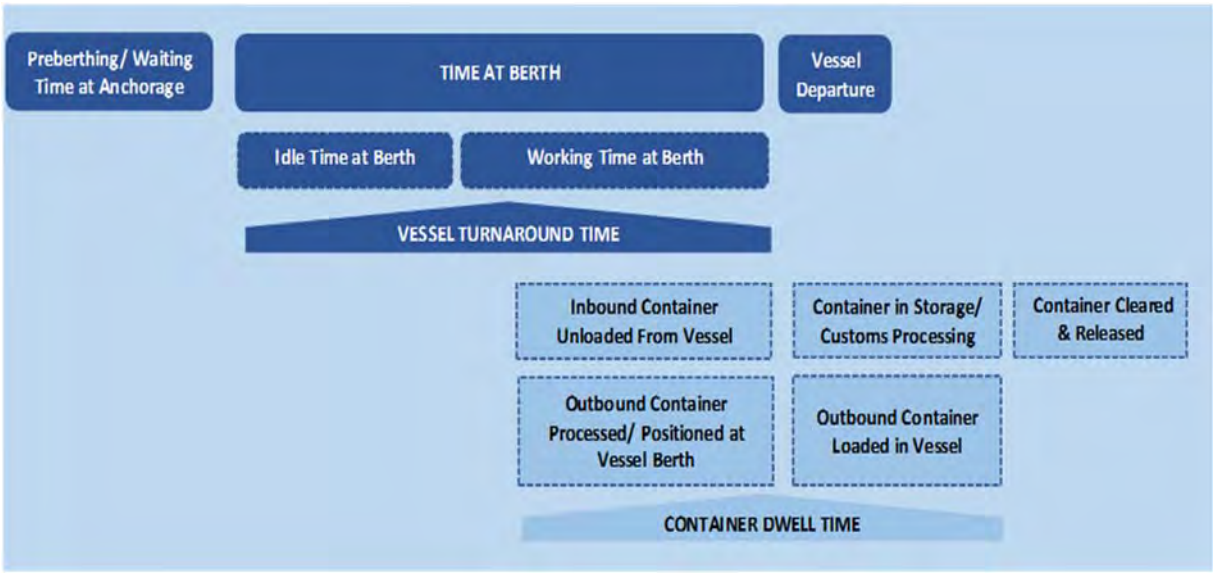
Figure 2: Schematic Container Terminal Layout



Source: M. Amrou M'hand, H. Badir, A. Boulmakoul. 2018. Process Mining for port container terminals: The state of the art and issues. *Conference Paper.* https://www.researchgate.net/figure/Schematic-container-terminal-layout_fig3_325056450.

56. The reduction in container vessel turnaround time consisted of a reduction in vessel waiting time at anchorage and a reduction in vessel service time at berth. Due to the existing congestion at Chittagong Port, vessels wait at anchorage until their assigned berths are available. At berth, the vessels wait until the unloading and loading of containers are completed. Savings in vessel operating costs are generated if the turnaround time is less than a baseline turnaround time value, e.g., the computed average vessel turnaround time in 2010 (4.31 days). A shorter vessel turnaround time could mean that lower shipping rates were passed on to users of the shipping service. Figure 3 gives the components of vessel turnaround time.

Figure 3: Components of Vessel Turnaround Time and Container Dwell Time



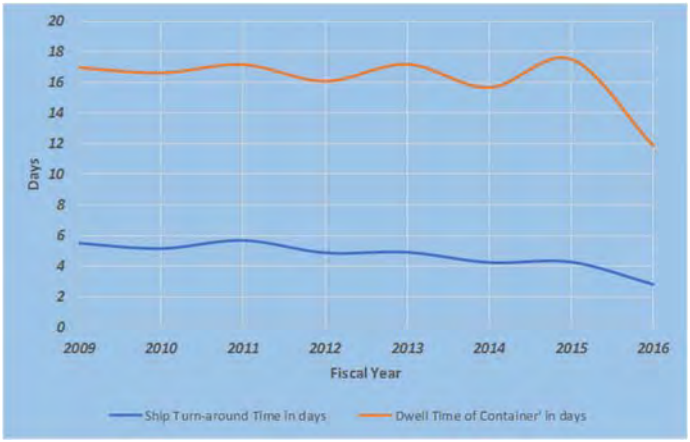
Source: Asian Development Bank (Independent Evaluation Department).

57. A reduction in vessel turnaround time could also be attributed to other facilities and equipment that were provided during and after the project. Without all these, including the CTMS functioning seamlessly, the reduction in vessel turnaround time would have been difficult to achieve. Total savings in vessel turnaround time cannot be wholly attributed to the project outputs.

58. The appraisal and completion reports were optimistic in assuming that all port benefits resulted from the project investments—from benefits to vessels and to cargo owners or consignees. As a result, their computed economic internal rate of returns (EIRRs) overestimated the benefits attributable to the project investments. To correct for this, the methodology for EIRR estimation used in this post-project evaluation considered project investments, investments funded by CPA from 2008 to 2011, and the value of CPA's net operating assets as of 2007.

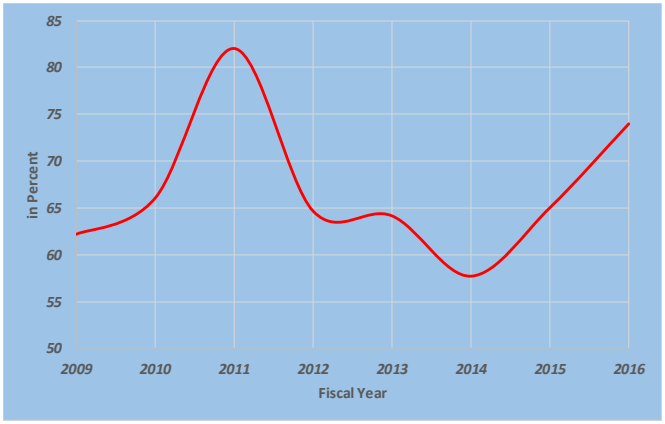
59. Analysis of actual data for vessel turnaround times, berth occupancy rate, and container dwell times from FY2009 to FY2017 showed an erratic trend in the value of average container vessel turnaround times and average container dwell times (Figure 4). Figure 5 indicates the trend in berth occupancy rate.

Figure 4: Container Vessel Turnaround Time and Container Dwell Time, FY2009–FY2017
(days)



FY = fiscal year.
Source: Chittagong Port Authority. 2018.

Figure 5: Berth Occupancy Rate, FY2009–FY2016
(%)



FY = fiscal year.
Source: Chittagong Port Authority. 2018.

60. The investment costs in this analysis included the project cost, the net value of the operating assets as of 2007, and incremental investments funded by CPA from 2008 to 2011. The costs were adjusted to economic costs using an estimated standard conversion factor (SCF) of 0.91. The SCF incorporated the effect of the shadow foreign exchange cost, the shadow labor cost, and an adjustment for traded and non-traded goods, estimated at about 0.09 per taka of investment cost. On the operation and maintenance expenses (O&M), the CPA financial statements for the analysis period lumped O&M expenses together and did not provide a breakdown by project outputs, i.e., CTMS, internal roads and bridges, port access road. The economic O&M expense was the adjusted financial O&M expenses using the SCF as the adjustment factor. Since only O&M expenses up to 2016 were available from CPA's annual reports, it was estimated that O&M expenses would increase by 5% per annum from 2017 onwards. Also, the project's economic life was assumed to be 5 years shorter than the 15 years assumed at appraisal and in the PCR to take into account the 8- to 10-year lifespan of the CTMS and cargo-handling equipment.

61. It was determined that, from project completion in FY2012 to FY2017, average vessel turnaround time increased from 3.24 days in 2012 to 6.94 days in 2017. On container dwell time, the improvement was very erratic although by FY2017, it had reached its lowest value of 10.99 days. While these figures may imply that the project has had no effect in mitigating congestion at Chittagong Port, without the CTMS, average vessel turnaround times and container dwell times would have been longer had manual operations continued. However, there is no reliable method to estimate the extent to which the CTMS affected average vessel turnaround time and container dwell time.

62. The economic reevaluation resulted in an EIRR of 19.4% (Appendix 2, Table A2.3). In general, the recomputed EIRR showed the project, including CPA's other capital investments, to be robust, considering all the savings from the vessel turnaround cost and the operating income of CPA. The EIRR estimate was lower than that in the PCR because of the inclusion of other investments in the analysis. Details of the assumptions and methodology used in the economic reevaluation, particularly the recomputation of the EIRR, are given in Appendix 2. In terms of process efficiency, the project incurred a delay of about 4 years and 7 months, although this delay was already incorporated in the economic cost and benefit flow stream (para. 20). The delay did not result in an increase in consulting costs for the project. However, it did mean that improvements to a nationally important piece of infrastructure were not available to support the economy for the period of the delay.

63. The evaluation recognizes the economic benefits generated by the port access road component, but these were not quantified. CPA, as project owner, had not conducted periodic vehicle traffic counts for this road. The port access road was implemented by RHD and subsequently turned over to CPA at completion. It has helped to decongest Chittagong City roads by diverting port truck traffic to the port access road. Completed in December 2011, the 1.42 kilometer flyover stretches from the Customs Bridge near the port to the Dhaka-Chittagong highway at Fouzderhat point. Cargo in and out of two container terminals—CCT and NMCT—is carried directly to the highway to and from Dhaka. It is estimated that more than 6,000 container carriers and trucks use the port access road each day.[36] The project is assessed *efficient*.

D. Sustainability

64. The main project outputs (the Navis-based CTMS, internal port roads and bridge, port access road, and oil waste reception and treatment facility) have been extensively used and are in good operating condition. In terms of technical sustainability, the CTMS continues to operate reliably., although downtimes have started occurring sparingly. But the system has sufficient back-up in place to ensure data recovery and almost seamless operation. It remains technically sound with sufficient repairs, replacement of broken and obsolete parts, and O&M procedures in place. Currently, CPA is exploring the

[36] D. Barua. 2012. Flyover eases goods transport in Ctg port. *The Daily Star.* 30 March. https://www.thedailystar.net/news-detail-228273.

option of enhancing or replacing the Navis-based CTMS software and hardware with a more advanced and higher capacity system that can handle the anticipated increase in volume of container and general cargo traffic. CPA's sound financial condition ensures that the project's outputs are adequately maintained and supported, and in some cases, replaced when they are no longer repairable or have reached the end of their economic life.

65. The Chittagong Port access road carries significant truck and container traffic (para.63). However, based on Chittagong RHD observations, no periodic or routine repair and maintenance has been undertaken since turnover. This is the same situation for the internal port roads and bridge constructed under the project. The existing port access road carries heavy traffic volumes as evidenced by the slow vehicle speeds observed by the evaluation mission. CPA, as the owner, is responsible for the road's maintenance and it has recently requested RHD to prepare the design and cost estimates for the replacement or repair of the flyover's expansion joints, which have deteriorated or need replacement. CPA may not have the technical capability to manage, repair and maintain its road infrastructure, specifically the port access road. If this is the case, CPA should contract the Chittagong RHD to undertake routine and periodic repairs and maintenance of its roads and bridge assets, including the conduct of periodic traffic surveys to ensure the proper programming of road and bridge asset repairs and maintenance and subsequent planning of capacity expansion requirements.

66. In terms of financial sustainability, CPA was financially healthy during FY2010–FY2017. Operating income from vessel and cargo charges has been increasing by 9.1% per annum. Operating, administrative, and general expenditures have been increasing by 12.8% annually. While the increase in expenditures is higher than the increase in operating income, net income still grew by 5.7% per annum during this period because of the continuous increase in container throughput and vessel traffic and the effect of congestion, which, by its nature, imposes additional costs on port users. Over this period, the average net income per annum before taxes was Tk7,458.45 million ($88.79 million) and Tk3920.95 million ($46.68 million) after taxes.[37]

67. The CPA financial ratios during FY2009–FY2016 showed a debt–equity ratio of 0.2, which indicates that CPA debt was significantly less than equity. This indicates that CPA had enough equity to finance additional capital investments through borrowings. CPA's current ratio, on the other hand, shows a slight deterioration from 1.08 in FY2009 to 0.69 in FY2016. This indicates a greater drawdown of current assets to meet short-term financial obligations. This could be attributed to the acquisition of new cargo-handling equipment and the construction of new facilities using CPA's cash and other short-term investments. Similarly, CPA's asset turnover ratio declined from 0.19 in FY2009 to 0.12 in FY2016 which shows that it still has significant capacity to generate revenues or that it has substantial unused capacity. Overall, CPA has sufficient financial resources to fund the acquisition of cargo-handling equipment, including ship-to-shore or quay cranes, or to expand its container back-up area to enhance port productivity.

68. In terms of operational efficiency, CPA maintains overall responsibility for port operations although the provision of cargo-handling services is undertaken by a concessionaire for both the CCT and NMCT, and various stevedoring contractors for the general cargo berths. The significant number of contractors operating within the port area, although they are confined to their assigned berths, causes overlaps in operating areas and the presence of too many workers leads to inefficient use of manpower and equipment. There is a huge imbalance in the demand and availability of equipment; mobile cranes or forklifts may be ordered for a certain shift or time but are then idle during long waiting times due to a lack of coordination, traffic jams, or other operational problems. These can lead to situations where

[37] Recomputation of the project's FIRR was undertaken, but the results proved to be unrealistic because of the following methodological issues: (i) there is no specific fee charged by CPA for access to the CTMS, (ii) there is no procedure for allocating CPA shipping and cargo charges to the CTMS, (iii) the shared costs nature of several CPA activities, and (iv) the absence of user charges being collected for access roads and other facilities provided under the project. In view of these issues, the assessment of CPA's financial health is a better measure for assessing sustainability.

requests of stevedores for specific equipment cannot be fulfilled, since the equipment has already been booked but is lying idle, resulting in less profit for CPA, since idle times are not invoiced. The revision of the tariff system on this aspect would not only generate incremental income but would also result in improved utilization of the equipment, since stevedores would not carelessly book equipment they have to pay for. Hence the cargo-handling fleet could be reduced, with lower capital costs and lower operating costs, including fuel, maintenance, spares, consumables, and wages.[38] The concessionaire for the New Mooring Container Terminal (NMCT) and the Chittagong Container Terminal (CCT) is merely a terminal operator in charge of cargo-handling operations within its assigned berth areas using cargo-handling equipment owned by CPA (with the exception of part of the truck trailer fleet), which had been procured and are owned by the concessionaire. CPA provides the cranes, RTGs, reach stackers, forklifts and straddle carriers. and takes care of inspections and repair in its own workshops. The concessionaire rents the CPA equipment and provides its own terminal trucks and empty container handlers. All administrative and data processing jobs are performed by CPA, including collection of applicable revenues from the vessel and box operators, consignees and shippers. CPA then pays the contractor according to the applicable handling charges.

69. To enhance operational efficiency, CPA needs to move away from direct port operations through various contractors and concessionaire to a more efficient public–private partnership arrangement where at least two terminal concessionaires who are responsible for all areas of cargo-handling operations compete with each other in terms of the levels of services provided. The concessionaires would be responsible for providing all the required equipment, terminal operations software, manpower, and business processes, and in implementing a port development plan approved by CPA for the concession period.

70. In terms of institutional sustainability, there is still scope for strengthening the institutional arrangements among CPA, CHC, RHD, Chittagong City Corporation, Chittagong Development Authority and other stakeholders. This could be undertaken by establishing a permanent council or institution to lay down consultative and accountability mechanisms to foster closer collaboration. The government's ownership and commitment to advance port modernization and trade facilitation, alongside the commitment by development partners, has strengthened the credibility of the project. The project is assessed *likely sustainable.*

[38] HPC Hamburg Port Consulting GmbH; KS Consultant Limited; & Sellhorn Ingenieurgesellschaft mbH.2015. *People's Republic of Bangladesh: Strategic Master Plan for Chittagong Port – Technical Assistance Consultant's Report*. Dhaka, Bangladesh.

CHAPTER 4

Other Assessments

A. Development Impact

71. The DMF indicated that the targeted impact was trade facilitation. This was to be measured by annual percentage changes in both national GDP and trade after project completion. However, there were no numerical targets or baseline values attached to the impact indicators, and the corresponding time frames for their achievement. This makes it difficult to make a meaningful assessment of the project's impact. Although annual GDP growth was 6.8% after project completion, it is difficult to determine the project's contribution to this.

72. In terms of changes in trade, Chittagong Port handles about 92% of all Bangladesh imports and exports, and about 98% of Bangladesh's container trade. The total port throughput increased from 19.2 million tons in 2002 to 41.9 million tons in 2012 and to 44.2 million tons in 2013, an average increase per year of 8%. Containerized traffic during the same period grew by about 11% per year and the volume of bulk transport increased by 7% per year. The project's improved facilities, including the introduction of a modern container tracking and management information systems, has facilitated trade flows by reducing delays for port users and service providers. These, in turn, have encouraged traders and other agents in the logistics chain to participate actively in economic activities.

73. Given Chittagong's strategic location as an international gateway, the project has potential to further facilitate transit trade, especially with Bhutan and Nepal and the seven northeastern states of India. Currently, Nepal and Bhutan utilize Indian ports for their trade overseas, with only a limited volume being coursed through Chittagong or Mongla Ports. Since these Bangladesh ports are closer to Nepal and Bhutan than their Indian counterparts, they represent an appropriate alternative. However, realizing the full potential of Chittagong Port's gateway function for third-country trade to Bhutan and Nepal will depend on various factors, such as a cross-border transit agreement with India. The volume of Bhutan's third-country import and export trade (excluding India) was valued at Nu15,281 million ($213.71 million) in 2016 after growing by 3.3% a year during 2007–2016.[39] The volume of Nepal's third-country import and export trade (excluding India and the People's Republic of China) was valued at NRs259,097 million ($2,246.37 million) in FY2016–FY2017 with an annual growth rate of 11.1% for the period FY2008–FY2017.[40] The diversion of Bhutan and Nepal's international trade traffic to Chittagong Port would significantly add to the port's traffic. Table 3 shows the volume of Bhutan and Nepal's international trade to third countries.

[39] National Statistics Bureau.2017. *Statistical Yearbook of Bhutan 2017*. Thimpu, Bhutan

[40] Central Bureau of Statistics, National Planning Commission, Government of Nepal.2018. *2017 Statistical Yearbook Nepal*. Kathmandu

Table 3: Third-Country International Trade of Bhutan and Nepal, 2007–2016

	NEPAL			BHUTAN		
	(NRs million)			(Nu Million)		
Period (FY)	Exports	Imports	Total Volume	Exports	Imports	Total Volume
2008	20,710.8	79,561.2	100,272.0	5,135.3	6,645.9	11,781.2
2009	26,691.6	122,032.0	148,723.6	1,110.6	6,155.6	7,266.2
2010	20,830.3	157,220.9	178,051.2	1,558.4	5,682.2	7,240.5
2011	20,978.1	134,250.3	155,228.4	3,323.5	9,746.1	13,069.6
2012	24,644.7	162,278.1	186,922.8	1,972.8	11,255.3	13,228.1
2013	23,831.6	127,257.7	151,089.3	2,873.8	9,383.6	12,257.4
2014	29,537.0	163,100.2	192,637.2	3,783.6	9,036.9	12,820.5
2015	27,224.6	182,861.9	210,086.5	3,428.0	14,296.8	17,724.8
2016	28,941.9	180,692.2	209,634.1	3,206.0	12,075.0	15,281.0
2017	29,898.4	229,198.6	259,097.0			

Note: Nepal's third-country international trade statistics exclude India and the People's Republic of China. Bhutan's third-country international trade statistics exclude India.
Sources: National Statistics Bureau, Royal Government of Bhutan. 2010. *Statistical Yearbook of Bhutan 2010.* Thimpu; National Statistics Bureau, Royal Government of Bhutan. 2015. *Statistical Yearbook of Bhutan 2015.* Thimpu; Central Bureau of Statistics, National Planning Commission, Government of Nepal. 2017. *2017 Statistical Yearbook of Nepal.* Kathmandu.

74. More broadly, a UNESCAP study of regional economic cooperation and integration in South Asia considered that regional connectivity in South Asia was particularly important because of its potential to turn the subregion into a land bridge between Europe, Central Asia and Southeast Asia. Two trunk corridors were identified, which have feeder links across South and Central Asia: (i) the Turkey–Iran–Pakistan–India–Bangladesh–Myanmar road corridor and the (ii) Istanbul–Tehran–Islamabad–Delhi–Kolkata–Dhaka rail corridor. These two corridors are integral parts of the Asian Highway and Trans-Asian Railway networks and have connecting sublinks to major ports, including Chittagong Port.[41] The two corridors offer multimodal transport options, particularly for landlocked countries. Chittagong Port's role therefore goes beyond serving the trade needs of Bangladesh; it serves the international trade requirements of countries within its wider sphere of influence. The project's development impact is assessed *satisfactory*.

B. ADB Performance

75. ADB conducted regular discussions with the concerned agencies, particularly with the Ministry of Shipping, CPA, CHC, and RHD. It supported the three executing agencies in the different aspects of project implementation. ADB undertook eight review missions, three special review missions, and a midterm review mission to ensure that ADB policies and procedures were being complied with and at the same time to help resolve implementation-related issues. ADB approved four extensions of the loan closing date following requests by the borrower. The stakeholders interviewed indicated that they were satisfied with ADB's performance and appreciated the support provided during project implementation.

76. ADB deserves credit for undertaking a project which was strategically important to the national economy and which helped reduce a key constraint on growth. ADB did identify the project implementation risk (even though this was not emphasized in the main text of the RRP) and sought to mitigate this by approving advance procurement action and by including a considerable amount of consulting services to support the executing agencies. The weakness in this approach was that the

[41] UNESCAP. 2017. *Unlocking the Potential of Regional Economic Cooperation and Integration in South Asia: Potential, Challenges and the Way Forward.* Bangkok.

consulting services to support project implementation were loan-financed, and thus the selection and recruitment of these consulting services was the responsibility of the executing agencies and the government. The key outputs of the project were delivered, even though the procurement arrangements and financing were adapted to client preferences during project implementation. For instance, ADB demonstrated flexibility in accommodating CHC's request to procure the container scanners using the government's resources, with technical support from the USTDA. It accommodated CHC's request to use part of the loan fund for the cost of technical support provided by UNCTAD for the ASYCUDA++. It also approved advance procurement action, although the executing agencies did not utilize this. Some indicators in the DMF were poorly defined and difficult to monitor. They were not adjusted during project implementation. ADB could have been more active in following-up the lack of data collection and monitoring. Nevertheless, on the whole, ADB's performance was *satisfactory*.

C. Borrower and Executing Agency Performance

77. The borrower and the three executing agencies coordinated regularly with ADB staff in reviewing project progress. The implementation arrangements allowed the project to move forward. Coordination and interministerial committees were set up to oversee the activities of the executing agencies and resolve outstanding implementation issues during project implementation.

78. However, in hindsight, the institutional arrangements could have been simplified. Instead of three executing agencies, one government agency or entity overall could have been designated as the executing agency to manage project implementation directly. Project implementation units could have been created to implement each agency's component while reporting directly to a single executing agency. This would have allowed greater clarity of roles and responsibilities and would have facilitated the interface of ASYCUDA++ and the CTMS, among other things. On the whole, the performance of the borrower and of the executing agencies was *satisfactory*.

CHAPTER 5

Overall Assessment, Issues, and Lessons

A. Overall Assessment

79. On the whole, the project facilitated vessel and cargo movements within the port area by providing needed support facilities. It improved access to the port and helped it to meet international environmental standards. Government ownership of the project was strong and the project was well integrated with the national agenda. However, Chittagong Port is still beset with lingering congestion problems, the causes of which could not all be directly addressed by the project's initial design, such as the upsurge in international trade. The port has continued to struggle in expanding its capacity sufficiently to meet growing demand. Overall, the project is assessed *successful* (Table 4).

80. Project design was generally appropriate as it considered not only interventions to enhance Chittagong Port's productivity, but also environmental and urban traffic mitigation measures. The project conformed to the development strategies of both the government and ADB. It is assessed *relevant*. The intended outcome of an increase in container terminal capacity was achieved. However, there were deficiencies in the outcome indicators which made it difficult to directly tease out information on the extent to which the project's outcome was attained. Using dwell time as a proxy indicator, Chittagong Port's container dwell time declined (para. 45). Delivery of other outputs, by CPA beyond those planned under the project, was needed to increase container terminal capacity significantly. Nonetheless, taken together, the completed outputs allowed Chittagong Port's container terminal capacity to increase, although the exact magnitude of that contribution is difficult to ascertain. In particular, the project helped Chittagong Port to transition from paper-based terminal management to modern electronic terminal operations and document processing. Hence, the project is assessed *effective*.

81. The economic benefits were cost savings in vessel turnaround cost and user charges. This evaluation's economic reevaluation yielded an EIRR of 19.4%, which indicated efficient use of the project's and other non-project investments in achieving the intended outcome and outputs. In terms of process efficiency, the project incurred a delay of about 4 years and 7 months, but the delay was already considered in terms of the delayed project benefits. Hence, the project is assessed *efficient.* In terms of financial sustainability, CPA has demonstrated continued financial health in its operations. However, there is still scope for further strengthening of the institutional arrangements among various agencies. This could be undertaken through the establishment of a permanent inter-agency and private sector joint council or body. The project is assessed *likely sustainable*.

82. The project's improved facilities have facilitated trade flows by reducing delays for port users, service providers and consignees through the introduction of modern container tracking and management information systems. Chittagong Port's proximity to neighboring countries enables it to present an appropriate alternative to neighboring ports. However, much work is still needed before the full potential of Chittagong Port's gateway function for third-country trade to Bhutan and Nepal can be realized. On the whole, the project's development impact is assessed *satisfactory*.

Table 4: Overall Assessment of Project Performance

Evaluation Criteria	PCR Assessment	PPER Assessment	Key Reasons for Disagreements and Comments
Relevance	Relevant	Relevant	
Effectiveness	Highly effective	Effective	Delivery of other outputs, beyond those envisaged by the project, were needed to fully realize the targeted outcome.
Efficiency	Efficient	Efficient	To attribute benefits, the methodology for the re-estimation of the EIRR was revised.
Sustainability	Likely sustainable	Likely sustainable	
Overall Assessment	**Successful**	**Successful**	
Preliminary Assessment of Impact	Substantial	Satisfactory	
Borrower and Executing Agency	Satisfactory	Satisfactory	
Performance of Asian Development Bank	Satisfactory	Satisfactory	

EIRR = economic internal rate of return, PCR = project completion report, PPER = project performance evaluation report.
Source: Asian Development Bank (Independent Evaluation Department).

B. Issues

83. **Provision of port facilities did not keep pace with the growing demand for port services.** Chittagong Port has increased and expanded its facilities since project completion. However, this expansion proved inadequate because of higher than anticipated growth in the volume of containers and cargo tonnage during the past few years. For instance, a larger container back-up area could have speeded up vessel container loading and unloading. Container movement within the port is slowed by the inadequate number of container storage slots in the back-up area. Export containers could not be positioned for loading on designated vessels and incoming containers could not be moved from the berth to the storage areas due to the lack of slots in the back-up area. Some of Chittagong Port's berths are in a poor condition and they are unable handle the weight of ship-to-shore cranes. In the case of the CTMS, it was designed to accommodate processing of about 1 million TEUs per year, but FY2017 traffic was already about 2.57 million TEUs. At this point, Chittagong Port operates at almost full capacity and there is a need for investments in facilities and services to match the increasing container and/or cargo traffic demand. In particular, the number of off-dock facilities is currently insufficient.

84. Although customs procedures are being streamlined, some rules still hold containers in the back-up areas for long periods, occupying scarce container slots. These aggravate delays in container storage and movement within the port, one cause of port congestion. One example is that less-than-container-load containers are unstuffed inside the port, rather than in off-dock facilities which would unclog the port. This requires trucks to enter the port, and to pick up and transport the unstuffed goods to consignees. At present, CHC has authorized only 37 items that can be moved directly to off-dock facilities (e.g., customs bonded warehouses) for customs processing and unstuffing, although these are also congested due to their limited space. Moreover, misdeclared import shipments or those with assessment disputes overstay in the port because of the long legal process. Import containers for auction remain in the port for a lengthy period, some as long as 10 years or more.

85. **Private sector participation through port operations contracts is weak.** The government through CPA had opted to engage the private sector through port operations contracts, whereby the private contractor operates the cargo-handling equipment and ship-to-shore cranes used in their assigned port areas—CCT or NMCT. The CTMS and the acquisition and maintenance of the cargo-handling equipment

and ship-to-shore cranes are the responsibilities of CPA. The private contractor merely implements the operational instructions of CPA. In this contractual arrangement, the private sector is largely a service provider. This arrangement is weak and does not bind the private contractor to performance indicators and productivity targets. For example, two ship-to-shore cranes became unoperational beginning June 2017 when a container vessel damaged them. The private operator had to use the two remaining cranes which slowed container loading and unloading operations. To replace the damaged cranes, CPA has procured 10 new cranes, with four for immediate delivery. These had yet to be delivered, as of the independent evaluation mission site visit. Aside from the 10 new cranes, CPA is acquiring additional cargo-handling equipment such as RTGs, spreaders, and container tractor-trailers to expedite container movement, stacking and unstacking at the port. The government could explore a scheme whereby a private port concessionaire would bear all the costs for providing cargo-handling services, equipment needed, fuel and other operation and maintenance expenditures, administrative costs and port management costs. The concessionaire could collect all fees and charges and could just pay the port authority the agreed concession fee.

86. **Limited interface between port and customs IT systems.** CPA's CTMS and CHC's ASYCUDA World links should be strengthened to further improve the processing of the increasing volume of transactions. CHC provides CPA with the import general manifest (IGM) details by e-mail, which are then inputted to the CTMS to coordinate vessel unloading of containers and slot assignments in the back-up area. Although there were some delays, this process has helped expedite vessel unloading upon arrival. The release of containers at the port gates is often delayed as CHC release documents are not provided to CPA. Even CHC personnel at the port gates manually review CHC's shipment release documents for verification. On exports, CHC does not provide CPA with the EGMs to expedite positioning and loading of export containers to designated vessels, which sometimes results in delays in the departure of their assigned vessels or in containers being left behind. The EGM module under ASYCUDA World has only recently been developed and is undergoing pilot testing in Mongla Port prior to roll-out and installation at other border points.

C. Lessons

87. **Future port project designs should consider intermodal connectivity.** Ingress and egress to the port area are critical to the efficiency of transport infrastructure and services. Most of the major ports in Asian countries are located in major urban centers, which initially did not pose any problem since cargo volumes were still small. As cargo volumes have increased because of economic and population growth, port areas have expanded while local transport networks have failed to keep pace. There is a need to fully utilize existing and potential intermodal connectivity to serve existing and future cargo growth. The growth of roads, rail, and water transport should coincide with the growth in cargo traffic, with each mode providing its share of transport capacity.

88. One mode cannot serve all the transport services, so multimodal transport needs to be considered for cargo movements. In the case of Chittagong Port, connector and port access roads were built under the project. Other projects involving double tracking of the Dhaka–Chittagong rail route and a capacity expansion of the Dhaka–Chittagong Highway, are being undertaken to improve port connectivity. In hindsight, Chittagong Port could have benefited from a holistic approach that considered the evolving demands of the trade logistics chain in Bangladesh and adjacent landlocked countries and matched the capacity of the various modes to transport Chittagong port traffic volume. Future project design should take into account the need for better integration with intermodal networks.

89. **Urban areas adjacent to port developments should anticipate the growth of port traffic in their urban plans.** City development efforts should consider the impact of likely growth in port traffic on both intra- and inter-city traffic. Port and city authorities should draw up coordinated short- and medium-term infrastructure plans to accommodate urban and port growth. Chittagong City has been experiencing growth in its population, the number of commercial establishments and industries, and

vehicular city traffic. Chittagong Port's cargo traffic, the lack of container off-docks, the limited capacity of rail, and the amount of port-related vehicular traffic contribute to traffic congestion within the city and hinder traffic flow to and from the port. Investments, in port capacity should carefully take into account the need for parallel investments in intra-city circulation roads to avoid urban traffic congestion.

90. **Periodic reviews of a port's IT systems are imperative.** The container cargo volume currently being handled is already well above the capacity of the CTMS. Although a prolonged operational standstill has not occurred, the risk of a system breakdown will grow as increased usage strains CTMS capacity. The rapidly changing nature of the IT environment requires that the IT infrastructure (e.g., operating systems, core data processing applications, network, and telecommunications technologies) have enough flexibility in terms of their compatibility, connectivity, and modularity to reflect advances in technology. The possible lifespan of a given system in a ports project needs to be assessed regularly and, if necessary, the system should be upgraded. Such a review could identify whether a particular piece of IT infrastructure is likely to become obsolescent, and the need for future hardware and software upgrades or replacements. Regular reviews and replacements would be preferable to waiting for an IT system to reach full or overcapacity.

91. **Data collection, especially of baseline data, is critical.** Greater priority should have been given to ensuring that socioeconomic and baseline data were collected and reported, especially during the appraisal period. Data that should have been collected included: (i) benchmarking figures that would have provided objective reference points for evaluation corresponding with the needs of the port management and users, (ii) socioeconomic benefit monitoring data to ensure that the project benefits actually accrue to the port users, and (iii) post-project performance evaluation data to assess overall project performance. In the absence of measurable baseline data, it is difficult to continuously monitor and update indicators throughout and after project implementation. This evaluation was hampered by the absence of these baseline indicators.

D. Recommendations

92. As inputs to future operations in Bangladesh, the evaluation recommends the following:

(i) **Explore further complementarities between CPA and the private sector in port operations and related services, including development activities.** This could help realize potential gains in capacity and productivity, and ease port congestion. The private sector has been increasingly involved in a variety of operations in Bangladesh (e.g., cargo-handling and off-dock facilities). For instance, there are about 14 private inland container depots around Chittagong Port that handle import and export containers. However, there is still scope for a greater push for private sector participation, especially in port development activities, to allow expansion and improvements to terminals and berths, the purchase of modern cargo-handling equipment, and the installation of the latest management and information systems. There is a need to explore the feasibility of various management and public–private participation models to enhance the enabling environment and maintain regional and international operating standards.

(ii) **Future port development should include increasing the number and capacity of off-dock facilities (ICDs).** The number of off-dock facilities in Chittagong and Dhaka should be increased in line with the capacity requirements for the unstuffing and stuffing of less-than-container-load containers, including storage of containers for auction. Increasing the number and capacity of ICDs will allow better handling of future increases in cargo volumes.

Appendixes

APPENDIX 1: DESIGN AND MONITORING FRAMEWORK

Design Summary	Performance Indicators and Targets	Assessment	Project Achievements
Impact Facilitate trade	Annual percentage change in national gross domestic product after project completion	Achieved	Bangladesh GDP at constant prices increased by 6.6% annually for the period 2012–2017. The project's contribution to this is difficult to determine.
	Annual percentage change in trade after project completion	Achieved	Bangladesh total imports and exports increased by 4.9% annually for the period 2012–2017. The project's contribution to this is difficult to determine. Chittagong Port continues to handle about 92% of all imports and exports, and about 98% of Bangladesh's container trade. The total port throughput increased from 19.2 million tons in 2002 to 41.9 million tons 2012 and 78.2 million tons in 2017. For the period 2012–2017, total port throughput increased by about 13.3% per year, on average. In metric tons, container traffic volume during this period grew by about 12.2% annually, while the volume of bulk and breakbulk cargo increased by 13.8% per year.
Outcome Increase container terminal capacity	Annual growth in container throughput sustained at above 6% in the first 6 years after project completion	Achieved	Annual growth in container throughput in TEUs increased at 12.8% a year for the period 2012–2017.
	Port charges reduced by 20% within 2 years of project completion	Not achieved	The current CPA tariff on goods and vessels, is as of 14 May 2008.
	Vessel turnaround time and berth occupancy rate reduced by 20% within 2 years of project completion	Partially achieved	For the period 2012–2014, total vessel turnaround time reduced by 17.8%, but berth occupancy rate increased by 14.3%.
Outputs Automated manifest system (at CHC)	Average customs clearance time for import containers reduced by 30% within 2 years of project completion	Partially achieved	In 2014, average customs clearance time for import containers was 11 days 9 hours and 45 minutes based on CHC time release study. The average customs clearance for export containers is 4 days 22 hours and 38 minutes (TRS). However, there were no comparable data for 2012.
	Annual number of customs declarations increased by 20% 1 year after project completion	Partially achieved	The number of customs declarations increases in line with the increased container volume handled by the port. Since the increase in container throughput

Design Summary	Performance Indicators and Targets	Assessment	Project Achievements
			(in boxes) from 2012 to 2013 was only 10%, the commensurate increase in customs declarations should also be 10%.
Container terminal management system (at CPA)	Average container dwell time at the port reduced by at least 20% within 2 years of project completion	Partially achieved	From 2012 to 2014, average container dwell time was reduced by only 2.6%, or from 16.05 days in 2012 to 15.64 days in 2014.
Container scanning system (at CHC)	Customs inspection time reduced by 30% within 1 year of project completion	Partially achieved	Based on the average container dwell time, the reduction in customs inspection time was reduced by only 2.6%.
Improved access through connector road from Chittagong Port Access Road to New Mooring Container Terminal and Chittagong Container Terminal	50% of all traffic to and from container terminals use the connector road within 2 years of project completion	Achieved	Based on the evaluation mission's observations, vehicular traffic on the connector road is substantial. Vehicle traffic is slow moving especially during peak periods.
Improved terminal traffic circulation and gate house system	Number of vehicles inside the port at any given time reduced by 50% within 2 years of project completion	Not achieved	The evaluation mission found no noticeable impediment hindering internal circulation of vehicles within the port, despite the increased container throughput. However, because of the increase in container throughput and the unstuffing of less-than-container-load containers inside the port area, the number of vehicles inside the port has increased by an estimated 14%.
	Vehicle waiting time to enter and exit the port reduced by 30% within 2 years of project completion	Insufficient evidence to assess achievement	No vehicle or truck waiting time surveys were conducted at the port's entry and exit points.
Oil waste reception and treatment facility and spill management system implemented	Reduced oil content in water at sample stations in Karnaphuli River within 2 years of project completion	Achieved	Incidents of oil spills have been contained through the use of oil boom and emulsified using oil spill dispersant. About six vessel-related oil spill incidents occur annually.
Port service improvement committee established	Anticorruption strategy submitted to Asian Development Bank	Achieved	A port service improvement committee was established and the final draft of the anticorruption strategy was submitted to ADB in 2008.

ADB = Asian Development Bank, CHC = Custom House of Chittagong, CPA = Chittagong Port Authority, GDP = gross domestic product, TEU = 20-foot equivalent unit, TRS = time release study.
Sources: Asian Development Bank (ADB). 2014. *Completion Report: Chittagong Port Trade Facilitation Project in Bangladesh.* Manila; ADB (Independent Evaluation Department).

APPENDIX 2: ECONOMIC REEVALUATION

1. The economic reevaluation was based on the results of the site investigation conducted by the evaluation mission in June 2018. During this investigation, most of the project components were found to be operational. The acquisition of the Customs House Chittagong (CHC) container scanners was to have been funded by the project, but the scanners were bought using government funds. The expected benefits of the project were affected by factors and developments that were not anticipated at appraisal, including such as:

(i) **Higher than expected growth in container traffic.** Chittagong Port container traffic was forecast to grow by 6.4% per annum for the period 2005–2020. At completion, based on FY2005–FY2011 Chittagong Port Authority (CPA) data, container traffic had grown by 10.0% per annum. More recent data collected by the evaluation mission for FY2006–FY2017 showed container traffic growth at 10.4% per annum. This was a more substantial growth in container traffic than expected.

(ii) **Container vessel turnaround time.** Average container vessel turnaround time declined from 4.31 days in 2010 to 3.99 days in 2015. However, average vessel turnaround time increased to 6.01 in 2016 and to 6.94 days in 2017.

(iii) **Container dwell time.** Improvements in container dwell time were erratic. In 2010, the average time was 17.13 days, improving to an average of 16.28 days by 2014. However, by 2015, average container dwell time had increased to 18.25 days, before declining again to 10.99 days by 2017. Container dwell time normally increases substantially before Ramadan, anticipating the significant demand for various goods that occurs during the Eid al-Fitr celebration.

2. The methodology used in this evaluation to recompute the project's economic internal rate of return (EIRR) and net present value (NPV) was different from that used at appraisal and in the project completion report (PCR). This was due to the lumpiness of the benefits and to operation and maintenance costs that could not be allocated to the project investments alone. A time slice analysis was used: in addition to the project investments, the net value of the operating assets as of 2007 and other investments funded by the CPA and other sources from 2008 to 2011 were included in the analysis.

3. The parameters and general assumptions used in the economic reevaluation were as follows:

(i) the unit of account used was taka; and

(ii) the corresponding value of the shadow conversion factor (SCF), inclusive of the 13% value-added tax, was estimated at 0.91.

4. **Project cost.** The project cost had three components: (i) CPA, (ii) CHC, and (iii) RHD. The estimated and actual project costs are summarized in Table A2.1. In addition to the actual project cost, the net value of operating assets as of 2007 and annual investments from 2008 to 2011 funded by CPA and other sources were also included. This included the cost of the four scanners procured by CHC using its own budget. The project financial cost was converted to economic cost using the estimated SCF.

Table A2.1: Estimated and Actual Project Financial Cost

Component	Estimated Cost at Appraisal ($ million)	Estimated Cost at Appraisal (Tk million)	Actual Cost at Completion ($ million)	Actual Cost at Completion (Tk million)
Chittagong Port Authority	14.3	830.1	17.00	1,320.0
Customs House Chittagong	13.2	767.3	0.59	45.8
Roads and Highways Department	13.8	803.0	10.25	799.7
Total	**41.3**	**2,400.4**	**27.84**	**2,165.5**

Sources: Asian Development Bank (ADB). 2014. *Completion Report: Chittagong Port Trade Facilitation Project in Bangladesh.* Manila; ADB (Independent Evaluation Department).

5. **Operation and maintenance expense**. The operation and maintenance (O&M) expense for the project could not be disaggregated from the total CPA O&M expense, so the total O&M expense was used in the analysis. The O&M expense estimates were sourced from the annual accounting records and information provided by CPA up to FY2016. From FY2017, the O&M cost was projected to increase by 5% a year. The inclusion of variable costs at appraisal and in the PCR was without a sound basis as the O&M expenses of the project outputs were not correlated to the volume of container traffic. The assumed O&M expenses were adjusted to economic costs using the SCF as the conversion factor (para. 3).

6. **Project benefits.** Statistics on Chittagong Port's container traffic from 2010 to 2017 were provided by CPA. The assumed project economic life was 15 years, but this was deemed excessive for the container terminal management system (CTMS) considering the likelihood of technical obsolescence. A 10-year project economic life was felt to be reasonable and this period coincided with current efforts of CPA to evaluate alternatives to the CTMS, which has started to experience intermittent hardware breakdowns and is operating slowly. Container traffic forecasts were prepared for 2018–2022 using the computed annual growth rate based on 2010–2017 traffic for reference. A more conservative forecast assumed that the likely growth rate was about 9% per annum from 2018 to 2022. The resulting container forecast is summarized in Table A2.2.

Table A2.2: Project Performance Evaluation Report Forecast Import, Export, and Total Container Throughput, 2018–2027
(TEUs)

Calendar Year	PPER Forecast Imports (TEU)	PPER Forecast Exports (TEU)	PPER Forecast Total[a] (TEU)	PPER Forecast Vessel Volume (number)	Appraisal Forecast[b] (TEU)	PCR Forecast[c] (TEU)
Actual						
2010	677,319	666,129	1,343,448	890	1,060,140	1,343,448
2011	691,653	700,451	1,392,104	938	1,127,989	1,392,104
2012	708,419	698,037	1,406,456	845	1,200,181	1,481,199
2013	772,451	769,066	1,541,517	947	1,276,992	1,575,995
2014	870,960	860,259	1,731,219	1,047	1,358,720	1,676,859
2015	1,019,072	1,005,135	2,024,207	1,193	1,445,678	1,784,178
2016	1,183,939	1,162,970	2,346,909	1,270	1,538,201	1,898,365
2017	1,289,036	1,277,561	2,566,597	1,454	1,636,646	2,019,861
Forecast						
2018	1,405,049	1,392,541	2,797,591	1,518	1,741,391	2,149,132
2019	1,531,504	1,517,870	3,049,374	1,630	1,852,841	2,286,676
2020	1,669,339	1,654,479	3,323,818	1,752	1,971,422	2,433,024
2021	1,819,580	1,803,382	3,622,961	1,885		2,588,737
2022	1,983,342	1,965,686	3,949,028	2,030		

PCR = project completion report, PPER = project performance evaluation report, TEU = 20-foot equivalent unit.
[a] From 2018 to 2022, the assumed annual container traffic growth was 9%.
[b] The base year of the appraisal forecast was 2006. Assumed growth rate was 6.4% per annum.
[c] The base year of the PCR forecast was 2011. Assumed growth was not indicated and 6.4% per annum was used.
Sources: Asian Development Bank (ADB). 2014. *Completion Report: Chittagong Port Trade Facilitation Project in Bangladesh.* Manila; ADB (Independent Evaluation Department).

7. The identified economic benefits accruing to the project were (i) user fees and charges on vessels and cargo and (ii) a reduction in container vessel turnaround time (a reduction in vessel waiting time at anchorage plus a reduction in vessel service time at berth). Because of the shallow draught (9.5 meters maximum), container vessels greater than 1,000 TEU cannot be accommodated at the port. Given the lower operating cost per TEU of these larger capacity container vessels, shipping lines would have been better off replacing their existing 1,000 TEUs by lower capacity vessels. As the worldwide demand for container slots in vessels increases, larger capacity container vessels are being ordered, built, and operated by major shipping lines. Chittagong Port does not have the draught to accommodate these vessels. Because of the existing congestion at Chittagong Port, vessels wait at anchorage until their assigned berths become available. At berth, the vessels wait until the unloading and loading of containers has been completed. Savings in vessel operating costs are generated if the turnaround time is less than a base turnaround time value, i.e., the computed average vessel turnaround time in 2010 (4.31 days). The competition in international shipping services means that these savings would benefit shippers, cargo owners, or consignees in the form of lower shipping costs. Based on the evaluation team's discussion with a major shipping agent in Chittagong, the shipping lines already integrate vessel congestion-related costs into their shipping rates. A shorter vessel turnaround time would therefore mean lower shipping rates that would in turn be passed on to users of the shipping service. The computed growth in container vessel traffic for the period 2010–2017 was 7.3% per annum. A conservative estimate of container vessel volume, assuming a 9% growth in import cargo volume, is about 7.0%. It is also assumed that there will be no changes in the size of the container vessels calling at the Port of Chittagong due to existing draught restrictions. The container vessel volume forecast is shown in Table A2.3.

8. The operating cost of a container vessel at anchorage and at berth is estimated at $10,000 per day,[1] while the savings in container vessel turnaround times are estimated at 0.91 days[2] per call. A reduction in vessel turnaround times may also be attributable to non-project interventions that were implemented during and after the project. The CTMS that was used to manage container-related operations at Chittagong Port was complemented by other interventions, including: (i) provision and operation of gantry cranes for ship-to-shore and shore-to-ship movement of containers; (ii) shunting vehicles for the transport of containers to and from their assigned slots at the back-up area; and (iii) rubber-tired gantry crane vehicles for the stacking and removal of containers in the back-up area. The cargo-handling equipment was acquired periodically by CPA using its own financial resources. These interventions continue to the present. The provision for the container back-up area is an ongoing concern given the container throughput forecast. Without all these factors, including the CTMS functioning together, a reduction in vessel turnaround time cannot be achieved.

[1] Japan International Cooperation Agency (JICA), Ministry of Transport, the Socialist Republic of Vietnam National Maritime Bureau (VINAMARINE). December 2002. *Final Report for The Port Development Study in the South of the Socialist Republic of Vietnam*. Volume 4. Overseas Coastal Area Development Institute of Japan (OCDI) and Japan Port Consultants.

[2] The reduction in container vessel turnaround time was estimated as the difference between the 2010 time (4.31 days) and the average vessel turnaround time from 2011 to 2015 (3.404 days). In 2016 and 2017, there was a significant increase in vessel turnaround time to 6.01 and 6.94 days due to breakdowns in two ship-to-shore gantry cranes. It was assumed that without the CTMS, the vessel turnaround times would have been higher.

Table A2.3: Project Performance Evaluation Report Forecast Import, Export, and Total Container Throughput, 2018–2027
(TEUs)

Calendar Year	PPER Forecast Imports (TEU)	Exports (TEU)	Total[a] (TEU)	Vessel Volume (number)	Appraisal Forecast[b] (TEU)	PCR Forecast[c] (TEU)
Actual						
2010	677,319	666,129	1,343,448	890	1,060,140	1,343,448
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2013	772,451	769,066	1,541,517	947	1,276,992	1,575,995
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2016	1,183,939	1,162,970	2,346,909	1,270	1,538,201	1,898,365
2017	1,289,036	1,277,561	2,566,597	1,454	1,636,646	2,019,861
Forecast						
2018	1,405,049	1,392,541	2,797,591	1,518	1,741,391	2,149,132
2019	1,531,504	1,517,870	3,049,374	1,630	1,852,841	2,286,676
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2021	1,819,580	1,803,382	3,622,961	1,885		2,588,737
2022	1,983,342	1,965,686	3,949,028	2,030		

PCR = project completion report, PPER = project performance evaluation report.
[a] From 2018 to 2022, assumed annual container traffic growth is 9%.
[b] The base year of the appraisal forecast was 2006. The assumed growth rate was 6.4% per annum.
[c] The base year of the PCR forecast was 2011. The assumed growth was not indicated and 6.4%/ annum was used.
Sources: Asian Development Bank (ADB). 2014. *Completion Report: Chittagong Port Trade Facilitation Project in Bangladesh*. Manila; ADB (Independent Evaluation Department).

9. There is no need to disaggregate the benefits in the reduction of vessel turnaround time by normal and incremental traffic. The appraisal and completion reports did not indicate how these were estimated. It was determined that vessel traffic volume increases were due to the growth in container vessel slot demand.

10. CPA collects user fees and charges on vessels and cargo. This was assumed to represent the willingness to pay of vessel owners and cargo consignees for the services provided by CPA, such as the loading and unloading of vessels, availability of berth, cargo-handling, availability of container storage areas and other facilities, including the CTMS.

11. Shippers, consignees and cargo owners also benefit from the improved vessel turnaround times in the form of lower shipping costs (para. 7). Container dwell time at Chittagong Port was largely due to factors that were not addressed by the project such as: (i) lengthy and complicated customs processes and procedures (the project only assisted in providing additional applications to the ASYCUDA++, which fell through); (ii) low CPA container storage fees that allow cargo owners and consignees to store their full container load at the port; (iii) questions on customs assessments, leading to lengthy negotiations to reduce assessments; and (iv) non-availability of railcars to ferry import containers to Dhaka ICD, which delays customs processing and the release of containers at Dhaka ICD.

12. The port access road component implemented by RHD helped decongest Chittagong City roads by diverting port truck traffic from city roads to the port access road. Completed in December 2011, the 1.42 kilometer flyover stretches from the Customs Bridge near the port to the Dhaka–Chittagong highway at Fouzderhat point. Cargo in and out of two container terminals—CCT and NMCT—is transported using the flyover directly to the highway to Dhaka. It is estimated that more than 6,000 container carriers and trucks use the port access road daily. CPA is supposed to maintain the road but does not do so, nor does it undertake periodic vehicle volume count surveys to determine usage. Recently, CPA requested RHD to prepare a design and cost estimate for the repair of the flyover expansion joints which had deteriorated

and required repair or replacement immediately. The savings in vehicle operating costs and travel time was not estimated in this reevaluation, the appraisal, or the PCR.

13. The recomputed project EIRR is 19.4%, while the NPV@12% is Tk10,356.14 million as shown in Table A2.4. The comparison of the economic evaluation results at appraisal, PCR, and reevaluation is shown in Table A2.5. In general, the recomputed EIRR and NPV@12% shows the project and non-project investments, and current operating assets to be robust.

14. The sensitivity analysis results show the project and other investments to be viable with EIRR values higher than the 12% hurdle rate threshold.

Table A2.4: Recomputation of the Project Economic Internal Rate of Return and Net Present Value–Project Performance Evaluation Report
(Tk million)

Calendar Year	Investment Cost	Operating Assets + Annual Investments (Other Sources)	Operations and Maintenance Cost	Total Cost	Savings in Vessel Operating Cost	Operating Income	Total Benefits	Net Benefits
2005				0.00				0.00
2006				0.00				0.00
2007	383.67	23,145.30		23,528.97				(23,528.97)
2008	231.40	767.86		999.26				(999.26)
2009	622.84	2,687.41		3,310.25				(3,310.25)
2010	808.67	2,963.32		3,771.99				(3,771.99)
2011	463.16	1,730.46		2,193.61				(2,193.61)
2012			4,268.26	4,268.26	597.05	14,611.69	15,208.75	10,940.48
2013			4,735.73	4,735.73	669.12	15,021.51	15,690.63	10,954.90
2014			5,334.69	5,334.69	739.78	15,586.15	16,325.92	10,991.23
2015			6,185.91	6,185.91	842.94	18,068.10	18,911.04	12,725.13
2016			7,568.65	7,568.65	897.34	19,778.80	20,676.15	13,107.49
2017			7,947.08	7,947.08	1,027.35	22,302.03	23,329.38	15,382.30
2018			8,344.44	8,344.44	1,099.27	24,055.77	25,155.04	16,810.60
2019			8,761.66	8,761.66	1,176.22	25,947.42	27,123.63	18,361.97
2020			9,199.74	9,199.74	1,258.55	27,987.82	29,246.37	20,046.62
2021			9,659.73	9,659.73	1,346.65	30,188.66	31,535.31	21,875.58
2022			10,142.72	10,142.72	1,440.91	32,562.57	34,003.49	23,860.77
EIRR								19.4%
NPV@12%								10,356.14

EIRR = economic internal rate of return, NPV = net present value.
Sources: Chittagong Port Authority. 2018; Asian Development Bank (Independent Evaluation Department).

Table A2.5 : Computed Economic Internal Rate of Return and Net Present Value at Appraisal, Project Completion Report, and Project Performance Evaluation Report

Description	EIRR (%)	NPV@12% (Tk billion)
Appraisal	21.6	3.6
PCR	24.98	4.76
PPER	19.4	16.65
Sensitivity Analysis		
Appraisal		
10% Decrease in User Benefits	12.8	-
10% Increase in Costs	13.5	-
30% Decrease in Incremental Traffic	15.3	-
PCR		
10% Decrease in Benefits	17.52	1.93
10% Increase in Capital/Operating Costs	18.24	2.42
PPER		
20% Decrease in Benefits	14.7	5.24
20% Increase in Operation and Maintenance Costs	18.0	13.0

EIRR = economic internal rate of return, NPV = net present value, PCR = project completion report, PPER = project performance evaluation report.
Source: Asian Development Bank (Independent Evaluation Department).

APPENDIX 3: FINANCIAL REEVALUATION

1. **Financial management, accounting and audit**. The Chittagong Port Authority (CPA) was established under Ordinance No. LII of 1976 by taking over the assets, liabilities, and operation of the Chittagong Port Trust. The ordinance specified that CPA was incorporated as a perpetual ongoing concern, was self-financing, and was administered by the Ministry of Shipping. It has considerable independence in its day-to-day operations, but overall planning and financial control is exercised by the government through budgetary controls. Major capital expenditures and their financing must have government approval. Recruitment of staff and employees requires government clearance. Tariffs and port dues, while revised and set by CPA, are still subject to government approval.

2. CPA maintains its accounts in accordance with the Generally Accepted Accounting Principles, Bangladesh Accounting Standards, CPA Ordinance 1976, and other applicable laws and regulations. Financial statements are prepared annually, submitted to the government and audited by external auditors.

3. **Financial performance**. From fiscal year (FY) 2009 to FY2016, CPA has shown sustained financial viability in its operations, with operating income from vessel and cargo charges increasing by 9.1% per annum. Operating and administrative expenditures, including general expenses, increased by 12.8% per annum. While the annual increase in expenditures is higher than the increase in operating income, net income still grew by 5.7% per annum. This is attributed to the growth in container and vessel traffic and the effect of congestion, which results in higher port income. On average, net income per annum before taxes is Tk7,458.45 million and Tk3,920.95 million after taxes. Tables A3.1–A3.4 provide a summary of CPA's financial statement, balance sheet and financial ratios for the period FY2009–FY2016 in taka and US dollars.

The CPA financial ratios from FY2009 to FY2016 showed a debt–equity ratio of 0.2, which indicates the CPA debt was significantly less than its equity. CPA therefore has substantial equity to finance its additional capital investments through borrowing. However, its current ratio showed a slight deterioration from 1.08 in FY2009 to 0.69 in FY2016. This was because of an increased drawdown in current assets to meet short-term financial obligations. This could be attributed to the acquisition of new cargo-handling equipment and the construction of new facilities using CPA's cash and other short-term investments. Similarly, CPA's asset turnover ratio declined from 0.19 in FY2009 to 0.12 in FY2016 and shows that CPA still has significant capacity to generate revenues or it has substantial unused capacity.

4. CPA has the financial resources to fund the acquisition of more cargo-handling equipment, including ship-to-shore cranes or quay cranes to improve port productivity. This is reflected in the increase in current liabilities as it has acquired additional cargo-handling equipment to improve port productivity. However, the port's more pressing problem has been the lack of container storage areas. Table A3.5 shows the growing inventory of cargo-handling equipment from 2011 to 2016. While CPA has bought more equipment, the growth in container import volumes means that container back-up areas are insufficient. This has impeded the productivity of the cargo-handling equipment in use.

5. CPA's financial condition will allow the CTMS to be adequately maintained and supported. The evaluation mission visited the CTMS facilities, including the back-up facilities, and found that CPA had already replaced some hardware components that were no longer serviceable. The CTMS officials explained their difficulty in looking for replacement parts, which were no longer available, given the age of the equipment being used. CPA is now undertaking its own study on a replacement for the CTMS as the current NAVIS is not designed to handle the current level of container traffic at Chittagong Port. The officials explained they were examining the feasibility of enhancing their current version of NAVIS with the developer to determine whether this was a viable option.

6. A recomputation of the project's FIRR was undertaken, but this is subject to several caveats. First, there is no specific fee that is being charged by CPA for the CTMS. CTMS is widely used in Chittagong Port container terminal operations to increase productivity and for more accurate billing. Second, there is no acceptable procedure for allocating CPA shipping and cargo charges to the CTMS. Third, there is also no acceptable procedure for allocating CPA costs to the CTMS. Given these methodological issues in apportioning costs and revenues, the recomputation of the FIRR could lead to an unrealistic result.

Table A3.1: Chittagong Port Authority Financial Statement, FY2009–FY2016
(Tk million)

Description	FY2009	FY2010	FY2011	FY2012	FY2013	FY2014	FY2015	FY2016	Growth Rate, FY2009–FY2016
Income									
Dues and Charges									
On Vessels	1,582	1,768	1,999	2,228	2,134	2,279	2,465	2,837	8.7%
On Cargo	9,194	9,202	12,001	12,383	12,887	13,307	15,603	16,942	9.1%
Total Income	**10,776**	**10,970**	**14,000**	**14,612**	**15,022**	**15,586**	**18,068**	**19,779**	**9.1%**
Expenditures									
Operating Expenses	3,598	4,882	4,679	4,690	5,204	5,862	6,798	8,317	12.7%
Administrative and General Expenses	977	1,366	1,662	1,836	2,826	2,294	1,812	2,341	13.3%
Total Expenditure	**4,575**	**6,248**	**6,341**	**6,526**	**8,030**	**8,157**	**8,609**	**10,658**	**12.8%**
Net Income	**6,201**	**4,722**	**7,659**	**8,086**	**6,992**	**7,430**	**9,459**	**9,120**	**5.7%**
Corporate Taxes	2,400	2,250	3,200	3,800	4,000	3,950	4,250	4,450	9.2%
Net Income After Taxes	**3,801**	**2,472**	**4,459**	**4,286**	**2,992**	**3,480**	**5,209**	**4,670**	**3.0%**

FY = fiscal year.
Source: Chittagong Port Authority. 2018.

Table A3.2: Chittagong Port Authority Balance Sheet and Financial Ratios, FY2009–FY2016
(Tk million)

Description	FY2009	FY2010	FY2011	FY2012	FY2013	FY2014	FY2015	FY2016
Balance Sheet								
Fixed assets	26,278	29,231	32,488	34,389	42,935	47,225	51,059	57,116
Deferred expenditure	73	73	94	92	106	108	120	170
Fixed deposit	34,271	40,355	48,405	56,157	61,888	70,260	81,990	92,396
Current assets	6,924	7,632	9,351	11,277	12,186	13,680	12,714	13,563
Turnover of working capital	6,408	8,657						
Current liabilities			12,276	13,095	16,898	16,714	17,058	19,546
Net current assets	516	(1,025)	(2,925)	(1,818)	(4,712)	(3,034)	(4,344)	(5,983)
Capital employed	61,137	68,633	78,061	88,820	100,217	114,560	128,835	144,225
Financial Ratios								
Debt–equity ratio	0.00	0.00	0.00	0.00	0.00	0.00	0.20	0.20
Current ratio	1.08	0.88	0.76	0.86	0.72	0.82	0.75	0.69
Quick ratio	1.08	0.88	0.76	0.86	0.72	0.81	0.75	0.69
Asset total turnover	0.19	0.17	0.15	0.14	0.13	0.12	0.14	0.12
Turnover of working capital	20.89	0.00	0.00	0.00	0.00	0.00	0.00	0.00

( ) = negative, FY = fiscal year.
Source: Chittagong Port Authority. 2018.

Table A3.3: Chittagong Port Authority Financial Statement, FY2009–FY2016
($ million)

Description	FY2009	FY2010	FY2011	FY2012	FY2013	FY2014	FY2015	FY2016	Growth Rate 2009–2016
Income									
Dues and Charges									
On vessels	18.75	20.96	23.69	26.41	25.30	27.02	29.22	33.63	8.7%
On Cargo	108.98	109.07	142.25	146.77	152.75	157.72	184.94	200.81	9.1%
Total Income	**127.73**	**130.02**	**165.94**	**173.19**	**178.05**	**184.74**	**214.16**	**234.43**	**9.1%**
Expenditures									
Operating Expenses	42.64	57.86	55.46	55.59	61.68	69.48	80.57	98.58	12.7%
Administrative and General Expenses	11.59	16.19	19.70	21.76	33.49	27.19	21.47	27.75	13.3%
Total Expenditure	**54.23**	**74.05**	**75.16**	**77.35**	**95.18**	**96.68**	**102.04**	**126.33**	**12.8%**
Net Income	**73.50**	**55.97**	**90.78**	**95.84**	**82.87**	**88.06**	**112.11**	**108.10**	**5.7%**
Corporate Taxes	28.45	26.67	37.93	45.04	47.41	46.82	50.37	52.74	9.2%
Net Income After Taxes	**45.05**	**29.30**	**52.85**	**50.80**	**35.46**	**41.24**	**61.74**	**55.36**	**3.0%**

FY = fiscal year.
Source: Chittagong Port Authority. 2018.

Table A3.4: Chittagong Port Authority Balance Sheet and Financial Ratios, FY2009–FY2016
($ million)

Description	FY2009	FY2010	FY2011	FY2012	FY2013	FY2014	FY2015	FY2016
Balance Sheet								
Fixed Assets	311.47	346.47	385.07	407.61	508.89	559.75	605.18	676.97
Deferred Expenditure	0.86	0.86	1.11	1.09	1.26	1.28	1.42	2.02
Fixed Deposit	406.20	478.31	573.73	665.61	733.54	832.77	971.80	1,095.14
Current Assets	82.07	90.45	110.84	133.66	144.43	162.15	150.69	160.76
Turnover of Working Capital	75.96	102.61	0.00	0.00	0.00	0.00	0.00	0.00
Current Liabilities	0.00	0.00	145.51	155.20	200.29	198.11	202.18	231.67
Net Current Assets	6.11	(12.15)	(34.67)	(21.55)	(55.85)	(35.96)	(51.49)	(70.91)
Capital Employed	724.64	813.49	925.23	1052.75	1,187.84	1,357.84	1,527.03	1,709.46
Financial Ratios								
Debt–Equity ratio	0.00	0.00	0.00	0.00	0.00	0.00	0.20	0.20
Current Ratio	1.08	0.88	0.76	0.86	0.72	0.82	0.75	0.69
Quick Ratio	1.08	0.88	0.76	0.86	0.72	0.81	0.75	0.69
Turnover of Total Assets	0.19	0.17	0.15	0.14	0.13	0.12	0.14	0.12
Turnover of Working Capital	20.89	0.00	0.00	0.00	0.00	0.00	0.00	0.00

( ) = negative, FY = fiscal year.
Source: Chittagong Port Authority. 2018.

Table A3.5: Cargo-Handling Equipment Inventory, FY2011–FY2016 (number of items)

No.	Type of Equipment	Capacity Ton	FY2011	FY2012	FY2013	FY2014	FY2015	FY2016	Procurement FY2015–FY2016
1	Quay gantry crane	40	4	4	4	4	4	4	10
2	Rubber tired gantry crane	40	11	11	19	19	19	21	18/20
3	Rail mounted gantry crane	40							1
3	Mobile harbor crane	84			2	2	2	2	1
4	Straddle carrier (4 high)	40	31	31	36	36	36	39	6/10
5	Straddle carrier (2 high)	40			2	2	2	2	
6	Reach stacker	45	17	12	11	11	16	13	
7	Reach stacker	7	2	2	4	6	6	5	4
8	Forklift truck	42	5	5	5	5	5	3	
9	Forklift	28	1	1					
10	Forklift	25	1	1					
11	Forklift (spreader)	16	19	19	19	19	19	13	
12	Forklift	16	3						7
13	Container mover	50	6	6	5	5	5	4	5
14	Terminal tractor	50	37	43	43	43	43	44	
15	Terminal trailer	50	56	55	55	55	55	53	
16	Mobile crane	10–50		34	45	45	45	41	33
17	Forklift truck	10–20		3	6	6	6	9	10
18	Forklift truck	3-5		80	96	96	91	106	79
19	Industrial tractor	25		11	11	11	11	15	
20	Heavy trailer	25		2	5	5	5	5	
21	Light trailer	6		30	30	30	30	37	15
22	Electric shore crane	1.6–3		19					

Source: Chittagong Port Authority. 2018.