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## The Caribbean Maritime Transportation Sector: Achieving Sustainability through Efficiency

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## About the Caribbean Economic Governance Project

This project convened researchers and leaders within the private and public sectors to examine and provide substantive answers and policy prescriptions to current economic governance challenges facing the Caribbean region. The papers were initially presented at CIGI workshops, where the authors benefited from extensive comments and discussion on their work. This series presents and discusses policy issues pertaining to trade, investment, human capital, the fiscal outlook, public sector management practices and other issues relevant to the Caribbean region's economic future.

CIGI's Caribbean Economic Governance Project is directed by Daniel Schwanen.

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## Acronyms and Abbreviations

CARICOM	Caribbean Community
CMI	Caribbean Maritime Institute
CSA	Caribbean Shipping Association
G7	Group of Seven
IMO	International Maritime Organization
JIT	just-in-time
KCT	Kingston Container Terminal
KWL	Kingston Wharves Limited
LSCI	Liner Shipping Connectivity Index
MARPOL 73/78	International Convention on the Prevention of Pollution from Ships
PAJ	Port Authority of Jamaica
SIDS	small island developing states
SLASPA	St. Lucia Air and Sea Ports Authority
SOLAS 74/78	International Convention on the Safety of Life at Sea
TEU	twenty-foot equivalent unit
UNCTAD	United Nations Conference on Trade and Development

## Summary

The port structure of the Caribbean has been heavily influenced by global change over the last 200 years. The historical context — colonialism, piracy and slavery — meant that ports were originally designed to serve colonial interests. The advent of containerization and globalization have dramatically changed cargo shipping, while at the same time, cruise tourism has increased significantly — the Caribbean accounts for 50 percent of the global market — which means that cargo and cruise ships now compete for limited berth space.

The Caribbean approach to the development and reform of the maritime industry has been fragmented, as the region is made up of microstates. As the global shipping industry evolved, port infrastructure in the region has not kept pace, and needs to undergo a major overhaul in order to become sustainable. This paper provides an overview of the maritime transport industry in the Caribbean, the history of both cargo and cruise shipping, and makes nine policy recommendations that could help the region achieve sustainability and efficiency: take an integrated approach when making large strategic decisions; take a regional approach to port security; align labour market regulation to global standards; harmonize maritime transport industry legislation; consider the public benefit when investing public funds in maritime infrastructure projects; undertake collective economic, social and environmental impact studies; implement the landlord model; recognize that transshipment is not always the correct answer for every port; and acknowledge that regional organizations should provide services to member governments.

## Author Biographies

Fritz Pinnock is the executive director at the Caribbean Maritime Institute. His experience in the shipping and transportation industry spans over two decades. Fritz holds a Ph.D. in sustainable development from the University of the West Indies. He also holds a master of science degree from University of Plymouth, United Kingdom. His consultancy services in strategic management have been extended to many Caribbean islands, including Jamaica, Barbados, Antigua and Guyana. He has written and presented papers at various conferences both within the shipping and transportation industry, and educational institutions. Fritz is an expert in developing and integrating operational and strategic plans, reengineering, cost-cutting control and managerial systems development.

## Introduction

The tourism industry has been embraced as a development tool by many countries in the Caribbean as a result of the impending demise of the traditional banana and sugar industries. The fastest-growing segment of the industry is cruise tourism, for which the Caribbean accounts for 50 percent of the global market share by vessel calls and passenger count, but represents less than five percent of the total global tourism industry revenue. Cruise ships have now become destination and floating theme parks, thereby reducing the Caribbean region to a low-value, high-volume destination. This is due to the fragmented approach to the development of the maritime transportation industry in the Caribbean, which is not sustainable in its current form. This unsustainable approach to maritime development is the major issue that this paper discusses. In many territories, cruise ships compete with cargo vessels for limited berthing space. Throughout the region, there is an understanding that cruise ships get priority berthing over cargo vessels, which have to wait until after cruise ships sail to berth. This means cargo vessels have to carry out their load and discharge operations after normal working hours, resulting in massive overtime costs and often-lengthy delays. In all cases, these extra charges are passed on to local consumers, contributing to the high cost of maritime transportation in the Caribbean. Barbados, for example, has been seriously affected by this dilemma.

The modern cruise industry has its roots in the early cargo and passenger industries serving colonial interests in the Caribbean. The birth of the modern cruise industry

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in the 1960s, however, accounts for the shift from mere maritime transportation to the cruise tourism industry. The approach to the development and reform of the maritime transportation industry has been fragmented, and the region has not capitalized on the opportunities to use maritime transportation as a development tool. The maritime transportation infrastructure throughout the region was designed to facilitate colonial trade. Advancements in technology and skills have today placed the Caribbean in catch-up mode, as most reforms have been cosmetic, and do not address the real need to overhaul the entire infrastructure and take a holistic approach to positioning the Caribbean within the global logistics and supply chain.

This paper takes a holistic look at the maritime transport sector in the Caribbean. It provides insight into both cargo and cruise shipping, which are often viewed independently, yet compete for limited infrastructure and logistics support. The paper further categorizes Caribbean ports into global hub ports, sub-regional hub ports and service ports. The matters of efficiency and sustainability are examined against the unique historical background of Caribbean ports. The terms “sector” and “industry” are used interchangeably in this paper.

## Methodology

The maritime transportation industry has received little attention in the Caribbean, due, in part, to the highly specialized nature of the sector and limited trained human resource capacity in the region, as well as the limited data and literature relating to Caribbean maritime transportation. Information was obtained through primary sources (semi-structured interviews, observation and the professional experience of the researchers) and secondary sources (government periodicals and industry journals). Research was conducted over a period of seven months, and the countries reviewed include: Antigua and Barbuda, the Bahamas, Barbados, the British Virgin Islands, the Cayman Islands, Dominica, the Dominican Republic, Granada, Guyana, Haiti, Jamaica, St. Kitts, St. Lucia, St. Maarten, St. Vincent, Suriname, Trinidad and Tobago, and Turks and Caicos. In the paper, emphasis is placed on ports, analysis of port efficiency, the port connectivity index, labour challenges and the importance of regional cooperation, and concludes with a set of policy recommendations for Caribbean maritime transportation including ports.

## General Shifts in the Maritime Industry

The maritime transportation industry has a legacy of piracy, slavery and colonialism, catering to small-market needs. The upward movement of world oil prices, the impact of globalization and containerization have all changed the face of the global shipping industry, and the Caribbean has been slow to respond. With the container revolution in its ninth-generation phase with 15,000 twenty-foot equivalent unit (TEU) vessels on order, Caribbean states are constantly dredging their channels and upgrading their infrastructure in an attempt to remain relevant in a changing global environment. The pressure has not been only on the physical infrastructure, but on finding and retaining qualified personnel. Unfortunately, the Caribbean has not kept pace with advancements in information technology, while at the same time, there has been a wide disparity between countries and ports in the region, certainly in terms of productivity.

New logistics concepts such as globalization, just-in-time (JIT) and outsourcing have created the need to establish complex international distribution chains. The ultimate goal is to allow shippers to place the right product on the manufacturing or retail floor anywhere in the world — at the right time and the right price. As a result, global logistic service providers have emerged in the past three decades, the main objective of satisfying customer-driven demand. To achieve this objective, they frequently rely on partnerships with industrial, distribution and transport entities. The global shipping industry, for example, is driven by forces of scale and technology. The Caribbean comprises a group of disconnected states sharing ocean space and is, therefore, challenged to find relevance within this paradigm. Sustained globalization and global logistics would not be possible without a dense and efficient transport network. The question is: How does the Caribbean fit into this picture? Given the poor performance of many ports in the Caribbean, it is not surprising that handling charges are two or three times higher than in similar ports in other regions of the world, and the overall cost of transport and insurance in the Caribbean basin is some 30 percent higher than the world average (Pinnock and Ajagunna, 2009).

Before air travel, passenger ships were the primary means for transoceanic transport, and transportation was provided in style, especially for those who could afford to travel first class. Transoceanic travel hit its peak in 1957 and began to decline in 1958, when Pan American

Airways introduced nonstop air travel between New York and Europe. Transatlantic boarding continued to steadily decline through the early 1960s. This simultaneously led to the demise of companies such as Canadian Pacific (cruise operations), United States Lines, Hamburg-America Line and Swedish America Line. Many of the idle ships were subsequently taken over by new companies that focused on the passenger vessel for leisure travel. The leisure industry, therefore, grew slowly in its early years, but by the 1980s had expanded widely, with cruise lines building ever-bigger ships and operating more ships, with new companies appearing on the scene. The *Carnival Destiny*, which debuted in 1996, was the first cruise ship too large to transit the Panama Canal. These ultra-large cruise ships are referred to as Post Panamax, having a capacity for over 2,500 passengers. As a result, the concept of cruising has, within the last few decades, gradually shifted from being merely a transportation base to floating resorts.

## Categories of Caribbean Ports

Most Caribbean states are microstates, with a heavy dependence on services such as tourism and offshore banking as the primary areas of economic activity. These states are also reliant on imports from North America and the Far East, supported with limited inter- and intra-regional trade (Pinnock, 2012). Given that import parcel sizes are small by global standards, they do not provide a large enough economic base to support the development of modern port facilities. Consequently, the concept of containerization has had a great impact on Caribbean small ports, which were designed to support colonial bulk importation of basic items and exportation of bananas and sugar. Caribbean countries have done their best to modernize old general cargo ports to accommodate newer container ships, further compounding the pressures these ports face.

The size of ships has constantly increased with improvements in technology. Increasingly, there are specialized container ships with no onboard container crane facilities, putting pressure on Caribbean ports to provide shore-based cranes and the supporting pier-side container-handling infrastructure. Consequently, the configuration of general cargo ports must change: large transit sheds, used primarily for storing sugar and bananas, need to be removed to create large open storage areas for container traffic.

Some states have strategically invested heavily in creating modern port infrastructure in an attempt to capitalize on their geographic location, by offering their services

as global transshipment hub ports, and sub-regional hub ports. The rest operate as service ports catering to domestic economic needs.

Caribbean ports have been segregated into three categories (see Table 1): global hub ports, sub-regional hub ports and service ports. Global hub ports are relay ports serviced by global container lines connecting three or more continents. For example, the port of Kingston serves as a global hub port for Zim Integrated Shipping Services and CMA CGM, from which cargos are transshipped to the US eastern seaboard, Gulf ports and the wider Caribbean. Sub-regional hub ports are secondary relay ports, such as Kingston Wharves Limited (KWL), Jamaica and Point Lisas, Trinidad and Tobago, from which cargos are relayed to surrounding Caribbean islands. These ports provide connections to wider geographic markets, such as the Far East and southeastern United States, from which cargos are filtered through the relay or sub-regional hub ports. Service ports are small ports serving specific islands with limited infrastructure and limited connection to larger ports. In the Caribbean, the schooner trade plays a significant role in the maritime network — in St. Vincent and the Grenadines and Dominica, for example.



Table 1: Global Shipment Hub Ports, Sub-regional Hub Ports and Service Ports

Port	Country	Global Hub	Sub-Regional Hub	Service
Port of Spain	Trinidad		*	
Point Lisas	Trinidad		*	
Bridgetown	Barbados			*
Kingston Wharves Limited	Jamaica		*	
Kingston Container Terminal	Jamaica	*		
Caucedo	Dominican Republic	*		
Rio Haina	Dominican Republic			*
Puerto Plata	Dominican Republic			*
La Romana	Dominican Republic			*
Boca Chica	Dominican Republic			*
Freeport	Bahamas	*		
Georgetown	Cayman			*
St. John's	Antigua			*
Castries	St. Lucia			*
Vieux Fort	St. Lucia			*
Georgetown	Guyana			*
Havana	Cuba			*
Willemstad	Curaçao			*
Pointe-à-Pitre	Guadeloupe			*

Source: Compiled by Fritz H. Pinnock and Ibrahim A. Ajagunna.

## Caribbean Ports: Challenges

Following the terrorist attacks on the World Trade Center on September 11, 2001 and the subsequent implementation of the International Ship and Port Facility Security Code, all ports in the Caribbean were plunged into debt in order to meet the stringent requirements, including installation of security perimeter fencing, state-of-the-art access control, security lighting in and around port facilities (major increase in electricity costs), water-side security patrol, restriction of activities in and around port and vessel areas, and the installation of x-ray equipment for cargo and equipment moving in and out of ports. Caribbean ports had no costs recovery, as only a small percentage

of this capital outlay could be recovered from shipping companies and consignees.

Ports and maritime services play a vital role in Caribbean countries since 90 percent of imports and exports are carried by sea (World Bank, 2007). The level of efficiency of these ports has a direct impact on overall cost. Lower levels of port efficiency and higher shipping costs result in higher import costs and reduce export returns, which has had a negative impact on the competitiveness of the region's economies. As mentioned previously, globalization and global logistics and its enabling tools have also had a tremendous impact on maritime transport in the Caribbean. So, how does the Caribbean fit into this picture?

The advent of the container revolution in the 1960s posed the first challenge. At that time, Caribbean ports were characterized by finger piers and large transit sheds. Very little was done to facilitate the new container paradigm, which called for large, open spaces, shore-based cranes, heavy-duty container handling equipment on land and, later, a sophisticated computerized management information system. Many countries treated this new container phenomenon as a passing wave, and continued with the old infrastructure, operational systems and mindset.

Over the years, there has been poor connectivity between the Caribbean and the rest of the world. Trying to bridge this divide has brought about challenges and opportunities for the Caribbean to reinvent itself. One of the major challenges facing the Caribbean shipping industry is the conflicting role of the customs department. In the Group of Seven (G7) countries, for example, customs and excise taxes account for less than four percent of GDP, while in the Caribbean, this figure exceeds 35 percent on average. The role of customs in G7 countries is primarily to facilitate trade, while in the Caribbean it is to collect revenue. This reverse relationship has created an unhealthy trade atmosphere, both for the shipping and logistics industry, with high handling fees and reduced efficiency and productivity vis-à-vis other countries and regions (illustrated in tables 4–11, which outline the productivity performance of various Caribbean ports).

This would suggest that a holistic and united regional approach to the shipping industry should be established in light of the global trends. The total population of Caribbean countries barely amounts to six million, competing with a global population of six billion. It would, therefore, make sense for the Caribbean region to come together to develop

a holistic and sustainable strategic maritime transportation plan to reposition the industry and maximize its value and contribution to regional growth and development. Several Caribbean countries use their limited resources to cater to cruise and cargo shipping companies. During the cruise season (October to March), when many cruise ships are redeployed to the Caribbean, productivity and efficiency figures for cargo operations are usually very low, while operation costs spike drastically (see Tables 6, 7 and 8). This is because the cruise ships are given priority berthing consideration, while cargo ships are forced to load and unload after cruise ships sail, between approximately 4:00 p.m. and 7:00 a.m. Operations during this window attract premium overtime rates and, in turn, drive up the price of goods.

Another challenge facing the Caribbean is the lack of standards for labour practices and operational efficiency factors. For example, most ports in the region are labour intensive and operate on the basis of archaic restrictive labour practices, such as the failure to reconfigure the work week to have more flexible working hours and allow for work to take place at night. This has led to intra-island competition and global pressure now dictating that the Caribbean transform from being ancient, exclusive and private, to becoming just another node on the global logistics chain. It is important to also keep in mind that the Caribbean is not homogenous and its transportation infrastructures vary significantly between countries.

## Structure and Models of Selected Caribbean Ports

The structure, organization and management arrangement of a port are influenced by a number of factors, including historical development (as discussed earlier), the socio-economic structure of a country, port location and the type of cargo handling and equipment. Most Caribbean ports are managed under the public service port model, which will be covered later. This arrangement is often inefficient, due to the lack of internal competition and user or market orientation. This structure also leaves the port vulnerable to government interference due to the dependence on government budgets, as well as to the value of customs to national budgets.

In port infrastructure today, best practice is focused on increased service levels, increased operational efficiency and improved allocation of public funds. Port terminals have become specialized in cargo handling services and have been integrated into global logistics chains, taking

on regional and global attributes and approaches. This has led to the decline in the role of governments in the ports in recent years, but full privatization of ports has not been widely adopted. Many countries still view some form of government intervention as being necessary to manage strategically significant port infrastructure, and inherently underscores the monopolistic characteristics of port services in the Caribbean. Today, governments continue to play an important role in facilitating and managing competitive behaviour in port services, creating a contestable market structure through licences, concessions and other management of port labour. Caribbean ports have historically been at the forefront of labour movements in the region, as the Caribbean trade union movement was born and incubated in ports. Ports are considered a major employer of both skilled and unskilled labour, which is often compounded by political interferences. This meant the Caribbean has been plagued with high unemployment in the face of a rigid and inflexible unionized system that is resistant to change. This has made it difficult for ports to embrace technological advancement and productivity improvements, which would result in labour layoffs, despite the overall potential for long-term economic benefits.

Table 2, Port Management Models, divides ports into either landlord or public service models. The landlord model remains the dominant model for larger- and medium-sized ports. The landlord model is characterized by its mixed public-private orientation. Under this model, the port authority acts as the regulatory body and as the landlord, while port operations (especially cargo handling) are carried out by private companies. Examples of landlord ports are Rotterdam, Holland; Antwerp, Belgium; New York, United States; and since 1997, Singapore. The public service port model is characterized by the port authority offering the complete range of services required for the functioning of the seaport system. The port owns, maintains and operates every available asset and cargo handling is executed by labour employed directly by the port authority.

Table 2: Port Management Models

Port	Model	Management Description	Comments
Kingston Container Terminal, Jamaica	Landlord	The Port Authority of Jamaica (PAJ) is a statutory body, with a semi-autonomous board. It has been appointed by the government to act in the interest of the port by setting port tariffs and negotiating individual tariffs with shipping lines. The PAJ also owns some of the superstructure assets, such as cranes at the transshipment terminals. Concessionaires or contractors operate the assets, cargo handling and other activities in the port. Up to February 2009, APM Terminal Limited and AP Moller-Maersk Group operated the transshipment terminal. This model of structural separation has improved the port's efficiency. Labour concessions and improved terminal management and equipment have enabled improvements in productivity. For example, negotiations in 1998 reduced the average port gang size from 21 to eight people and introduced flexible staffing hours. The exception to this agreement is stevedoring labour, which continues to employ a pool system through the Shipping Association of Jamaica, and the pilotage service run by a private contractor composed of former PAJ staff. The PAJ owns the port tugs, but they are operated by a private company. Finally, private facilities at KWL compete to serve local and regional traffic.	There is a conflict of interest as the PAJ is the regulator of all ports throughout the islands and yet operates in direct competition with KWL for regional container traffic.
Rio Haina, Dominican Republic	Landlord	The port of Rio Haina was established as a landlord port following the enactment of the Port Law in the 1970s, which was aimed at reforming the sector. The Port Authority of the Dominican Republic sets overall policies and tariffs and grants concessions. The governing board is comprised of public and private members who represent business organizations such as the shipping agents association and the National Industrial Association. Competition for traffic volumes intensified when a new privately owned terminal was established at Caucedo.	The port is landlocked in the city, leaving no room for expansion and productivity improvement, losing and continuing to lose customers to Caucedo and other more efficient ports.
Bridgetown, Barbados	Landlord	The Bridgetown port has moved from the public service to the landlord model. The Barbados Port Authority has been replaced by the newly incorporated Barbados Port Inc., and draft legislation sets a framework for port regulation and grants the company certain rights as a warehouseman and harbour authority. Barbados Port Inc. oversees marine operations, owns the port superstructure, and is also involved in cargo operations. There is no competition for local traffic among the ports in the country.	The port is plagued with restrictive practices, in particular labour. Competition between cruise and cargo vessels results in cargo vessels working nights after cruise vessels sail during the winter season. Cargo vessels are charged overtime rates, thereby adding to the overall cost to cargo vessels and, ultimately, these are passed on to consumers.
Port of Spain and Point Lisas, Trinidad and Tobago	Landlord	The Port Authority of Trinidad and Tobago was established in 1961. It has responsibility for operating the main port at Port of Spain and regulating other ports and controlling their existence and the cargo they handle. It is government owned and has a government-appointed board. Of the approximately 50 ports on the wharves in Trinidad and Tobago, the principal international ports are Port of Spain and Point Lisas. Most of the others are private special purpose (for example, bulk) wharves. Point Lisas is 51 percent government owned, but falls outside of the Port Authority control. As a result of its more efficient service, it has become the preferred port for many businesses.	Port of Spain is landlocked and new business is being diverted to Point Lisas.
Castries and Vieux Fort, St. Lucia	Public service port	These two ports are structured according to the public service model, in which the government owns and operates all aspects of the port. In St. Lucia, the ports at Castries and Vieux Fort are administered by the St. Lucia Air and Sea Ports Authority (SLASPA), a government body with a government-appointed board. A subsidiary company, St. Lucia Marine Terminals Limited, has operated Vieux Fort for SLASPA since 1995. There is little private involvement in any service operation at the port. The role of transshipment business has been given to the separately operated Vieux Fort.	
St. Georges, Granada	Public service port	The port is run by a statutory body and has a board that is appointed by the minister of finance. There is no private ownership or operation of services at this port and no competition for traffic from other local ports. Like Castries, the port at St. Georges is run by a statutory body. These ports could be well positioned for transshipment businesses, although this may require some structural reforms to increase levels of efficiency at the ports.	
Georgetown, Guyana		The port consists of 11 independently operated wharves. It is government owned, managed by the Guyana National Shipping Corporation	Ports are adversely affected by tidal movement. Guyana needs stronger port regulatory machinery.

Source: Compiled by Fritz H. Pinnock and Ibrahim Ajaqunna.



Table 3: Strengths and Weaknesses of the Landlord and Public Service Models

	Landlord Model	Public Service Model
<b>Strengths</b>	<ul style="list-style-type: none"> <li>- A single entity executes cargo handling operations and owns and operates cargo handling equipment. The terminal operators are more loyal to the port and more likely to make needed investments as a consequence of their long-term contracts.</li> <li>- Private terminal handling companies are generally better able to cope with market requirements.</li> </ul>	<ul style="list-style-type: none"> <li>- Superstructure development and cargo handling operations are the responsibility of the same organization (unity of command).</li> </ul>
<b>Weaknesses</b>	<ul style="list-style-type: none"> <li>- Risk of overcapacity as a result of pressure from various private operators.</li> <li>- Risk of misjudging the proper timing of capacity additions.</li> </ul>	<ul style="list-style-type: none"> <li>- There is no role or only a limited role for the private sector in cargo handling operations.</li> <li>- There is less problem solving capability and flexibility in case of labour problems, since the port administration is also the major employer of port labour.</li> <li>- There is a lack of internal competition, leading to inefficiency.</li> <li>- Wasteful use of resources and underinvestment as a result of government interference and dependence on government budget.</li> <li>- Operations are not user or market oriented.</li> <li>- Lack of innovation.</li> <li>- No, or limited, access to public funds for basic infrastructure.</li> </ul>

Source: *The International Bank for Reconstruction and Development, The World Bank, 2007.*

## Port Regulatory Framework

Throughout the Caribbean, the port authorities have typically retained a regulatory function. In the Dominican Republic and Jamaica, for example, the port authority sets the port tariffs. In many other countries, the ports enter into contracts with port management companies on negotiated terms. In Trinidad and Tobago, regulations are in place to control various types of cargo handled. Allocating traffic among ports and wharves is a traditional form of regulation and is coming under pressure from ports that need to expand, but also maintain operational flexibility.

In several Caribbean countries, the lines between regulatory functions and competitive operations are often nebulous. In Jamaica, for example, the PAJ, a statutory body charged with regulating all ports, including granting wharfage and storage tariff rates and increases, is also in direct competition with KWL on the operation side. In an interview, executives at KWL alluded to the PAJ using its regulatory powers to achieve competitive advantage. Similar occurrences take place in Trinidad, but in a less obvious manner. Most of the other Caribbean countries have only one port, with the exception of St. Lucia, with Vieux Fort and Castries.

## Transshipment

Transshipment business helps ports and shipping lines generate economies of scales, which can expand a ports' market and lower its costs. The ports of Kingston, Jamaica and Freeport, Bahamas are good examples of the way in which transshipment adds economies of scale beyond that which local business will permit. For countries astride major trade routes, transshipment of foreign cargo can be a major part of their operations. This is, in effect, the business of exporting services that generate income for the country by exploiting and maximizing a natural resource (geographic location) that never becomes depleted. This form of transshipment involves consignments or containers with neither origination nor destination within the region.

Ports in the Caribbean sit at the intersection of the major round-the-world, East-West trade routes linking Asia, America, Europe and the Middle East, and the important North to South routes between North and South America, and South America and Europe. Shipping lines find it economical to line haul to the Caribbean, and transship to vessels serving different destinations. Other transshipment ports competing for global hub port status outside of Kingston Container Terminal in Jamaica, include Caucedo, Dominican Republic, and Freeport, Bahamas. Investment in major transshipment ports is risky in that 90 percent

of the cargo volumes moving in and out of the ports are transshipment. Risk here relates to the fact that the transshipment portion can move overnight to competing ports (such as those in Panama and Columbia), as they are not tied to domestic ports.

## Ranking of Caribbean Port Productivity

Table 4 represents Caribbean ports’ productivity for January to December 2008, per berth moves. These are ports that predominantly use mobile cranes in their load and discharge operations. KWL appears to be the most productive port with a year-to-date average of 17.73 berth moves per hour. This is 63.4 percent ahead of Georgetown, Cayman Islands, which is ranked number two in this port sub-group. In third position is Castries, St. Lucia,

followed by Nassau, Bahamas. In eleventh position was Grand Turks, Turks and Caicos, achieving an average 4.78 berth moves per hour. From the statistics, KWL, Jamaica achieved the highest berth moves per hour over the period, with the exception of March and May 2008. In March 2008, Castries, St. Lucia got the number one spot with 15.05 berth moves per hour. This was followed by Georgetown, Cayman Island with 14.45 berth moves per hour ahead of KWL in the number three position with 14.43 berth moves per hour. In May 2008, Vieux Fort, St. Lucia achieved 19.36 berth moves per hour behind KWL, Jamaica with 25.76 berth moves per hour. This supports the thesis that by virtue of handling larger volumes of cargo and larger ships, sub-regional hub ports such as KWL, Jamaica, have higher productivity levels. Productivity levels, measured in berth moves per hour, are one of the competitive factors that determine whether business stays or moves to other competing sub-regional ports. All the other ports in this category are service ports.

Table 4: Caribbean Productivity by Berth Equipment Type (Berth Moves per Hour) — Mobile Cranes

Port/Country	Average Moves per Month												Year Avg.
	Jan.	Feb.	March	April	May	June	July	August	Sept.	Oct.	Nov.	Dec.	
KWL, Jamaica	22.66	16.79	14.43	17.86	15.76	17.58	17.64	18.88	16.60	18.07	19.56	20.22	17.73
Georgetown, Cayman Islands	11.64	14.27	14.45	13.36	14.24	7.31	8.58	7.47	8.83	13.77	16.80	15.43	11.24
Castries, St. Lucia	10.98	14.38	15.05	13.48	7.67	11.96	8.64	13.44	6.10	13.63	13.17	14.38	11.08
Vieux Fort, St. Lucia	11.13	N/A	N/A	N/A	19.36	N/A	N/A	N/A	8.21	9.95	8.72	7.81	9.84
Nassau, Bahamas	12.83	8.63	7.92	9.29	9.09	7.99	14.97	17.00	7.08	15.20	16.50	13.17	10.93
Port-au-Prince, Haiti	11.24	9.24	7.22	8.77	16.38	8.14	8.12	8.00	10.05	10.79	11.95	12.36	10.07
St. John’s, Antigua	11.34	13.82	11.93	13.88	15.64	5.27	6.90	5.34	5.67	11.68	15.38	13.01	9.13
Montego Bay, Jamaica	7.42	6.45	12.47	9.62	10.51	9.43	8.22	10.59	4.04	5.48	5.70	10.73	8.67
Providenciales, Turks and Caicos	13.34	13.04	11.00	10.84	10.82	4.50	6.57	6.15	5.97	11.94	12.07	12.07	8.51
Grand Turk, Turks and Caicos	5.13	4.36	4.65	4.49	4.82	2.10	N/A	4.48	4.86	7.31	9.18	5.92	4.78
Phillipsburg, St. Maarten	9.67	8.43	8.70	5.84	8.19	4.97	3.22	5.29	3.28	8.05	8.42	6.17	6.12

Source: Adapted from Florida Ship Owners’ Group, 2008.

Table 5 shows productivity for the same time period for ports that depend on gantry cranes. KCT recorded the highest average berth moves per hour (19.80) for the year 2008. This was 59.9 percent ahead of second place Point Lisas, Trinidad's average of 11.86 berth moves per hour. KCT tops the table for every single month, with its highest productivity average recorded in January 2008 with 30.05 berth moves per hour, and its lowest in September 2008, of 16.75 berth moves per hour. Barbados took the fourth spot with an average of 7.72 berth moves per hour. KCT, the only global transshipment port in this category, with the largest inventory of straddle carriers and Super-Post Panamax gantry cranes, is far more efficient than the smaller sub-regional hub ports. As a global transshipment port, it specializes in containerized cargo while other general cargo are directed to other sub-regional hub ports such as KWL, and service ports such as Montego Bay. The larger containerized vessels calling at global hub ports are far more stable and designed for greater efficiency in cargo handling operations, thereby accounting for higher efficiency levels. Although productivity levels displayed by KCT are significantly higher than the other competing ports when compared to global hub ports in the Far East,

Middle East and Europe, they are 50 to 60 percent below their productivity targets. The Caribbean has a long way to go in achieving global productivity standards.

Table 6 categorizes ports that depend on ships crane/RO/RO in their daily operations. It is traditional to categorize these ports as the least productive and least developed among the three categories. However, Georgetown, Guyana achieved a respectable 12.43 average berth moves per hour for 2008. This was ahead of Paramaribo, Suriname, with a credible 11.98 berth moves per hour. Georgetown, Guyana, achieved the highest berth move per hour with the exception of the months of August, October and December 2008. All the ports in this category are service ports. Very little has been done to the physical infrastructure, as parcel sizes of cargo are small. Guyana and Surinam are different from all other ports in that they generate significant export cargos, providing a balance between import and export. This balance allows them to achieve greater operational efficiency as the loaded containers removed can be replaced by loaded containers for export.

Table 5: Caribbean Productivity by Berth Equipment Type (Berth Moves per Hour) — Gantry Cranes

Port/Country	Average Moves per Month												Year Avg.
	Jan.	Feb.	March	April	May	June	July	August	Sept.	Oct.	Nov.	Dec.	
KCT, Jamaica	30.05	N/A	21.37	18.24	24.40	20.54	17.21	19.14	16.75	20.92	20.85	18.89	19.80
Point Lisas, Trinidad	7.77	13.85	15.44	14.47	11.95	11.45	10.60	9.86	10.06	13.26	12.82	17.59	11.86
Port of Spain, Trinidad	14.14	N/A	N/A	N/A	17.76	N/A	N/A	N/A	6.56	8.51	9.53	27.81	10.98
Bridgetown, Barbados	14.46	14.97	13.45	12.85	13.33	7.26	6.51	6.92	1.78	11.72	9.58	13.29	7.72

Source: Adapted from Florida Ship Owners' Group, 2008.

Table 6: Caribbean Productivity by Berth Equipment Type (Berth Moves per Hour) — Ships' Crane/RO/RO

Port/Country	Average Moves per Month												Year Avg.
	Jan.	Feb.	March	April	May	June	July	August	Sept.	Oct.	Nov.	Dec.	
Georgetown, Guyana	N/A	N/A	12.25	14.75	13.73	13.55	13.50	12.97	14.03	11.95	14.26	6.78	12.43
Paramaribo, Suriname	N/A	N/A	11.40	14.18	10.79	10.29	9.75	13.09	13.13	13.09	13.57	11.69	11.98
Roseau, Dominica	5.26	7.96	11.33	12.31	5.16	9.48	12.17	12.07	9.49	9.94	7.20	10.85	8.93
Freeport, Bahamas	8.09	7.75	8.48	8.39	7.82	7.75	7.21	4.29	6.78	8.14	8.46	8.72	7.42
St. Georges, Grenada	6.38	N/A	8.45	8.05	7.27	9.10	7.90	5.52	6.00	6.78	7.15	7.68	7.13
Kingstown, St. Vincent	2.55	7.58	6.71	7.28	5.70	8.06	6.15	6.58	7.64	8.61	8.67	7.00	6.53
Road Town, Tortola	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	6.34	6.34
Basseeterre, St. Kitts	5.08	9.34	8.51	7.92	7.01	8.22	6.62	5.10	3.37	6.07	7.34	8.76	6.26

Source: Adapted from Florida Ship Owners' Group, 2008.

Table 7 speaks to an overall ranking of all 22 ports regardless of stevedoring equipment (gantry crane, mobile cranes and ships crane/RO/RO). The table does not include Bahamas transshipment terminal and Caucedo, Dominican Republic, as these ports are dedicated international transshipment facilities. The productivity figures presented in the tables show that gantry cranes are the most productive, followed by mobile cranes and ships' cranes/RO/RO as the least productive. KCT was the most productive port. Interestingly, KWL, which was

ranked among the top mobile cranes, caught the number two spot overall ahead of Port of Spain and Point Lisas, which are competing regional hub ports. KWL uses state-of-the-art mobile harbour cranes, along with an advanced management information system and tight operation procedures. Furthermore, it operates in a tough private sector environment, having to compete daily with the global container transshipment port KCT, its next door neighbour.

Table 7: Average Moves per Berth Hour (January–December 2008) for the Caribbean

Port/Country	Rank	Average Moves per Berth Hour												Year Avg.
		Jan.	Feb.	March	April	May	June	July	August	Sept.	Oct.	Nov.	Dec.	
KCT, Jamaica	1	30.05		21.37	18.24	24.40	20.54	17.21	19.14	16.75	20.92	20.85	18.89	19.80
KWL, Jamaica	2	22.66	16.79	14.43	17.86	15.76	17.58	17.64	18.88	16.60	18.07	19.56	20.22	17.73
Georgetown, Guyana	3			12.25	14.75	13.73	13.55	13.50	12.97	14.03	11.95	14.26	6.78	12.43
Paramaribo, Suriname	4			11.40	14.18	10.79	10.29	9.75	13.09	13.13	13.09	13.57	11.69	11.98
Point Lisas, Trinidad	5	7.77	13.85	15.44	14.47	11.95	11.45	10.60	9.86	10.06	13.26	12.82	17.59	11.86
Georgetown, Cayman Islands	6	11.64	14.27	14.45	13.36	14.24	7.31	8.58	7.47	8.83	13.77	16.80	15.43	11.24
Castries, St Lucia	7	10.98	14.38	15.05	13.48	7.67	11.96	8.64	13.44	6.10	13.63	13.17	14.38	11.08
Port of Spain, Trinidad	8	14.14				17.76				6.56	8.51	9.53	27.81	10.98
Port-au-Prince, Haiti	9	11.24	9.24	7.22	8.77	16.38	8.14	8.12	8.00	10.05	10.79	11.95	12.36	10.07
Vieux Fort, St. Lucia	10	11.13				19.36				8.21	9.95	8.72	7.81	9.84
St. John's, Antigua	11	11.34	13.82	11.93	13.88	15.64	5.27	6.90	5.34	5.67	11.68	15.38	13.01	9.13
Roseau, Dominica	12	5.26	7.96	11.33	12.31	5.16	9.48	12.17	12.07	9.49	9.94	7.20	10.85	8.93
Montego Bay, Jamaica	13	7.42	6.45	12.47	9.62	10.51	9.43	8.22	10.59	4.04	5.48	5.70	10.73	8.67
Providenciales, Turks and Caicos	14	13.34	13.04	11.00	10.84	10.82	4.50	6.57	6.15	5.97	11.94	12.07	12.07	8.51
Bridgetown, Barbados	15	14.46	14.97	13.45	12.85	13.33	7.26	6.51	6.92	1.78	11.72	9.58	13.29	7.72
Freeport Bahamas	16	8.09	7.75	8.48	8.39	7.82	7.75	7.21	4.29	6.78	8.14	8.46	8.72	7.42
St. Georges, Granada	17	6.38		8.45	8.05	7.27	9.10	7.90	5.52	6.00	6.78	7.15	7.68	7.13
Kingstown, St. Vincent	18	2.55	7.58	6.71	7.28	5.70	8.06	6.15	6.58	7.64	8.61	8.67	7.00	6.53
Road Town, Tortula	19												6.34	6.34
Basseterre, St. Kitts	20	5.08	9.34	8.51	7.92	7.01	8.22	6.62	5.10	3.37	6.07	7.34	8.76	6.26
Phillipsburg, St. Maarten	21	9.67	8.43	8.70	5.84	8.19	4.97	3.22	5.29	3.28	8.05	8.42	6.17	6.12
Grand Turk, Turks and Caicos	22	5.13	4.36	4.65	4.49	4.82	2.10	-	4.48	4.86	7.31	9.18	5.92	4.78

Source: Adapted from Florida Ship Owners' Group, 2008.

Drawing from the data in Table 7, it is clear that factors besides equipment type, including human factors, management of operations and the logistics of terminal and integrated information technology, impact the productivity levels at the various ports in the Caribbean. The top two ports in Table 7 have invested heavily not just in hardware stevedoring equipment, but also in training and development of their work force and in advancing information technology infrastructure in the industry.

In a study done in 1980 on the *Fortune* 500 companies, 70 percent indicated that their greatest asset was their physical assets, such as property and equipment. In a repeat study in 2007, over 60 percent of the companies that had held this view were no longer a part of the *Fortune* 500 list. Seventy-six percent of the respondents in the 2007 study pointed to human capital as their greatest asset. This suggests that the Caribbean is no longer a quiet corner where each country can, in effect, manipulate their local industry while ignoring global forces. Today, the market is controlled by the customer who demands greater value, which in turn calls for more informed and better-trained



personnel. This places pressure on Caribbean ports to move beyond the basic role of receiving, storing and delivering cargoes, to becoming an integrated member of the global supply chain. It is now time for the Caribbean to make plans to train and certify its human resources, placing the same importance on training personnel as acquiring and deploying cutting-edge equipment. Barbados is one country that has accepted this reality, evidenced by its plan to train and certify its stevedoring labour in a partnership agreement with the Caribbean Maritime Institute (CMI) in Jamaica. This makes Barbados the first country in the Caribbean to undertake such an initiative.

Table 8 highlights the average time a vessel has to wait to access Caribbean ports. As a common maritime expression goes, “A ship in dock is a wasted ship.” Ships are expensive assets that make money while sailing — not lying in port. In several instances, this waiting time can

exceed the total load-on and discharge time. As Table 8 shows, Roseau, Dominica, is the most accessible port followed by Freeport, Bahamas and then Vieux Fort, St. Lucia. The Caribbean’s top two ports overall — KCT and KWL — are ranked sixth and tenth respectively. The two lowest-ranked ports are Point Lisas, Trinidad and Paramaribo, Suriname. Georgetown, Guyana, the port ranked third overall in the Caribbean, only placed fourteenth. Interestingly, ports in Georgetown, Guyana and Paramaribo, Suriname are tidal ports, and can only be accessed at high tide with large container vessels. This can add an additional six to 12 hours to the wait time, in order to allow for low and high tide changes. Working with these limitations, these ports utilize every possible productive advantage and with the lack of interference of active trade unions, as in the case of Port of Spain, Point Lisas and Barbados, they are able to turn around vessels in a much shorter time.

Table 8: Average Time Awaiting Berth for Caribbean Ports (January–December 2008)

Port/ Country	Rank	Average Time Await Berth												Year Avg.
		Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	
Roseau, Dominica	1	0:33	3:49	0:21	0:25	0:19	0:18	0:18	0:17	0:18	0:24	0:16	0:16	0:37
Freeport Bahamas	2	1:12	0:33	0:22	0:23	0:27	0:21	0:17	0:27	0:59	1:34	1:08	1:11	0:42
Vieux Fort, St. Lucia	3	0:48	N/A	N/A	N/A	0:51	N/A	N/A	N/A	0:34	0:42	1:03	0:31	0:46
Road Town, Tortola	4	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	1:01	1:01
Castries, St Lucia	5	0:28	1:57	0:36	1:11	0:31	0:47	1:29	0:31	0:34	1:58	2:11	2:00	1:14
KCT, Jamaica	6	1:52	N/A	0:13	0:27	0:25	0:43	0:28	0:25	0:52	3:10	3:26	2:44	1:24
Montego Bay, Jamaica	7	5:04	2:04	0:47	0:53	0:52	0:47	0:55	0:57	0:42	0:40	0:40	0:55	1:24
Basseterre, St. Kitts	8	0:10	2:06	6:43	2:45	0:20	0:21	0:18	0:35	0:33	2:06	0:55	0:33	1:25
St. John’s, Antigua	9	1:54	1:48	3:09	0:56	3:29	0:41	0:44	1:02	1:35	2:01	0:55	0:37	1:35
KWL, Jamaica	10	1:30	1:25	1:25	1:22	3:07	1:12	1:10	2:22	1:13	1:41	1:30	1:17	1:40
Kingstown, St. Vincent	11	4:34	0:35	0:27	0:23	0:56	0:24	0:38	6:54	1:54	1:10	1:02	1:06	1:42
St. Georges, Grenada	12	0:48	N/A	0:33	0:59	0:26	0:32	2:53	3:56	0:59	1:41	2:45	1:27	1:46
Georgetown, Cayman Islands	13	2:54	0:58	3:58	0:42	1:17	1:02	1:55	1:13	2:51	3:41	1:27	7:17	2:25
Georgetown, Guyana	14	N/A	N/A	2:26	3:12	1:48	3:45	1:03	0:47	2:01	2:32	3:14	6:35	2:57
Bridgetown, Barbados	15	23:43	0:58	2:30	1:28	1:33	1:44	0:41	0:49	1:12	0:58	1:57	2:47	3:04
Port of Spain, Trinidad	16	2:18	N/A	N/A	N/A	7:17	N/A	N/A	N/A	12:26	1:15	0:51	0:50	3:10
Phillipsburg, St. Maarten	17	5:39	1:17	4:20	4:25	1:34	2:32	1:18	3:39	5:39	1:47	3:34	1:32	3:11
Port-au-Prince, Haiti	18	1:47	1:16	0:57	4:12	5:45	10:33	1:37	1:55	5:58	2:11	3:03	12:00	3:35
Grand Turk, Turks and Caicos	19	0:11	0:16	0:15	0:10	0:09	0:31	N/A	1:15	0:42	0:24	7:01	21:17	3:45
Providenciales, Turks and Caicos	20	1:43	3:09	6:10	4:07	3:40	9:23	2:47	1:46	1:36	1:51	1:59	3:54	3:47
Point Lisas, Trinidad	21	8:22	2:36	3:11	2:46	1:29	3:54	4:41	15:14	6:38	9:30	4:10	2:18	5:30
Paramaribo, Suriname	22	N/A	N/A	0:52	27:00	2:16	16:20	3:26	6:48	7:19	11:07	12:21	7:51	8:24

Source: Adapted from Florida Ship Owners’ Group, 2008.

## Liner Shipping Connectivity Index: A Global Perspective

The question of who trades what with whom depends not only on the demand and supply of goods, but also on the ability to deliver the goods to the market. Geographical factors such as distance, the degree to which a country is landlocked, as well as transportation costs affect this ability. Another important, yet often neglected, determining factor for trade competitiveness is transport connectivity, defined as access to regular and frequent transport services. Except for bulk commodities, most intercontinental trade is conveyed by liner shipping services. Access to liner shipping services determines competitiveness in addition to the geography of trade. Possible indicators for the supply of liner shipping services include number of available ships serving the region, TEU capacity, number of shipping companies and services they offer, as well as maximum ship size. A distinction also needs to be drawn between direct services and those requiring transshipment. To measure connectivity per country, the United Nations Conference on Trade and Development (UNCTAD) has, since 2004, produced a Liner Shipping Connectivity Index (LSCI), which combines available information about fleet assignment, liner services, and vessel and fleet sizes per country, in order to provide a measure of a country's integration in the global shipping network and, thus, its trade competitiveness.

According to the LSCI, most of the least-connected countries are developing countries, and a majority of them are small island developing states (SIDS). Whereas 75 percent of the top 20 best-connected countries recorded an improved LSCI between 2004 and 2006, only 30 percent of the 20 least-connected countries recorded an improvement during the same period. Hence, the "connectivity gap" between the best- and least-connected countries is increasing. This is a concern for the Caribbean, as its nations are important constituents of the SIDS grouping.

An analysis of recent trends found that the number of ships, the maximum ship size and the total TEU capacity deployed per country have all increased since 2004, while the number of services and companies, as an indicator of competition, have decreased.

International seaborne trade (goods loaded) in 2007, driven by emerging and transition economies, surpassed a record eight billion tons. More than 80 percent of international trade in goods is carried by sea, and an even higher percentage of developing-country trade is carried

in ships. In 2007, world seaborne trade increased by 4.8 percent to surpass eight billion tons for the first time (UNCTAD, 2007).

By the beginning of 2008, the total world merchant fleet had expanded by an impressive 7.2 percent, to reach 1.12 billion deadweight tons, and the average age of the world fleet had dropped marginally, to 11.8 years. Container ships made up the youngest fleet, with an average age of nine years. By May 2008, the world container ship fleet had reached approximately 13.3 million TEUs, of which 11.3 million were on fully cellular container ships. This fleet included 54 container ships of 9,000 TEUs and above.

### LSCI in the Caribbean

Table 9 shows the LSCI for the Caribbean between 2004 and 2010. During the period from 2004 to 2008, the Dominican Republic improved its connectivity level by 60.3 percent, which increased its ranking from 58 in 2004 to 37 in 2008. This was the most significant improvement in the Caribbean, and was due largely to the opening of the Caucedo port, thereby attracting global carriers such as Mediterranean Shipping Company and Hapag-Lloyd, among others. Between 2008 and 2010, however, the Dominican Republic slipped back to the number three position, moving from 37 in 2008 to 49 in 2010. Jamaica, on the other hand, was able to move up to regain the number one position, moving from number 41 in 2008 to number 32 in 2010. Similarly, Bahamas, which was ranked number 49 in 2008, improved by approximately 6.5 percent, moving to the number two spot at number 46 in 2010. The global transshipment hub ports have the highest level of connectivity to the global supply chain, followed by the sub-regional hubs and then the service ports. The three least-connected Caribbean ports in 2010 were Cayman Islands, Antigua and Barbuda, and Dominica, which were ranked at 152, 153 and 155 respectively.

Table 9: LSCI in the Caribbean

2010 Rank	Country	2010		2008		2006		2004		Change
		LSCI	Rank	LSCI	Rank	LSCI	Rank	LSCI	Rank	
32	Jamaica	33.09	32	24.61	41	23.02	37	21.32	33	11.77
46	Bahamas	25.71	46	19.83	49	16.19	51	17.49	42	8.22
49	Dominican Republic	22.25	49	26.49	37	15.19	53	12.45	58	9.80
65	Trinidad and Tobago	15.76	65	17.42	56	11.18	67	13.18	52	2.58
96	Netherland Antilles	7.97	96	10.22	80	7.82	91	8.16	88	-0.19
100	Haiti	7.58	100	4.16	131	2.91	143	4.91	117	2.67
103	Cuba	6.57	103	7.76	95	6.43	99	6.78	96	-0.21
117	Aruba	5.34	117	6.14	105	7.53	92	7.37	90	-2.03
129	Barbados	4.20	129	6.41	102	5.34	107	5.47	108	-1.27
132	Surinam	4.12	132	5.32	114	3.90	131	4.77	120	-0.64
134	Belize	3.95	134	3.36	143	2.62	146	2.19	149	1.76
135	Guyana	3.95	135	5.36	113	4.60	119	4.54	123	-0.59
136	Saint Lucia	3.77	136	5.09	116	3.43	133	3.70	131	0.07
139	St. Vincent and the Grenadines	3.72	139	5.45	110	3.40	134	3.56	133	0.07
140	Grenada	3.71	140	4.74	119	3.37	135	2.30	148	1.41
149	St. Kitts and Nevis	2.84	149	7.91	93	5.59	105	5.49	107	-2.64
152	Cayman Islands	2.51	152	3.21	146	1.79	156	1.90	153	0.61
153	Antigua and Barbuda	2.40	153	4.36	124	2.43	148	2.33	145	0.07
155	Dominica	1.88	155	3.26	144	2.33	150	2.33	146	-0.44

Source: UNCTAD (2011).

The LSCI is calculated using five components:

- deployment of container ships;
- deployment of container carrying capacity in TEUs;
- the number of liner shipping companies;
- the number of services; and
- the maximum ship size, always referring to the ships that are deployed to provide liner shipping services to a country’s port.

### Deployment of Container Ships

Fleet deployment is the number of ships that national and international liner shipping companies assign to liner services from and to a country’s ports. A larger number of ships indicates that a country’s shippers have more opportunities to load their containerized exports, that is, they are better connected to foreign markets.

### Deployment of Container Carrying Capacity (TEU)

This is the number of slots for TEUs in a country. Given the growing average size of container ships, TEU deployment tends to grow faster than vessel deployment.

### Number of Liner Shipping Companies

The downward trend in the number of liner shipping companies continued in 2008 due to mergers and acquisitions as well as an overall trend towards consolidation. The average number of liner shipping companies providing services per country has also declined.

Table 10: Trade Routes, Vessel Capacity and Number of Ships Serving the Caribbean

No.	Trade Routes	No. of Vessels	Total Capacity (TEU)	Average Size of Vessel (TEU)
1	Far East to Europe	330	2,234,943	7,000
2	Far East to US West Coast	358	1,828,366	5,000
3	Caribbean/Central America to South America	121	204,448	1,700
4	Caribbean /Central America to North America West Coast	64	240,217	3,800
5	Caribbean/Central America to North America Gulf	58	110,282	1,900
6	Caribbean /Central America to South America (West Coast)	58	129,764	1,000
7	Caribbean/Central America to South America (East Coast)	56	132,298	2,400
8	Caribbean to Europe	54	84,040	1,600
9	Intra Caribbean to Central America	25	17,212	700
10	Caribbean to Mediterranean	21	30,090	1,500
11	South Africa to Caribbean/Central America	7	19,503	2,700
12	Australia to Caribbean/Central America	6	13,622	2,300
13	Caribbean/Central America to North/South Pacific	6	13,622	2,300

Source: Compiled by Fritz H. Pinnock and Ibrahim A. Ajagunna.

From a global perspective, there are two major trade routes — namely, Far East to Europe and Far East to US West Coast. At the end of 2008, there were just under 700 vessels servicing these markets. While the actual number of vessels may have decreased over the past five years, the average size of the vessels has been rising sharply. Today, the Far East to Europe average vessel size is approximately 7,000 TEU, and the Far East to US West Coast stands at 5,000 TEU. At the other end of the spectrum, the Intra Caribbean vessels average only 700 TEU. This is due, in part, to the fact that the number one industry in the Caribbean, tourism, has little or no physical product to export. Hence, maritime transport is priced on a one-way movement (import of cargo and empty return of containers). This creates an imbalance in trade, which makes it uneconomical to operate vessels far in excess of the average minimum size of 700 TEU, as more than 50 percent of the time, vessels are deployed with empty non-freight paying container repositioning movement. Most of these smaller vessels have older tonnages, with high fuel consumption per TEU and high maintenance costs.

Drawing from Containerisation International statistics, at the end of 2008, a total of 476 ships served the Caribbean, over 90 percent of which were involved in transshipment cargo movement, which is limited to larger ports such as Kingston, Jamaica; Freeport, Bahamas; and Caucedo, Dominican Republic. Over the last decade, there has been a shift in trade away from North America, Canada and northwest Europe towards direct sourcing from the Far East and South America. Table 11 supports the fact that the

larger vessels are engaged in these two trade routes, giving greater economies of scale per container transported. Interestingly, it is often less costly to import a container from China to Kingston, Jamaica, than to move a container from Kingston, Jamaica to Aruba. This point suggests that it is more cost effective to move cargo between a regional hub port and global hub port than between two service ports in different Caribbean regions.

Globally, there are 9,494 container ships with a total carrying capacity of 14,534,657 TEU. There were 1,265 new ships on order at the beginning of January 2009, representing a mere 13 percent increase in actual number of ships. However, the total capacity on order is 5,855,430, representing a 40.3 percent increase in global carrying capacity. Over 95 percent of the new vessels on order are in excess of 4,000 TEUs, which would make them too large to service the Caribbean. This would, therefore, call into question the sustainability of Caribbean maritime transportation, as the smaller fleet capable of serving the region is aging and more difficult to operate on economically viable terms in the face of technological advancements and escalating operating costs, such as fuel, maintenance and labour.

Table 11: Global Ranking of Caribbean Container Ports by TEU (2007–2009)

Country	Ports	2009		2008		2007	
		Rank	TEU	Rank	TEU	Rank	TEU
Trinidad and Tobago	Port of Spain	162	403,000	149	385,000	184	358,541
	Point Lisas	256	164,183	197	175,000	268	156,016
Barbados	Bridgetown	422	21,868	126	57,189	304	99,626
Jamaica	Kingston	62	1,689,670	58	1,915,951	53	2,016,792
Dominican Republic	Caucedo	99	906,279	136	463,172	140	574,441
	Rio Haina	204	277,949	201	167,151	222	248,695
	Puerto Plata	N/A	N/A	281	21,721	393	38,306
	La Romana	N/A	N/A	313	326	495	852
	Boca Chica	455	10,985	280	10,616	432	20,207
	Santa Domingo	414	23,799	N/A	N/A	N/A	N/A
Bahamas	Freeport	76	1,297,000	67	1,580,000	71	1,634,000
Antigua and Barbuda	St. John	394	29,150	270	17,333	400	34,081
St. Lucia	Castries	392	30,186	264	35,915	394	36,117
	Vieux Fort	423	21,756	247	38,190	434	19,465
Cayman Islands	Georgetown	384	33,072	265	35,162	362	49,415
Cuba	Havana	N/A	N/A	N/A	N/A	195	319,857
Curacao	Willemstad	307	97,913	133	52,035	310	97,271
Guadeloupe	Pointe-à-Pitra	273142,692		196	170,729	259	168,839

Source: Containerisation International (2011).

## Toward Regional Sustainability and Efficiency

Ninety percent of Caribbean imports and exports are now part of the region’s expensive shipping network. Freight rates between Miami and the Caribbean are similar to those paid for the much longer distance between Miami and Buenos Aires, Argentina. Port handling charges in the Caribbean vary between US\$200 and US\$400 per container, far more, for example, than the US\$150 per container charged in Argentina.

The Caribbean shipping industry faces significant obstacles. It must overcome the unfavourable economies of scale characteristic of the industry and the inherent disadvantages of operating from and between small and isolated states. The present volume of cargo does not, in the short term, appear to justify the large fixed capital cost needed to secure more efficient port operations. One cargo container handling crane, for example, costs US\$8 million. The costs of administration and support services are also greatly influenced by economies of scale. In addition, smaller island ports are generally served by smaller (or

underutilized) vessels, directly affecting per-unit shipping costs. While this is a difficult “chicken-and-egg” problem, measures can, nevertheless, be taken to improve port cost efficiency and increase cargo flows. Barbados, for example, now faces a significant challenge in the winter tourist season, as cargo ships are forced to wait until after cruise vessels sail in the afternoon to commence their load and discharge operations. With cruise ships leaving port between 5:00 and 6:00 p.m., cargo vessels must endure long delays and high overtime labour costs. A response to this problem was undertaken in Georgetown, Cayman Islands, where the government reorganized port labour to facilitate work over any 40 hours per week, either night or day. Overtime wages start when the first 40 hours are exceeded. This has resulted in a significant decrease in costs to shipping lines. The island also saved millions of US dollars by not having to build a separate cruise ship port that would only be busy for five months of the year during the cruise season. This could be a possible solution for the port of Bridgetown, Barbados, where the government is considering building a new port that will be underutilized, based on seasonal cruise ship use. Instead, Barbados could follow the example of the Cayman Islands, reorganizing and maximizing the use of the existing facility, which would give cruise ships preference to use



the port facility during the day, while cargo ships could work at night, but pay labour regular wage rates.

A close analysis shows that Caribbean ports may not necessarily lack capacity overall, nor is the number of carriers insufficient for present needs. Instead, harmonized regulatory and legal reform is needed to create incentives to improve management and administrative practices, stimulate investment for existing facility modernization and ensure efficient pooling of resources in this area. Industry reforms should emphasize greater competition, regional cooperation and modern efficiency techniques.

Port performance in the Caribbean is hampered by a lack of competition. Given that island ports have full monopoly power over cargo movements to and from the island hinterlands, Caribbean governments have been reluctant to privatize their ports. In most cases, governments retain ownership of port infrastructure and are heavily involved in port operations. Although many Caribbean islands are too small to support multiple ports, it is nevertheless possible to achieve competition within a port. One example is Georgetown, Guyana, where there is now competition among different private and public operators within the port. Although 60 percent of port traffic still passes through one private terminal, competition has reduced handling charges by 25 to 30 percent. It is possible, even in smaller ports, to separate services and spark competition. Reforms are therefore needed to strengthen independent port authority institutions, and separate regulatory and operational functions are needed. As discussed earlier, in Jamaica, the PAJ operates KCT, which is in competition with KWL (a publicly listed company on the Jamaica stock exchange). However, the PAJ has regulatory functions for all ports in Jamaica. This often creates conflicts between KWL and the PAJ as noted earlier.

Efforts to improve cooperation among Caribbean port authorities and shipping companies could provide further benefits. Coordination to facilitate growth in transshipment, for example, where cargo is moved to and from intermediate hub ports on the way to its final destination, could benefit the entire region. Transshipment allows the use of larger and more specialized vessels, and takes advantage of economies of scale at the major hub ports. For small countries, even a low volume of transshipment can make up a high proportion of total port cargo traffic. Transshipment is extremely attractive to ports, because it adds cargo to the local trade, making otherwise uneconomical operations profitable and expensive infrastructure investment more viable. This, in turn, leads to direct benefits for local traders and

consumers as it increases the number of services that call at the port while lowering unit costs.

The Caribbean lies at the crossroads of several major shipping routes that, if managed properly, could greatly increase cargo flows through Caribbean ports. Developing the most efficient network would require regional agreements to share in the infrastructure investment costs so that all ports might benefit from increased traffic flows. A lack of cooperation among carriers also leads to inefficient use of cargo space. Carriers with a backlog of cargo often prefer to keep cargo idle and customers waiting, rather than approach a competitor sailing away with a half-empty ship. In other regions, maritime carriers cooperate with slot sharing agreements and alliances to utilize shipping capacity in a more effective way. A voluntary regional system in which ships and shippers can access information on available capacity could greatly improve the use of cargo space.

It is important to modernize Caribbean maritime labour policies and practices if the Caribbean is to lift its standard of global competitiveness. Some ports still close after 5:00 p.m. in the evenings and on the weekends. Improved maritime training and technical help is needed to ensure local seafarers are trained to meet international certification standards and that Caribbean shipping comply with international maritime safety and environmental laws. Improved data collection in a homogenous format is also needed to expedite cargo processes and provide industry analysts with the means to assess problems and to craft improvements throughout the region. Further harmonization and rationalization of customs procedures could save days, and even weeks, from the time it takes to move cargo to its final destination. There is an urgent need for Caribbean customs to move away from being primarily a collector of revenue to helping cargo facilitation.

Annual Caribbean seaport investment needs roughly US\$300 million — the challenge is where this investment will come from. The overall approach towards improving Caribbean shipping should emphasize legal reforms to encourage market competition and regional cooperation, as well as technical assistance to improve labour and infrastructure efficiency. Caribbean industrial policies have, in the past, focused on the direct benefits of a national maritime sector protected by preferential policies, but now general institutional attention must continue to shift towards even greater indirect benefits of foreign trade enhanced by an efficient and inexpensive transport system. Regional organizations such as the private sector — Caribbean Shipping Association (CSA), Association

of Caribbean States and the Caribbean Community (CARICOM) should provide a much needed regional perspective in the dialogue on shipping problems and be encouraged to deliver the impetus and leadership for inciting reforms (Anneke and Rodriguez, 1999).

## Environmental Management Framework for the Caribbean Cruise Industry

Maritime transportation and cruise shipping is *sui generis* international, as their operation involves port calls in several jurisdictions within a relatively short space of time. The framework for the regulation of the operation of the industry is, therefore, found in multilateral treaties known as international conventions, which are developed and adopted at the International Maritime Organization (IMO) and International Labour Organization. These multilateral treaties contain rights and obligations for flag states and port states alike; however, the provisions cannot be enforced against ships unless these have been incorporated into national legislation. The primary international convention governing the safe and secure operation of ships is the International Convention on the Safety of Life at Sea (SOLAS 74/78). All the states in the Caribbean have ratified the convention and incorporated its provisions in merchant shipping legislation. The International Convention on the Prevention of Pollution from Ships (MARPOL 73/78) regulates the operation of ships, in so far as the prevention of pollution of the marine environment is concerned. MARPOL 73/78 contains regulations governing the prevention of pollution by the following substances, which are classified according to Annexes addressing Oil (Annex 1), Noxious Liquid Substances Carried in Bulk, (Annex 11), Harmful Substances Carried in Packaged Form (Annex 111), Sewage (Annex 1V), Garbage (Annex V), and Air Pollution (Annex VI).

All the major flag states and the majority of countries have ratified or acceded to all the relevant annexes to the MARPOL Convention. Some states, however, such as Bahamas (one of the three largest flag states worldwide), have not ratified Annex IV on the regulation of sewage. Many countries, including Jamaica, have not passed legislation incorporating MARPOL 73/78, nor have they updated their legislation to address the current risks associated with ships. MARPOL 73/78 also reflects the minimum accepted standards, and it is known that the enforcement of its provisions is difficult. In 1993, the Wider Caribbean Region was declared a Special Area for Annex V (Garbage) and this status allows for the

implementation of “no discharge” or very strict discharge standards. Sixteen years since the designation, the region has not been able to implement the Special Area status, due to the absence of reception facilities to receive the garbage. Some of the Eastern Caribbean sub-region states and Barbados have these facilities. The majority of other states have not established the facilities for a number of reasons, including cost and indecision relating to the mechanism for recovering the costs, which may make a port uncompetitive. Both SOLAS 74/78 and MARPOL 73/78 contain provisions allowing port states to exercise limited jurisdiction over ships, including the power to detain the ships where the certificates produced to the Port State Control officers are not consistent with the condition of the ship. There appears to be no record of any detention of a cruise ship, for example, in a member state of the Memorandum of Understanding on Port State Control in the Caribbean region, which could be due to the generally high standard to which cruise ships are maintained or the unwritten policy that cruise ships will not be inspected.

The International Convention on Civil Liability for Bunker Oil Pollution Damage, 2001, provides a legal regime for establishing liability for pollution damage, including the cost of reinstating the environment and preventative measures taken in response to the pollution incident. Cruise ships have discharged significant amounts of bunker oil, and the convention provides for strict liability, direct access to the ship’s insurers and compulsory insurance, all of which will assist claimants in recovering damages from a ship operator that has been found liable. Only four countries are, however, state parties to the Convention as indicated in Table 12.

Table 12: Status of Convention, December 2008

Country	MARPOL Annex 1 and 11	MARPOL Annex 1V	MARPOL Annex V	Bunkers 2001	SOLAS 74/78
Antigua and Barbuda	X	X	X	X	X
Bahamas	X	None	X	X	X
Barbados	X	X	X	X	X
Belize	X	X	X	X	
Costa Rica	None	None	None	None	None
Cuba	X	None	X	None	X
Dominica	X	None	X		X
Dominican Republic	X	X	X	X	X
St. Vincent and Grenadines	X	X	X	None	X
Suriname	X	X	X	None	None
Trinidad and Tobago	X	X	X		X
UK (Cayman Islands and Anguilla)	X	X	X	X	X
Grenada	None	None	None	None	X
Guyana	X	X	X	X	X
Haiti	None	None	None	None	X
Jamaica	X	X	X	X	X
Mexico	X	X	X	X	X
St. Kitts and Nevis	X	X	X	None	X
St. Lucia	X	X	X	None	X

Source: Pinnock (2012).

## Policy Recommendations

To enable the Caribbean region to achieve sustainability and efficiency for its maritime transportation industry in the twenty-first century, the following nine recommendations are put forward.

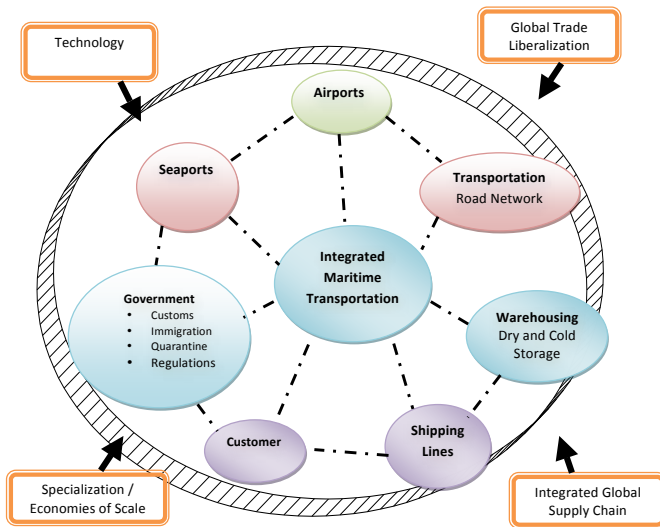
### Integrated Approach (A Framework for Development)

The diverse and pervasive nature of the maritime transportation industry highlights the importance of an integrated assessment to help create better links between the disparate stakeholders (for example, see Clayton et al., 2004). Integrated assessment is particularly important when making large strategic decisions that will effectively determine a future development pathway, which includes public policy decisions that affect the national interest or corporate strategic choices that could lead to a comprehensive repositioning and restructuring of firms (Clayton et al., 2004). According to Clayton, economically vital and diverse sectors of any economy are particularly vulnerable to policy deficiencies. This is due to several reasons. One is that the

maritime transportation industry is extremely pervasive. It affects and is affected by many other sectors, ranging from construction and engineering to a wide range of services, thereby involving, or having implications for, the livelihood of many people at all levels of society. The converse is also true; the economic potential of maritime transportation can be curtailed by a major policy failure in another unrelated area. Another reason is that maritime transportation imposes a range of diverse burdens and impacts on the environment, infrastructure, culture and social relationships. The role of integrated assessment in this regard is, thus, to identify linkages and interdependencies, which makes the costs, benefits and consequences of a course of action more explicit.

The Caribbean remains isolated and disconnected from the global shipping and logistics supply chain. In order to achieve efficiency and productivity, it needs to benefit from the synergies of integration as outlined in Figure 1. Globalization rests on the following four primary pillars: technology; global trade liberalization; specialization and economies of scale; and an integrated global supply chain. The challenge for the Caribbean is how to realign its fragmented air and maritime transportation networks, shown in Figure 1, to the four pillars of globalization.

Figure 1: Obstacles for the Caribbean MaritimeTransport Sector



### A Regional Approach to Port Security and Safety

A regional approach to implementing and monitoring safety and security regulations would benefit all Caribbean countries as these microstates share common problems of monitoring their water space. Most of the islands are classified as micro states and it is difficult for each individual island to monitor its water space, which is, on average, 15 times larger than its land mass. A holistic approach would allow each country to pool its limited resources, yielding greater benefits and affording a stronger voice based on their strategic location — being the third border to the economies of North, South and Central America.

### Align Labour Market Regulation to Global Standards

Regulation of the labour market speaks to the standardization of certification, such as mandatory skills certification by IMO. This would allow maritime shipping and transportation the potential to develop global collective bargaining for the protection of workers and establish industry minimum standards. In addition, regulation to global standards would make seafaring jobs more attractive to Caribbean nationals.

### Harmonization of Legislation of the Maritime Transport Industry

The Caribbean Sea is a homogenous area shared by all Caribbean states. Collectively, the Caribbean islands need to harmonize legislation of the maritime transport industry to achieve efficiencies and sustainability. Since 2000, the IMO has developed model legislation for the English-speaking Caribbean to give effect to IMO instruments, which is being used by most of these countries. The model includes the following:

- Ratification and accession to all of the major international treaties governing safety, security and pollution prevention by all states as discussed above.
- Ensure legislation that is promulgated is harmonized, with the assistance of the office of the IMO Regional Maritime Adviser, to prevent cruise ships, in particular, from playing one destination against the other due to the variation in island laws. As part of a World Bank project for waste management systems in the Eastern Caribbean, legislation was developed to enforce waste management both ashore and by ships, and agreement was reached among the countries to recover costs through a small levy on cruise ship passengers. This levy was, however, never implemented, as cruise ships objected to it, thereby defeating the implementation process as no single island could successfully apply such a levy without sanction by the cruise lines.
- Establish a regional policy on the management of ship waste and establish adequate facilities to collect and manage such waste. In the early 1990s, the IMO, through the World Bank, initiated a project to address the issue facing the wider Caribbean initiative on Ship Generated Waste. This project, however, failed due to lack of support from the Caribbean countries the project was designed to benefit.
- Matters relating to the regulation of shipping should be included in the agenda at CARICOM meetings and implement the Regional Transport policy in so far as shipping lines are concerned.
- Implement, on a regional basis, the training of enforcement agencies, prosecutors and the judiciary on matters relating to shipping lines — for example, customs, immigration and quarantine departments, as standards vary significantly across the region.
- Complete a gap analysis on the equipment and other requirements necessary for testing and sampling the level of pollution and waste



- Determine whether the costs for the acquisition and operation of equipment and facilities for waste management can be shared regionally.

### Consider the Public Benefit When Investing Public Funds in Maritime Infrastructure Projects

Caribbean states need to invest public funds in accordance with public benefit. One of the key issues relating to overall cost-benefit and value creation for a society is the opportunity cost of public funding. All Caribbean island governments have the right and obligation to ensure that scarce public funding is dedicated to activities that provide the greatest public benefit. Decisions on potential investments to support maritime transportation must be compared with:

- realistic estimates of the benefits they will generate;
- other potential investments within the sector; and
- other investments outside the sector that could achieve similar development outcomes.

Caribbean governments should evaluate the opportunity costs of investing limited capital resources and the use of prime real estate space to construct cruise ship port terminals that do not match the island's image, culture and carrying capacity. Economic returns often do not justify the investment outlay, and capital could be better utilized in supporting community-based activities with less demand on the delicate infrastructure.

### Undertake Collective Economic, Social and Environmental Impact Studies

The Caribbean islands collectively should conduct their own economic, social and environmental impact studies to guide investments in ports development and infrastructure through integrated policy. This policy could draw on the experience of Bermuda and Alaska, whereby local residents played a major role in the development of cruise tourism policy. For example, in Bermuda, there was buy-in from the public as their participation in the process played a major role in the success of the policy implementation. As with safety and security, regional cooperation in the area of benchmarking and procurement would be beneficial to all ports in the region.

### Implementing the Landlord Model

The landlord model appears to have benefited those ports that have adopted it — for example, Kingston, Jamaica, which has operated successfully employing this model. Trinidad and Tobago has also moved to this model in an

attempt to improve port efficiency. Those ports that have not yet adopted this model may benefit from doing so. Efforts to increase competition within and among ports have been shown to improve overall port performance, which in turn, attracts increased traffic.

### Transshipment Is Not the Answer for All Ports

Goods should not be sought for their own sake. Although transshipment can transform the business and size of a port, it is not necessarily the answer for every port and has risks; therefore, governments should exercise caution before moving to the transshipment model. All Caribbean ports have the potential to develop a transshipment business. However, while there is room for improving efficiency and growing ports, there are risks in the transshipment model. Specifically, global and regional competition is strong, and trade owes no allegiance to a particular country. Ports wishing to enter or expand transshipment opportunities should seek to do so with private entities that are specialists in the area, including those that are linked to major international shipping lines, in order to share and manage risks.

### Regional Organizations Should Provide Services to Member Governments

Sub-regional organizations and institutions (for example, CSA, CARICOM and CMI) should cooperate with member governments by providing services such as access to databases and research, and by sponsoring events and maritime and logistics courses.

## Conclusion

The sustainability of the Caribbean maritime transportation sector draws heavily on the efficiency of ports infrastructure, which forms the backbone of the industry. The port sector has been impacted radically by global changes over the past two centuries. The Caribbean has been slow in adopting and conforming to major transformations in the industry, especially technology. During the nineteenth century and the first half of the twentieth century, ports tended to be instruments of state or colonial powers and port access and egress were regarded as a means to control markets. Competition between ports was minimal, and port-related costs were relatively insignificant in comparison to the high costs of ocean transport and inland transport. As a result, there was little incentive to improve port efficiency. To achieve sustainability and efficiency, Caribbean maritime infrastructure needs to undergo a major physical, legislative and labour practices overhaul.



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## Appendix

### International Ports in the Caribbean

Abaco, Bahamas	Philipsburg, St. Maarten
Port of the Valley, Anguilla	Plymouth, Montserrat
Basseterre, St. Kitts	Point Lisas, Trinidad
Boca Chica, Dominican Republic	Ponte-à-Pitre, Guadeloupe
Bridgetown, Barbados	Ponce, Puerto Rico
Castries, St. Lucia	Port of Spain, Trinidad
Caucedo, Dominican Republic	Port-au-Prince, Haiti
Charlotte Amalie, St. Thomas, US Virgin Islands	Providenciales, Turks and Caicos
Christiansted, Saint Croix, US Virgin Islands	Puerto Plata, Dominican Republic
Eleuthera, Bahamas	Rio Haina, Dominican Republic
Fort-de-France, Martinique	Road Harbour, British Virgin Islands
Freeport, Bahamas	Roseau, Dominica
Georgetown, Cayman Islands	San Adres, Columbia
Grand Turk, Turks and Caicos	San Juan, Puerto Rico
Havana, Cuba	Santiago de Cuba, Cuba
Kingston, Jamaica	Santo Domingo, Dominican Republic
Kingstown, Grenada	St. Barthelemy, Guadeloupe
Manzanillo, Panama	St. Eustatius, Dutch Antilles
Marsh Harbour, Bahamas	St. George's, Grenada
Moa, Cuba	St. John's, Antigua
Montego Bay, Jamaica	Port Purcell, Tortola, British Virgin Islands
Nassau, Bahamas	Vieux Fort, St. Lucia
Oranjestad, Aruba	Willemstad, Curacao

Source: Compiled by Fritz H. Pinnock and Ibrahim A. Ajagunna from *Containerisation International* (2011).

### Shipping Lines Serving the Caribbean

ANL Container Line Pty Ltd

APL Ltd.

BBC Chartering & Logistic GmbH & Co KG

Caja Logistics

China Shipping Container Lines Co. Ltd.

Compagnie Maritime Marfret

Compania Chilena de Navegacion Interoceanica S.A.

Crowley Liner Services

Europe Caribbean Line

Frontier Liner Services

Grand Alliance

Hugo Stinnes Linien GmbH

Kawasaki Kisen Kaisha, Ltd.

Maersk Line

Mediterranean Shipping Co S.A.

Mitsui OSK Lines Ltd

Horizon Lines, Inc.

Nordana

Orient Overseas Container Line Ltd

Sea Star Line LLC

SeaFreight Line Ltd

Thompson Line

Tropical Shipping Co Ltd

*Source: Compiled by Fritz H. Pinnock and Ibrahim A. Ajagunna from Containerisation International (2011).*

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