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## A critical evaluation of how free trade zones and maritime activities impact on port development: a case study of the port of Kingston

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**WORLD MARITIME UNIVERSITY**

Malmo, Sweden

**A CRITICAL EVALUATION OF HOW FREE TRADE ZONES AND  
MARITIME ACTIVITIES IMPACT ON PORT DEVELOPMENT A CASE  
STUDY OF THE PORT OF KINGSTON**

By

**NICOLAS SPENCE**

**Jamaica**

A dissertation submitted to the World Maritime University in partial  
fulfilment of the requirements for the award of the degree of

**MASTER OF SCIENCE**

**In**

**MARITIME AFFAIRS**

(SHIPPING MANAGEMENT AND LOGISTICS)

2017

## **DISSERTATION DECLARATION FORM**

I certify that all the material in this dissertation that is not my own work has been identified, and that no material is included for which a degree has previously been conferred on me. The contents of this dissertation reflect my own personal views, and are not necessarily endorsed by the University.

(Signature): .....

(Date): .....09/18/2017.....

**Supervised by: Fabio Ballini**

**World Maritime University**

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## **ABSTRACT**

Title of Dissertation: **A CRITICAL EVALUATION OF HOW FREE TRADE ZONES AND MARITIME ACTIVITIES IMPACT ON PORT DEVELOPMENT WITH A CASE STUDY OF THE PORT OF KINGSTON.**

Degree: **MSc**

This dissertation is a study to reveal the degree of impact which free trade zone operations and maritime activities impact on the development of the Port of Kingston. Furthermore, provides a clarification as to the growth of the global economy, causes a significant demand for port capacity. Therefore, additional investment in port infrastructure is required for ports in order for them to maintain their viability and success. Importantly based on the results of the logistics performance index and the doing business report has proven Jamaica competitive in maritime industry in the Latin American and Caribbean region due to its geostrategic location and the efficient services provided at the port. Moreover, the policies implemented by the government specifically the special economic zone act 2016 created an enabling business environment which benefits investors, shipping lines, maritime stakeholders and free trade zone operators.

Additionally, with the use of various statistical tools this research was able to prove that a country is able to develop its economy through the implementation of free trade zones around its ports of entry. Hence the zones attract foreign direct investment and increase employment numbers. Moreover, the combination of an efficient transshipment port fully integrated with the free trade zones is the ideal combination for economic development. Consequently, the Eviews regression model revealed that vessel arrival numbers, free zone values and cargo volumes definitely contribute to port development. Summarily the research presents three scenarios in which the administration of the port of kingston should evaluate in order to main continued growth of the port.

**KEYWORDS:** Free Trade Zone, Port Development, Cargo Volumes, Vessel

## Table of Contents

DISSERTATION DECLARATION FORM.....	ii
Acknowledgment .....	iii
ABSTRACT .....	iv
Table of Contents .....	v
Table of figures .....	<b>Error! Bookmark not defined.</b>
List of Tables.....	vi
List of Abbreviations.....	vii
Chapter 1: Introduction .....	1
1.1 Background to the study.....	1
1.2 Motivation .....	3
1.3 Problem Statement.....	4
1.4 Objectives .....	4
1.5 Research Questions .....	5
1.6 Hypotheses .....	5
1.7 Expected Results .....	5
1.8 Key Assumptions.....	5
1.9 Limitations.....	6
1.10 Outline of Dissertation .....	6
Chapter 2: Literature Review .....	8
2.1 Drivers of Port Development.....	12
2.2 Methodology.....	17
Chapter 3: Free Trade Zone Development .....	20
3.1 The History of Free Trade Zones. ....	20
3.2 International applications of free trade zones.....	21
3.3 Integration of Free Trade Zones in the Caribbean.....	22
3.4 National application of Free Trade Zones to Jamaica .....	23
Chapter 4: The Connectivity of the Port of Kingston.....	24
4.1 The Bahamas .....	29

4.2 Columbia .....	29
4.3 Cuba .....	30
4.4 Dominican Republic.....	31
4.5 Panama .....	32
4.6 Trinidad & Tobago.....	33
4.7 Logistics Connectivity.....	34
Chapter 5: Free Trade Zone Analysis.....	39
5.1 Hypotheses .....	43
5.2 Regression Analysis .....	44
5.3 Correlation Analysis.....	46
5.4 Scatter Plot analysis.....	46
Chapter 6: Conclusion.....	50
6.1 Recommendations .....	52
6.2 List of References.....	54

**List of Tables**

Table 1: Regional Port Characteristics.....	28
Table 2: Comparative Analysis of Major Caribbean Ports .....	33
Table 3: Regression Analysis .....	45
Table 4: Pearson Correlation Coefficient Table.....	46
Table 5: Sensitivity Analysis.....	48

## **List of Abbreviations**

CARICOM	Caribbean Community
DPW	Dubai Port World
ECLAC	Economic Commission for Latin America and the Caribbean
EU	European Union
FDI	Foreign Direct Investment
FTZ	Free Trade Zone
ICT	Information Communication Technology
IDB	International Development Bank
IIC	Inter-American Investment Bank
KCT	Kingston Container Terminal
LPI	Logistics Performance Index
MICAF	Ministry of Industry Commerce Agriculture and Fisheries
MTO	Mobile Terminal Operator
NAFTA	North Atlantic Free Trade Agreement
PAJ	Port Authority of Jamaica
SEZ	Special Economic Zone
TEU	Twenty-foot EQUIVALENT
UNCTAD	United Nations Conference on Trade and Development
UNDP	United Nations Development Program
US	United States
VAT	Value Added Tax
WTO	World Trade Organization



## **Chapter 1: Introduction**

A critical evaluation of how Free Trade Zones and Maritime activities impact on port development a case study of the Port of Kingston.

### **1.1 Background to the study**

The Inter-American Investment Corporation (IIC), acting on behalf of the Inter-American Development Bank (IDB) Group, had signed a US\$265 million financing package with Kingston Freeport Terminal Limited in June 2014. The project was to optimize and expand the terminal capacity of the Port of Kingston, so as to maintain the port's ability to handle larger ships which will pass through the expanded Panama Canal. This new development had resulted in ports along the US East Coast and within the Caribbean region commencing expansion and modernization plans in anticipation of increased amounts of large ships, which would traverse the Panama Canal. The upgraded terminal will manage increased vessel volumes, expanding capacity from 2.8 to 3.2 million Twenty-Foot Equivalent Units (TEUs) per year within the next six years. The project will contribute to strengthen Jamaica's relevance in global trade and foster private sector activity and foreign direct investment (FDI) (IDB Annual Report. 2016).

Furthermore, the Port Authority of Jamaica (PAJ) started expansions of the Kingston Container Terminal (KCT) in response to expansion of the Panama Canal, in order to make the port to become a more productive multi-modal logistics and distribution hub. The PAJ had planned to increase the logistics services conducted at the port by creating an environment that facilitates value-added services light manufacturing and warehousing services. The goal is for the Port of Kingston to offer competitive logistics and distribution facilities which include the ready-made services for the breakdown and repackaging of cargo, light manufacturing, assembly of goods, and marketing for a wide range of goods (World Port Source,2016).Moreover, CMA-CGM has now gained full control of the Kingston Container Terminal. The shipping line aims to transform the previously underperforming terminal into a regional powerhouse, by increasing transshipment volumes and improving vessel calls. Jamaica's strategic geographic location along major shipping lanes combined with its connectivity to global markets and proximity to North America presents great trade possibilities. This is further complemented by the close proximity of Jamaica to the Panama Canal which presents an ideal location for value-added cluster development (Miller, 2016).

Maritime transport significantly contributes to the well-being of nations through the impact of economic and social factors which sustain the world trade system. Furthermore, numerous ports now aim to become regional hub ports the whereby, achieving a higher market share which encourages competition (Lee, Cullinane. 2016). Logistics play a vital role in the development any country's economy, therefore companies spend considerable amounts of money to procure supplies and conduct related distribution services on a routine basis. This can be considered as logistics costs which are a recurring expense for business. This business cost occurs throughout the lifespan of a business, which in turn contributes significantly value to the economy. Logistics also enables the movement and flow of goods, which further leads to the facilitation of the sale of goods and services which form the basis for economic transactions (Stock, Lambert, Grant & Ellram, 2006).

Moreover, the process of economic growth for an undeveloped country is closely linked to the improvement of internal accessibility through port infrastructure. Policymakers are encouraged to provide employment opportunities in the maritime sector being that it ensures fast, reliable and cost-effective shipping services to the countries traders (Gould, Taff, et al, 1963). Logistics performance remains a common criterion for businesses which aim to fully globalize their operations. Thus firms utilize global strategies whereby their products which are destined for international markets are produced where cost-effective components and labors can be found. This business strategy is further supported by political arrangements with the aim to support trade (Ballou,1999).

In addition, the modern global business environment enables international companies to source and manufacture products offshore with final destinations in other countries. This has resulted in global operating companies dominating global markets by capitalizing on competitive advantages to optimize profitability by means of production offshore. This logistics strategy is reliant on global supply chains which are firmly supported by the maritime industry (Christopher, 2005). Global production and distribution networks play an integral role in the success for global manufacturers, this occurs when large manufacturing firm's open factories in markets which it serves, and the capabilities of these factories are dependent on well-established logistics distributing systems (Meidell, Chopra, 2007).

Nevertheless, world trade growth occurs innately as a result of growing industrial activity and other factors which normally form part of a nation's economic development. Therefore, economic growth can be stimulated and controlled by national and international policy structure. (Alicke, 2007). International companies conduct offshore sourcing of materials through effective logistics management while taking into consideration geographic locations. The production of international companies can be done anywhere globally and logistics enable the viability of these activities, with the result being the growth of world trade.

Importantly the success of a global business is supported by ocean or air container shipping. This provides effective country-to-country connectivity, which fits into the interests of global business who seek to gain competitive advantage. (Coyle, Bardi, Langley, 2003). The growth of global supply chains is closely linked to global trade, this is the result of the expansion of consumption and production in new locations globally. Logistics hubs facilitate the manufacturing and distribution of goods. Furthermore, global logistics hubs process goods by facilitating exchange between various modes of transport which include; sea, air, rail, road, and waterway. Logistics hubs are strategically located around the world. They provide businesses with a platform for optimized distribution process for goods from suppliers to end users. Logistics hubs allow distribution flexibility to businesses by enabling them to readily adjust to new paradigm shifts in the existing market in a timely manner, as well as providing multiple channels for distribution to newly emerging markets through a reduced management and cost-saving delivery process (Chin, Yo, 2016).

## **1.2 Motivation**

The development of integrated trade dynamics such as free trade zones being connected to a ports can significantly boost port productivity as well as increase and generate cargo. The effect of this can result in a developing country such as Jamaica improving its maritime capabilities. This research will be geared towards reviewing the driving factors which by their occurrence foster the development of the Port of Kingston. Thus the synchronization of port and free trade zone operations are only possible through appropriate government policy in partnership with the private sector. The expected outcome is to attract large carriers to utilize the port based on the gains they would achieve, which include more cargo being generated at the terminal which will reduce trade imbalance and with the availability of more cargo for return voyages from the port therefore significantly reducing backhaul costs.

Therefore the economic interests of the shipping lines would be secured meanwhile the port would gain from the increased vessel traffic. The multiplier effect of the increased vessel traffic will be seen where the port authority will have increased revenues through the various tariffs which include; port and docking charges. This type of maritime arrangement can further enhance the ambitions of the Port of Kingston to transition into a global logistics hub and outperform competing ports. Additionally, this research will also reveal the level of influence which free trade zones and maritime activities influence port development.

### **1.3 Problem Statement**

Jamaica's shipping industry has experienced prolonged stagnation in growth. Therefore, shipping operators, manufactures along with commercial and private importers and exports have been exposed to delays in receiving their cargo. Frequently these maritime stakeholders have been subjected to unfavorable storage and port charges high administrative fees and lack of cargo security as well as procedural hurdles for the clearing of cargo. These issues are combined with outdated are insufficient port infrastructure. Furthermore, these challenges have resulted in major operating problems for the carriers which call to the Port of Kingston, causing them to divert their operations to other shipping friendly ports. These problems have also caused manufacturers to move their operations from Jamaica to locations which are conducive to commercial and private cargo movements. Therefore, in order to alleviate the loss of manufacturers and facilitate large ocean carriers using the Port of Kingston significant development is required. Moreover, the development should be led by the integration of Free Trade Zones and the innovation related maritime activities.

### **1.4 Objectives**

The intention of the research is to discuss and outline the factors which influence port development and outline the extent to which the implantation of Free Trade Zone operations and maritime activities complement port development thus the objectives are:

- Identify how the Port of Kingston fit into the global supply chain.
- Evaluate regional competition to Jamaica's port development.
- Outline the government of Jamaica has for FTZ expansion.
- Reveal the factors which makes a FTZ influence port expansion.

## **1.5 Research Questions**

The research is tasked to provide a critical response to the following questions:

- What are the push and pull factors which drive port expansion?
- How the cargo volumes moving through the FTZ stimulates port expansion?
- Who are Jamaica's main competitors in FTZ development?
- What are the challenges associated with port development in Jamaica?
- How can Jamaica improve its participation in the global supply chain?

## **1.6 Hypotheses**

If Jamaica can improve and develop existing Free Trade Zone and maritime activities this will result in significant increase in port development. This development should be capitalized to achieve the country's main port becoming a global logistics hub.

## **1.7 Expected Results**

The results of the findings of this research are expected to reveal the factors which are needed to enable Free Trade Zone to complement port development. The research is also expected to outline a practical approach to increase cargo volumes into Jamaica's ports. Additionally, results from the research are expected to clearly articulate the economic relationship between trade and port development. The trade dynamics for the Caribbean and America's regions should be identified.

Expected results will further reveal the main logistics principles which need to be implemented by Jamaica to successfully increase its cargo volumes and associated logistics services. The finding will also show how Jamaica can improve its vessel calls by increased operations through free trade zone operation. Finally, the research will determine if port expansion is either positively or negatively influenced by free trade zone operations and maritime activities.

## **1.8 Key Assumptions**

This research is based on the government of Jamaica's national development strategy which is to improve the country's logistics and maritime capabilities, so as to effectively transition into the global supply chain through significant port development.

Furthermore, this research is also reliant on the major investments in Free Trade Zone's currently being done in the Port of Kingston by private sector groups within the maritime sector of Jamaica. This research is being conducted on the premise that major shipping lines have decided to make Jamaica a logistics hub due to the attraction of value-added services cluster development and increased cargo output to be derived from the Free Trade Zones in the country.

## **1.9 Limitations**

This research is expected to encounter limitations in its execution, the possible constraints are likely to occur in the following areas.

- Restricted access to information from government agencies.
- Restricted access to information from private stakeholders who operate in the local maritime sector.
- Insufficient time to capture all related information of trade patterns and cargo flow dynamics.

## **1.10 Outline of Dissertation**

This dissertation has been structured in the following chapters to guide the reader from concept to implementation.

**Chapter 1:** This chapter outlines the background information of the Port of Kingston and the drive by the government of Jamaica to look at the development of a logistics hub, the chapter also contains the motivation of the research, the problem statement, the objectives, the research questions, hypothesis, expected results, key assumptions and limitations.

**Chapter 2:** Provides a concise literature review of related publications on the development of free trade zones and the various factors which affect maritime growth and development. Additionally, the chapter includes the methodology of the research which explains how the research will be conducted and what type of statistical applications which have been utilized.

**Chapter 3:** This chapter reveals the history behind the development of Free Trade Zones and explains the applicability of these trade developments instruments to shipping and modern business practices.

**Chapter 4:** The connectivity of the Port of Kingston is analyzed and the logistical competitiveness of Jamaica is reviewed. Furthermore, a comparison of competing ports in the Caribbean is conducted including an assessment of their free trade operations.

**Chapter 5:** An in-depth analysis is conducted on the case study of Port of Kingston to reveal the analytical applications of statistical methods used to determine the relationship of specific variables within the Port of Kingston, while seeking to explain the relationship which they have to the development of the Port of Kingston.

**Chapter 6:** The final chapter provides a practical conclusion which presents the outcome of the research and clarifies the meanings attributed to the findings. After which an applicable series of recommendations are outlined to provide the reader with best fit solutions for the challenges affecting the Port of Kingston.

## **Chapter 2: Literature Review**

Free Trade Zones are areas where goods which are imported or landed, handled, processed assembled, manufactured or reconfigured and re-exported with companies deriving various benefits. These benefits include tax exemptions and simplified administrative procedures and duty-free imports of raw materials parts and equipment. Furthermore, FTZ's are located around major seaports international airports and national borders and locations which provide a geographic advantage for trade. The relaxed regulations, limited taxes and reduced oversight in FTZ's provide considerable opportunities for business to play a critical role in global trade by driving economic growth and facilitating increasing international trade and investments. FTZ's are aimed at stimulating export and enable production and commerce to attract foreign direct investment and foster technological and economic development (Kozakiewicz, 2015). Furthermore, the Kish Island in the Persian Gulf of the coast of Iran has developed a FTZ. The administrators of the FTZ have been able to create a balance between the operation of economic activities and utilization of the population and the preservation of the environment. The sustainability in management ensures proper spatial planning and a harmonization of employment while preserving the environment (Pak, Majd,2011).

Free Trade Zone facilitates trade by enabling distribution and production of cargo which is destined for distant markets. FTZ are designed to encourage investment, international trade as well as to moderate and manage land and factory space. This is done in order to promote export and generate foreign currency earnings which will create employment and facilitate the transfer of technology (Alicke, 2007). Ports play an integral role in connecting supply chains by functioning as logistics centers which support trade through activities such as inbound and outbound logistics, marketing and technology development. Furthermore, the trait of an efficient port is to enable a fluid supply chain, to minimize, its buffer of inventory. This is achieved through the sharing of information and the effective control in the demand of stock levels (Lee, 2016). There are various factors which influence the relationship between FTZ's and port development. These factors comprise of value chain development, due to logistics facilitation. Improved global trade administration, this is reflective of the level of trade acceleration between ports and FTZ's which are guided by the World Trade Organization (WTO). Additionally, the emergence of e-commerce, digital trade along with the expansion of trade routes combined has increased port development (UNCTAD, 2016).



Moreover, the creation of FTZ's in local areas, equally creates convincing growth in the port sector while providing employment benefits. The creation of free trade zones, are often done in locations which are in close proximity to ports or airport. These areas are used for trading and export activities, importantly FTZ's perform an integral function in the development of international trade by facilitating transit and delivery of goods and enabling of economic activities.

Free Trade zones are differentiated based on the measure of control exercised by the customs authorities. FTZ's accommodate the storage of non-community goods, which have specific points of access for entry and exit condition under customs supervision. Free Trade Zones do not isolate good and these goods can be stored for without time limitations. Additionally, goods which are stored in FTZ's can be further processed through industrial and commercial activities. This can be done for their conservation, presentation resale or re-export, based on the authorization of the customs authorities. Furthermore, the payment of import duties on the goods stored in FTZ's are suspended until the goods are outside the zone. In the case of the, EU (European Union), goods located in the free trade zone destined to other countries is value- added tax exempted (VAT), although they are physically present within the customs territory (Quaglia, 2015).

Importantly FTZ's are the result of policy instruments of governments to promote export oriented foreign direct investment (FDI). Hence large manufacturing companies are encouraged to establish logistics and distribution centers around ports to improve their competitiveness. This is done through value-added offerings which are available by locating within these zones. Ports and maritime activities function as a stimulus for the initial stages of urban growth. Additionally, port development in China has shown a strong correlation between urban economic growth (OECD, 2011). Free Trade Zones over the 20<sup>th</sup> century have undergone changes caused by growth in world trade and transport efficiency.

Free Trade Zones are instruments of commercial policy which are specific to each region. They facilitate prompt processing of goods meanwhile generating jobs and FDI. Subsequently port development now in cooperates FTZ operations, which include a strong connection to the port hinterland. To this end significant investment has been done in developing ports to improve their port infrastructure in order to remain competitive. (UNESCAP, 2015).

The innovation of free trade zones has been to facilitate cross-border trade by removing obstacles imposed by national customs regulations. FTZ's encourage the accelerated turnaround of ships by reducing administrative procedures of customs agencies. FTZs have proven to be beneficial to both the importers and exporters, through the reduction of labor and tax related costs. Furthermore, the employment opportunities created by free trade zones help to reduce unemployment problem in the less developed economies (Economy Watch, 2010).

The economic growth of a country is undoubtedly likely to its ability to generate international trade, which in turn drives the demand for sea transport. This is exemplified by the relationship between seaborne trade and economic growth (Lee, Lee,2016). Specifically, in the case of Alabama USA, economic development has led to the growth of ports, intermodal centers, highways, railroads, energy production and delivery systems. The benefits derived from FTZ's have an economic multiplier effect. Local business become suppliers to operators within the zones positively contributing to the zones profitability. Furthermore, employment is increased and maintained. The local suppliers and vendors gain or maintain their geographical advantage.

The governments gain from the operations of the zone through the taxation of the economic activity that directly or indirectly results from manufacturing and distribution operations conducted within the zones. Generally, these economic activities are conducted by international companies to increase their competitiveness. This is often done through the building and expansion of the infrastructure associated with trade, mainly port facilities (Jones, 2006).

The growth of shipping intensity can be used as a guide to measure economic activity. Moreover, the growth in the economic sectors of manufacturing mining or agriculture usually generates the demand for sea transport. The development of global supply chain has increased the pressure on improving port operations along with maintaining maritime and inland transport. Shipping hubs are supported by strong functional interdependence with the hinterland and foreland. In light of these synergies which have developed among shipping networks. This has led to the creation of shipping hubs. Consequently, port linkages to inland markets have become essential to port development, which is ultimately supported by a transport complex economy. Therefore, efficiency of the port is based on the integration of inland operations (Lee, Lee,2016).

Moreover numerous ports within the Latin American and Caribbean region have commenced expansion projects of their ports based on forecasted port capacity developments intensifying from years 2025 to 2030, as a result of these estimated capacity developments up to 2030. Ports therefore have to adjust their existing capacity of existing infrastructure such as terminals and equipment to alleviate problems of congestion which may emerge (ITF, 2017). Importantly within the Caribbean region port infrastructure development is a facilitator of maritime transport growth and therefore has an integral link with transport supply chain. The region has two global transshipment centers, they are Port of Kingston Jamaica and Freeport Bahamas. Kingston has efficient and competitive quayside operations, good TEU movements, storage and handling and related services, with customs comparable to that of global standards. Moreover, Kingston is integrated into the global liner service which affirms the emergence of Port of Kingston becoming a transshipment hub. Therefore, the Port of Kingston has grown to a level is to capitalize on the opportunities of being a global logistics hub (Sanchez, Wilmsmeier, 2009).

Economic growth in the year 2016 was largely attributed to both the goods-producing sector and services sector. Additionally, the goods-producing sector contributed to the cumulative growth of 2.2% over the previous year. Furthermore, economic activities and trade are the main the drivers of transport demand whereby demand has increased due to the growth of ports and populations. It stands to reason that there is a close correlation between gross domestic products and the growth in transport demand (ECLAC, 2017). Moreover, the administration of ports has transitioned from government to private sector management. These development aides in the function of mixed–use zones transforming isolated enclaves to connected growth areas have all form part of FTZ’s operations. These zones attract distribution operators to the ports which will result in increased vessel calls being generated. The result of the vessel calls facilitates more empty container deliveries, which support the region's export market. This creates an ideal environment for third-party logistics providers. International companies use FTZ distribution centers to have their product closer to a rapidly growing markets, particularly to the USA. Moreover, FTZ's provide the components which facilitate door to door logistics services which are highly reliant on efficient port operation (Site Selection Magazine, 2015)

The present business environment requires, companies to search for opportunities to improve efficiency and increase bottom-line savings. Therefore, for many large manufacturing and production companies to achieve global reach they tapping into the efficiencies of global supply chains. The primary challenge for many international companies have been customs and logistics expenses relating to the import and export of finished goods and raw materials. These costs have been considered to be an unavoidable expense of doing business. However efficient supply chain operations streamline the sourcing of materials in one location which and then manufactured in another location, therefore the use of FTZ's have become cost-saving strategies to get goods to market. In the case of Taiwan, their free trade area is considered to an area outside of the customs territory, the government in order to enhance trade, had eliminated numerous barriers and introduced clearance schemes and multiple incentives to encourage businesses within the FTZ. Benefits from these incentives include value-added processing, the hiring of foreigners, tax exemption and financial services (Newton, 2016).

Moreover for companies to achieve both supply chain efficiency and cost savings, FTZ's, can be utilized for distribution and manufacturing. Many countries offer FTZs to companies operating within their borders to increase trade, tariffs, taxes, and other barriers to trade. In addition to offering supply chain benefits, companies can benefit by having an integrated supply chain structure. Multinational companies conducting operations globally can use FTZs (KPMG, 2009).

## **2.1 Drivers of Port Development**

Developed ports have adapted to globalization, whereby these ports are retrofitted to accommodate the ever increasing growth in cargo traffic volumes. Moreover, with the privatization of the managing ports, this has resulted in international groups taking control in the handling of the complete operations and management of the port. Simultaneously shipping lines contend with ports to adjusting to their evolving operation strategies. Thus in order to remain efficient and profitable, these shipping lines try to extended their networks by integrating larger ships into their fleets.

Importantly this causes increased pressure on existing port infrastructure, ports now have to increase their average capacity to cope with the changing dynamics of the shipping lines. Collectively both the maritime and the port industry are fundamentally important to the globalized economy.

Furthermore, the maritime industry has grown progressively over the years meeting the expectations of the demand of port capacity which is projected to increase proportionally in the future. These forecasts are based on current existing port infrastructures not adequately meeting the existing demand for port throughput. Therefore, to avoid excessive congestion at the port additional investment in port infrastructure is both practical and justifiable in the near future (Paralo, 2016).

Additionally international companies have applied the business practices of offshoring aspects of their productions either through utilizing subsidiaries or external outsourcing or alliance partners. The operating strategy of many of these firms incorporate their supply chain which has become largely, fragmented and geographically dispersed. This trend had presented lucrative economic opportunities for developing countries because they are targeted by international companies for the outsourcing of their processing and manufacturing activities which reduce cost and access to resources. The return benefit gained for the developing country is being better integration into the global value-chains by becoming exporters of commodities or of machinery (Leung, 2015).

Moreover, port infrastructure is critical in the integrating and coordinating globalized production, whereby ports have to provide the service of enabling goods to be transported from other countries to be brought to market. The gains which are achieved from adequate physical infrastructure are enhanced supply chain networks, improved integration and coordination of global production process. Moreover, adequate development of transport infrastructure is integral justifying the location of economic activities. International companies tend to be positioned around logistics hubs to ensure fast and reliable delivery of their products to the end user. Additionally, a country's stage of development is proportionally tied to the capacity and the of its port (Bong-Ming, 2012).

The lack of sufficient and modern port facilities and inadequate trade policies contribute to severe bottlenecks in the transport and logistics chains which obstruct trade, this has to be rectified in light of the future increase in demand for cargo. Additionally, efficient inland intermodal transport including road, rail and connection to the port hinterland is conditioned and dependent on efficient demand forecast which enhances trade from the hinterland (Economic and Social Commission for Asia and the Pacific, 2014).

International trade is mainly reliant on the efficiency and effectiveness of the port operation. Therefore, ports continuously have to innovate their operations to improve port functions, by coordinating transport and communications along with the development of innovative business models that enhance both shipping and port operations. Ports mainly serve as the interface between maritime shipping activities and economic systems (Cullinane, Wilmsmeier, 2008).

The Latin American and Caribbean region can be considered to be an emerging region for global container trade although it accounts for a relatively small portion of the world container trade reaching numbers of 7.2% in 2013. However, in recent years' growth of container traffic in the region has resulted in significant challenges to the ports in terms of infrastructure development, trade policy framework. Over time ports have developed from being mainly a bridge between ocean carriers and logistics networks. Innovation has led to changes in the role of main players in the maritime sector having to adapt by becoming facilitators of development responding to demands of trade led by shipping lines. This is more apparent in the case of the port authorities. Ports now have to be able to readily respond to the changes in market developments while having to contend with increasing size of vessels (UNSCAP, 2015).

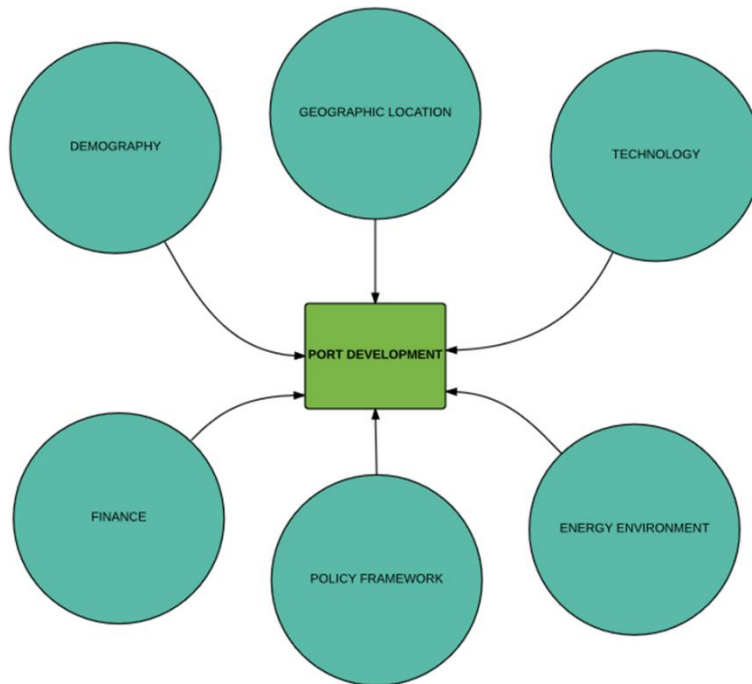
Therefore, the pull factors which attract shipping lines and subsequently lead to the port development are adequate port systems. These systems comprise of sufficient hinterland which encourages infrastructure and carrier's strategies, along with an economic system which is conducive to enabling logistics strategies and economic development (Ehlers,2014). There are specific factors which form the catalyst for port development as displayed in Figure 1, they include; demography and social changes which can be seen particularly in the form of population growth and urbanization which impact on the transport demand that eventually leads to more international trade and movement of freight. The demand generated from this can be seen in increased vessel arrivals which then contributes to a reduction in shipping which is further supported by the emergence of bigger ships which function increased vessel arrival frequency.

Hence energy and environmental factors are also key factors which influence port development whereby fuel cost which fundamentally impacts on transport cost lead to higher incentives for cost savings and consolidation. Additionally, climate change policies result in concerted efforts for more environmentally friendly transport models, whereby the impact of these results in higher incentives for cost savings and consolidations which position the maritime sector to become the preferred means of transportation as opposed to other modes of transport.

Technology innovation is a very integral component which drives port development. Whereby it is the means by which applications are implemented to improve the transportation operation, this results in a considerable reduction of administrative procedures through information and communication technology (ICT). This ultimately improves the processing of documentation and data flexibility. The economy is also a major driver for port expansion through the impact of economic growth globalization of production and consumption. This result in the subsequent impact on leading to a profound increase transportation demand, causing a measurable reduction in shipping costs creating the ideal environment for economies of scale. These conditions shape the increasing demand for transportation demand over long distances.

Financial instruments also influence on port development whereby once there are numerous available financing possibilities to port administrators the greater the incentive to engage in port development. Policy direction is very critical to enable port development whereby regulations which relate to safety, environmental protection and security conditions and market condition causes an increase in competition in the shipping market and encourages consolidation and efficiency. Additionally, geostrategic interest serves as major criteria for port development. It is on this basis that the investment in the location is made and the trade agreements to new shipping clients in the shipping and port sector are made (Rodrigue, 2010).

Figure 1: Drivers of Ports Development



*Source: Rodrigue, 2010*

Logistics hubs are conceptualized in a 5<sup>th</sup> generation port framework, they conduct operations at the back of the port which are done in free trade zones and logistics parks. Furthermore, manufacturing is seen as a key component to maritime logistics chains, whereby through the connection of the ports high value-adding flexibility can be offered to the manufacturing process. Therefore, in advanced free trade zones and logistics parks these logistics functions are further supported by the inbound cargo to the hinterland which maximises the synergies between the port and free trade zone (Khalid, 2014).

Consequently the Port Authority of Jamaica had commissioned the development of a commercial free zone and distribution hub in 2014 which is dedicated to providing logistics and business solutions for clients within the North, Central and South American markets. The activities within the free trade zone will involve warehousing, assembling operations, logistics services, distribution and value adding services, for the operator within the zones (PAJ,2016).



## **2.2 Methodology**

In conducting this study, a quantitative research format will be used to perform a comprehensive evaluation to determine the nature of the influence which the Kingston Free Trade Zone, and maritime activities have on the development of the Port of Kingston. To effectively achieve the objectives of this research a correlation framework will be adopted, whereby a regression analysis along with other statistical tools will be used to guide the findings of the research. Furthermore, the dependent variable will be the port's capacity represented in TEU, while the independent variables will be cargo volumes, vessel arrival numbers and FTZ value of the trade. The primary data source will be derived from the established database of the Port Authority of Jamaica (PAJ).

The data provided will include vessel arrivals to the Port of Kingston from the last nine years as well as the types and volumes of cargo which had been handled. Furthermore, data will also be used from the Statistical Institute of Jamaica (STATIN) which will reveal Jamaica's GDP and economic performance for the last nine years with the focus placed on trade numbers particularly import and export.

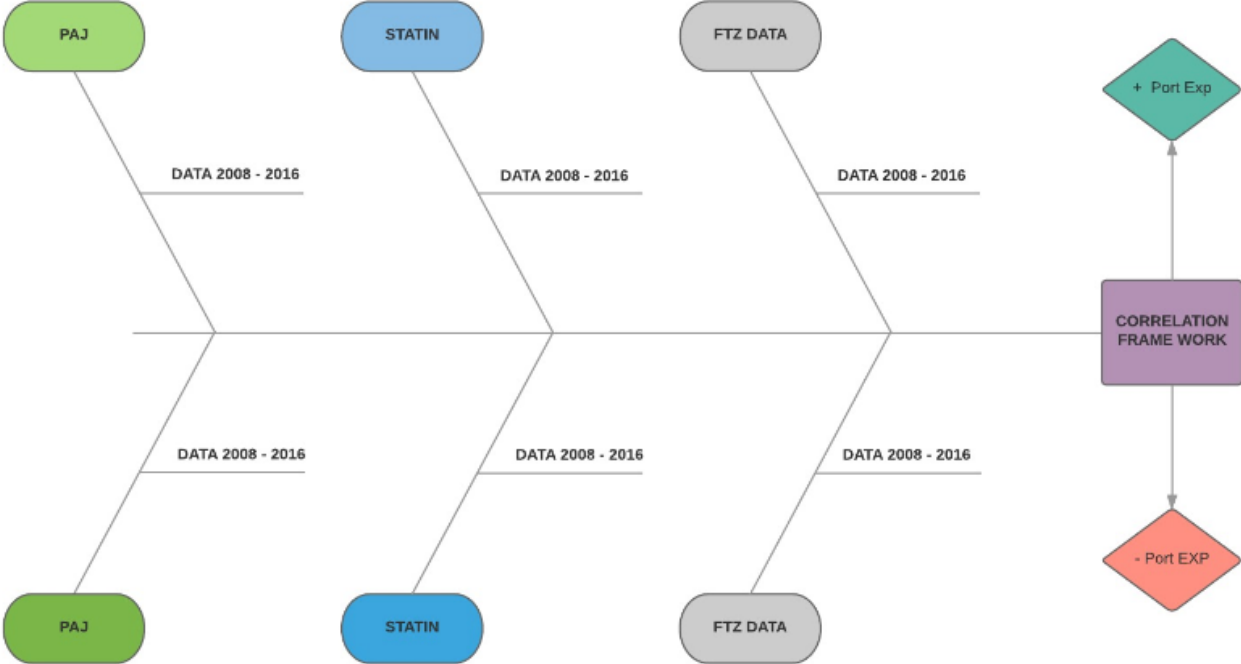
Moreover, data will be provided by the Ministry of Economic Growth and Job Creation (MICAF). This information contains the number of entities which operate in the Kingston Free Zone as well as the type of operations which are performed there and the plans for future Free Zone development. These datasets will be examined based on a timeline starting from January 1, 2008, to December 31, 2016. This date is used as the reference point for examination being it was during that year that the Government of Jamaica had announced a global logistics hub initiative which was geared to improving and developing the country's logistics capabilities so as to become fully integrated into the global value and supply chain. Objectivity is critical in assessing and evaluating the conditions where a port infrastructure is impacted by free trade zone operations. Additionally, a qualitative review is expected to be conducted to further complement the correlation framework, whereby an evaluation will be conducted to review the Port of Kingston stage of development in reference to (Any Port Model) development by (Bird. 1980).

Importantly this is done to guide the port development process with a focus on the hub and spoke dynamics. The second stage of this research will utilize relevant secondary data by comparative analysis of Free Trade Zones in other countries to find trends and pattern which can explain the relationship between the variables of port expansion and free trade zones, which will support the findings for achieving the stated aims and objectives of the research.

The secondary data sources will comprise of graphs, pictures, and related shipping literature which will be intensively utilized to effectively evaluate Jamaica's current response the developments of international shipping. The secondary data sources will indicate the trade flow dynamics of Jamaica in response to its regional rival competitors. This research will execute a context analysis of related publication, initiatives, and proclamations by the government of Jamaica and related state agencies of Jamaica. This will be done to draw focus to the modernization and development plans for Jamaica's Free Trade Zone development. Detailed, articles and publications from the World Bank, the International Monetary Fund, and the United Nations Convention on trade and development (UNCTAD) will be integrally used to highlight the direction of growth and innovation for the shipping industry of Jamaica. Finally, various periodicals and reports from respected international shipping and business organizations will be used to provide supplemental perspective to the data analysis process.

The main sources of secondary data will comprise of the logistics performance index which is published by the world bank, the global competitiveness report which is published by the world economic forum as well as the Economic Council of Latin American and Caribbean states (ECLAC), along with the doing business index published by the world bank. The conceptual framework which guides the research is illustrated in flowchart in the Figure 1.2.

**Figure 1.2: Conceptual Framework**



*Source: Author 2017*

## **Chapter 3: Free Trade Zone Development**

### **3.1 The History of Free Trade Zones.**

The emergence of free trade zones, originates to the terms of free harbours, which can be traced to being established more than 2,000 years ago. Modern developments results in a change, from free harbours to free trade zones. This is directly linked to exponential growth in world trade and improvements in transport efficiency. FTZ's act as instruments of commercial policy and development, they have evolved and adapted to the economic realities and conditions of participating countries from around the world. Furthermore, FTZ are constantly adjusting to the changing demands of the public and private sector regularly reinventing itself.

FTZ's over the last fifty years have been used intensely by developing countries as a means to encourage export oriented FDI. There was an emergency of FTZ's in 1997 whereby and estimated 850 zones were being operated in both developed and developing countries. Additionally, the number of FTZs had continued to increase. There has been a proven study which reveals that there is a strong correlation between the establishment of FTZs and strong export performance (World Bank, 2015). Moreover FTZs differentiate based on the nature of their operations, this is evidenced by the wide variety of activities performed in the zones. The more commonly used terms are free trade zone, export processing zone, special economic zone, and industrial free zone all of which have similarities in their function. The characteristics of these zones are fenced-in industrial estates specializing in manufacturing for export and offering the occupants free-trade conditions and a liberal regulatory environment (World Bank, 2013).

These zones have special incentives set up to attract foreign investors, in which imported materials undergo some degree of processing before being re-exported. FTZ's are designated areas of a national customs territory, often at an advantageous geographical location. In addition, these zones have infrastructure suited to conduct trade and industrial operations subjected to customs and fiscal segregation. They are also considered to be an enclave in the customs and trade regime of a country, for foreign manufacturing firms, mainly producing for export. Whereby they benefit from a certain number of fiscal and financial incentives (Kozwkiewicz, 2015).

The usual benefits of FTZ's include improved business infrastructure. Within a defined area operators are provided with enhanced infrastructure and services in comparison to the rest of the country. In addition to land, office space, utilities, logistics services, business services and other facilities. The operators also have flexible business regulations. Streamlined customs services through one-stop shopping for permits and investment applications. Labour and other business related legislation is generally more flexible compared to the laws and regulations applied to business located elsewhere in the host country. The FTZ's are chosen as a location for business activities moving offshore, away from the markets where the finished products are sold in search of a low or lower cost manufacturing basis.

Companies located within the zones produce mainly or exclusively for foreign markets. The main factors of the FTZ's are the incentive packages offered to foreign investors. These include unlimited duty drawbacks or exemptions from import duties on raw materials, intermediate inputs and capital goods used in the production of exported products exemptions from the payment of sales tax on exported products as well as on all goods and services domestically purchased and used in their production (Guoqing, 2016).

### **3.2 International applications of free trade zones.**

The relationship between the free trade zone operations and economic growth are supported but the economic principle that all countries, have assets which can be leveraged to produce goods and services for their domestic markets or to compete overseas in a cost competitive manner. Furthermore, where trade policies which enable the flow of goods and services, this increases the competition among countries. Free Trade Zones are mainly used by multinational corporations to establish production plants to produce goods which include clothing, shoes, and electronics.

Free Zones can cross a national border, such as the Syrian-Jordanian Free Trade Zone. Free trade areas are also established between countries, such as in Latin America through the Latin America Free Trade Association (LAFTA) which is a free trade agreement between the countries; Argentina, Brazil, Chile, Mexico, Paraguay, Peru, and Uruguay. In addition to the North American Free Trade Agreement (NAFTA) between Mexico, the United States, and Canada. Free-trade zones have more recently been also called special economic zones in some countries.

These special economic zones (SEZs) have been established in many countries as testing grounds for the implementation of liberal market economy principles. SEZs are viewed as instruments to enhance the acceptability and the credibility of the transformation policies and to attract domestic and foreign investment (World Bank, 2011).

### **3.3 Integration of Free Trade Zones in the Caribbean**

The application of free trade zones within the Caribbean basin has led to the growth in new exports. This has been made possible through trade incentives and technical aid from the United States through the Caribbean Basin Initiative along with other special access norms in the US tariff code. The positive effects of these zones has encouraged industrial production for export in Central America and the Caribbean. The employment which is created by these zones are very large with estimates being over 109,000 workers in Honduras, 86,000 in El Salvador, 37,000 in Nicaragua and 35,000 in Costa Rica. In the Dominican Republic, employment in free trade zones has increased significantly over the past two decades, from 16,400 in 1980 to 170,883 in 2002. The contribution of exports from free trade zones to total exports in the region increased from 20.6% in 1995 to over 44.0% in 2003. In 2003, free trade zones provided 81% of total exports in the Dominican Republic, 60% in El Salvador, 59% in Costa Rica and 35% in Honduras. The result of this has led to a reduction on the, dependency on primary products such as coffee, bananas and sugar. (UNDP, 2016).

### **3.4 National application of Free Trade Zones to Jamaica**

Jamaica has provided many incentives to attract foreign direct investment in the area of special economic zones and free trade zones. Furthermore countries such as Mexico and Southeast Asia countries use FTZ's to generate economic development. FTZ's are industrial areas created with the intention to assist the country in diversifying its economy and move from dependency on agricultural exports towards greater industrialization. The proposed benefits from the SEZ strategy are, earning foreign exchange, boosting the export sector, expanding job opportunities, raising the standards of local industries, creating backward linkages with the local economy, and promoting the country's industrialization. The activities which were promoted in the FTZ included offshore data processing and office administration including back-office operations. Additionally, they included global production of goods which are produced for the international market. Jamaica, like many developing countries, have tried to replicate the success of Mexico and Southeast Asia that have used SEZ's as a development strategy (Leith, Dunn, 1999).

Caribbean countries expanded FTZ operations in the 1970s and 1980s, centered on the production of garments for export to the USA. A small amount FTZ produced goods were exported to the EU, and most garment exports from the region operate under US tariffs. In the 1990s this type of investment expanded to include data-entry and data-processing industries specifically in the case of Jamaica. The government drafted legislation such as the special economic zone act of 2014 which enables companies producing for export without trade barriers.

Furthermore, the governments of Jamaica have established national body to promote and regulate FTZ's. Through these zones Jamaica offers investors a special package of incentives that consists of financial services such as tax holidays, unrestricted repatriation of profits low cost of development, duty-free imports and exports, special low-cost infrastructure, efficient communication facilities and access to a developed port. The package is a production subsidy that allows foreign investors to operate more cost-effectively than they would in their own country. These incentives are regulated by the Jamaica Free Zone Authority. (JSEZA, 2016).

**Chapter 4: The Connectivity of the Port of Kingston**

The Port of Kingston is situated in the Kingston Harbour, it is currently ranked as the world's seventh natural harbor and comprises of a nearly landlocked area of water ranging over ten miles in length and two miles in width, it is illustrated in Figure 1.3. The primary terminal in the Port of Kingston is the Kingston Container Terminal (KCT), which is owned by the Port Authority of Jamaica. The Port of Kingston has a geostrategic location, within the major maritime trading routes of the Caribbean region. The location is further strengthened by its close proximity to the Panama Canal which provides Jamaica with the opportunity to fit directly into the global value chain.

Conversely, The KCT is one of the Caribbean region's premier transshipment hub, consisting of three terminals with a berth face draft of 13 meters, and a capacity of 2.8 million TEU's. The terminal is expected to undergo expansion to increase its present capacity to meet an improved standard goal of 3.2 million TEU. The major driving force behind this expansion is the port's current operator which is the container shipping line, CMA CGM. The shipping line has entered into a thirty-year port concession arrangement with the Government of Jamaica and has invested over US\$600 million in THE upgrade and expansion program (Port Authority Annual Report, 2015).

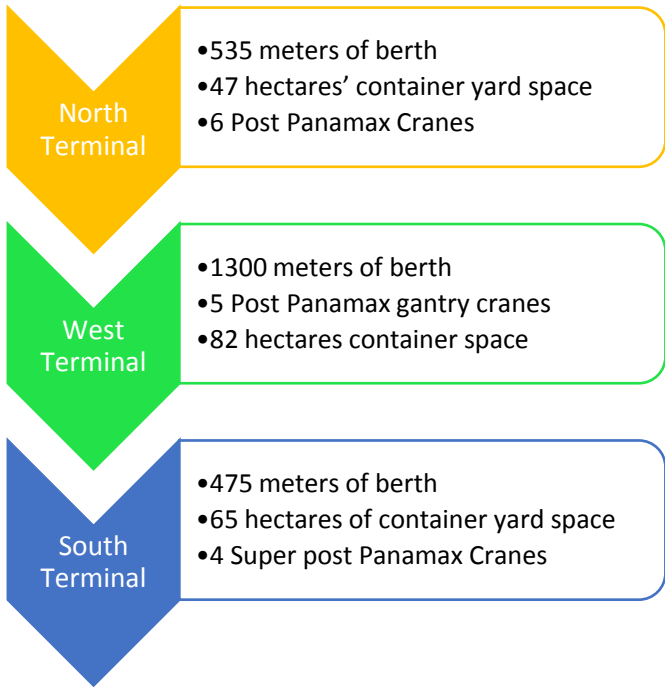
**Figure 1.3: Aerial Picture of the Port of Kingston**



*Source: Port Authority of Jamaica, 2016.*



**Figure 1.4: Expansion of Kingston Container Terminal**



*Source: Port Authority of Jamaica 2016.*

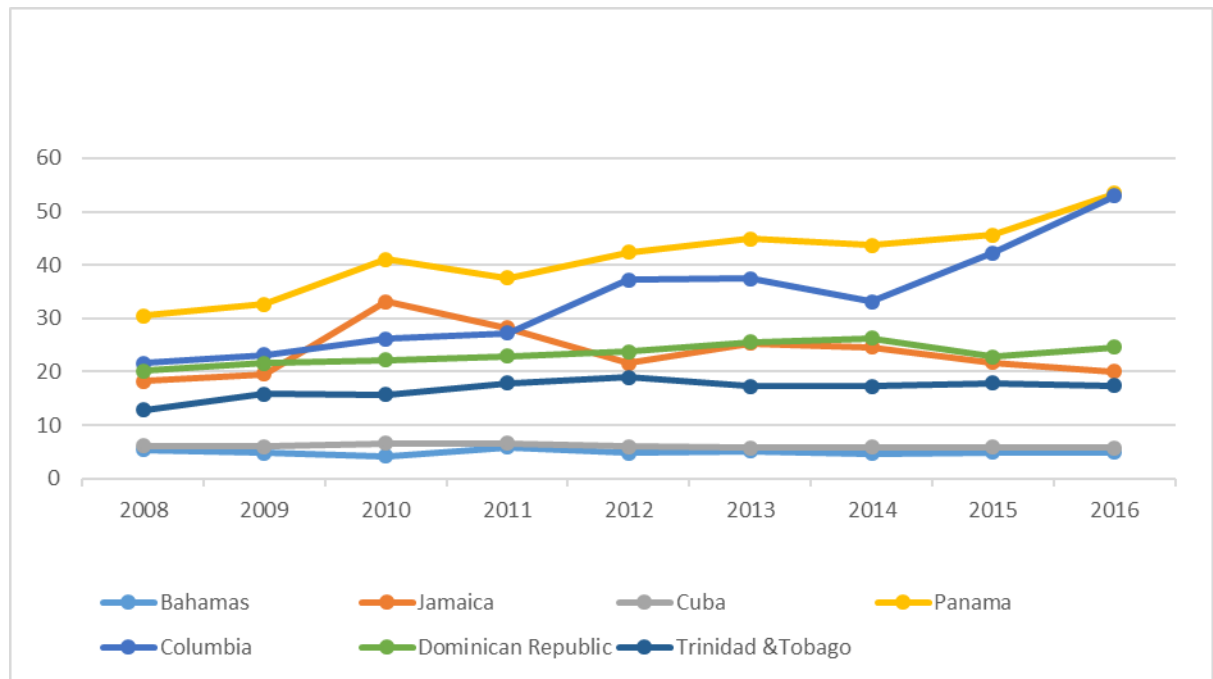
The future development and expansion plans for the Port of Kingston are illustrated in Figure 1.4. Furthermore, the expansion plans of the KCT are expected to improve the terminals efficiency and infrastructure, which will take the form of increased land space, the addition of more container handling equipment and expanded cargo handling area. Containerized cargo is the main operation conducted at the KCT, with transshipment cargo accounting for 88 % of container movement that amounts to earnings of over twenty million (US) (PAJ annual report, 2016). The operators of the port (CMACGM) has decided to improve their position in Latin America and the Caribbean, by essentially improving their economic growth. As such, they have deployed over 156 vessels to service this region. The ultimate goal of the shipping line is to acquire more dominance in the region, thus the establishment of the container hub in the Port of Kingston not only provides greater connectivity when the Caribbean, between the South and Central America. It also ensures that efficient service is delivered between these regions and the United States Eastern Seaboard (CMACGM Group Magazine, 2017).

Developing economies share of world throughput increased by 0.2% to an approximate 71.9%. This has continued the trend of a global rise in developing countries share of world container throughput. The two main drivers of this process have been the increased participation in global value chains and the continued increase of containers for transporting dry bulk cargo. Furthermore, the performance of the ports and terminals have significantly affected the country's trade competitiveness.

The primary determinant of this performance is dependent on the type of cargo handling equipment and landside access channel the port has for operations. Moreover, increases in terminal and port efficiency contribute to meaningful reductions in transport cost (Review Maritime Transport, 2015). The liner connectivity of a country reflects its access to global trade. Its measurement is significantly influenced by its link to other countries. Furthermore, Jamaica's liner connectivity also plays a vital role in vessel traffic at its ports.

In order to illustrate Jamaica's level of liner connectivity in comparison to its main competitors in the Latin America and Caribbean region, the UNCTAD Liner Shipping Connectivity Index (LSCI 2016) was utilized as the indicator to reveal Jamaica's access to the global liner shipping network on a scale of 0-100. The index provided an indication of the network of regular maritime transport services for the containerized cargo of the country by incorporating the number of vessel arrivals along with the total container carrying capacity of the port. Additionally, the index collates the number of companies providing services with their own operated ships; as well as the number of services provided. Developing ports cities have increasingly become the most important element in world economy parallel to international trade wherever ports are developed they support their environment. The city boundaries grow proportionally in terms of spatial, economic and administrative parameters modern port development has moved beyond the waterfront to new in-land dynamics. This shift is led by the every changing maritime transport demands. (Piotr et.al, 2014).

**Figure 1.5 Caribbean Ports Liner Shipping Connectivity**



Source: UNCTADSTAT, 2016.

Figure 1.5 illustrates the growth of liner connectivity of the main ports in the Caribbean region. The results show that Jamaica and the Dominican Republic have performed similarly from the year 2012 to 2016. This makes the Dominican Republic Jamaica’s closest competitor for liner services. However, Trinidad and Tobago, Cuba and the Bahamas had low liner connectivity over the observed period. This is attributed to the inadequate capacity of their ports to attract larger vessels as well the insufficient policies to increase vessel arrivals. Moreover, Panama and Colombia both showed higher levels of liner connectivity. This can be explained based on their proximity to the Panama Canal combined with modern and efficient ports. These factors attract more shipping lines these country therefore increasing their liner connectivity.

Conversely Jamaica liner connectivity has experienced a series of marginal growth of 2% for the protracted period 2008 – 2016. Additionally the liner figures had climbed marginally in 2015 by 0.9%, which was primarily attributed to the improved TEU volumes at the port’s container terminal facility, particularly from the shipping line Sea Freight which offers connection to the markets of the United States, Central and South America and throughout the Caribbean Basin (Maritime Review, 2016). Consequently the intended expansion which is to take place by CMA-CGM, is set to will improve Jamaica’s liner connectivity.

Additionally, the quay will be lengthened to 2.4 km and its berths deepened to 15.5 m, to provide adequate maneuvering room for vessels up to 14,000 TEU, which is anticipated to call at the terminal. Further infrastructural development will take place in the form of the addition of 14 new gantry cranes and 60 port riders (Lloyds list. Maritime intelligence, 2017). Free zone operations in Jamaica date as far back as 1976 with the establishment of the Kingston Free Zone, the free zone regime has transitioned into a SEZ regime evidenced by the SEZ Act 2016, in order to remain compliant with WTO requirements. This regime is designed to encourage foreign direct investment and promote export growth and create new employment. The value proposition that the free zones offer to operators include easy access to air and seaports, duty-free benefits, minimal customs procedures, large skilled workforce and telecommunication, logistics and transportation services (JSEZA, 2016).

**Table 1- Regional Port Characteristics**

<b>Port</b>	<b>Berth (m)</b>	<b>Length</b>	<b>Terminal (h)</b>	<b>Current (M)</b>	<b>Capacity</b>
Cartagena- Colombia	970		86	2.5	
Colon- Panama	982		160	4	
Dominican-Republic	922		50	1.25	
Freeport-The Bahama	1036		57	1.5	
Port of Kingston-Jamaica	2310		194	2.8	
Mariel- Cuba	702		54.9	0.82	
Port of Spain Trinidad &Tobago	1500		142	2	

*Source: World Port Source, 2017*

Table 1 displays a detailed outlined of the terminal areas of the main shipping ports in the Caribbean region. It can be observed that the ports which has TEU capacity of over 2 million have large terminal space, this includes the ports of; Colon, Cartagena, and Port of Kingston. However, ports which have a limited capacity of below 2 million TEU's have limited terminal space. It stands to reason that the terminal space of a port influences its capacity.

#### **4.1 The Bahamas**

The Freeport Container Port operates a sophisticated computerized facility with modern security features. It also offers comprehensive support services with advanced technology for the container vessels which call to the port. Furthermore the port has developed into an efficient container terminal that forms part of the Hutchison Ports chain. In addition, its location makes it well suited as a transshipment hub to service the US East Coast, with no deviation from the major east-west trade lanes. Moreover, the port has achieved steady growth in recent years, which has been attributed to its main clients which include Maersk line and Mediterranean shipping, whom both form the 2 M alliance. This has resulted in a constant flow of TEU volumes to the port. Moreover, MSC has also now gained a large shareholding interest in the Freeport Container Port (FCP).

In anticipation of increased cargo volumes which are to be attributed to the expanded Panama Canal, rapid port infrastructural developments have been undertaken. These include the inclusion of three electric straddle carriers to improve yard performance in 2015. While there are no company taxes, the Bahamas offers free zone incentives, including exemptions from stamp duty and import/export duties for qualifying transactions. (Lloyds list Maritime intelligence, 2015). Further improvements included major refurbishment to stacking areas, particularly of roadways, in order to improve straddle carrier travel efficiency and reduce potential damage to yard equipment. FCP's operators have invested in nine post-Panamax cranes and one super-post-Panamax crane, as well as the widening of the entrance channel of the port to 16 meters in order to facilitate the larger vessels transiting the Panama Canal. The terminal also houses a free trade zone complex and a terminal that spans over 49 hectares of land which has the capacity to handle 1.5 million TEU annually. (World Port Source, 2016).

#### **4.2 Columbia**

Cartagena port lies on Colombia's northern Caribbean shore in Cartagena Bay. Cartagena Bay is a large harbor, fully protected from the sea, with more than 18 meters of natural depth APM Terminals is the manager of the terminal, in a joint venture with a Colombian-based port and terminal operating company, Campania de Puerto's Associates (Compas SA). APM Terminals has purchased the Container Terminal of Cartagena and has since increased the port's capacity, as well as streamlined the port procedures and security measures. There are four container terminals operating in the area. (Lloyds Maritime intelligence, 2016).

The Port of Cartagena's main operator is the Sociedad Portuaria Regional de Cartagena (SPRC). SPRC is a private company which operates two container terminals in Cartagena Bay, the Magna Terminal and the Contecar Terminal, along with distribution centers and other maritime-related businesses. The terminal has expanded and retrofitted into an integrated container terminal, which handles both regional transshipment as well as domestic traffic. Cartagena is the regional hub for the shipping lines Hamburg Sud (HSD) and also has a limited presence of CMA-CGM and HLD. These shipping lines account for more than 80 percent of SPRC's volume, with the remainder divided among Maersk, MSC, Evergreen, Marfret, King Ocean and others lines. The port was to make major developments in 2016, however this had been delayed, due to port volume numbers revealing a potential weakening of demand, despite the pending expansion of the Canal (World Port Source, 2016). The port is inland connections to the Bogota Free Trade Zone. Which is centrally located within the capital city and is connected to the airport. Its operators benefit from having 0% on social equity tax, in additional incentives include 0% value added taxes on raw material imports with a 15% corporate tax (Healy, 2017).

### **4.3 Cuba**

The container terminal in Mariel, is located in a small city 45 kilometers west of Havana, it was inaugurated in January 2014. The development of this terminal was the result of a recent change in Cuba's law to allow foreign private investments. Accordingly, the terminal was constructed by Group Odebrecht, a large Brazilian consortium, which is also involved in the construction and ownership of Embraport, a large container terminal in Santos, Brazil. The construction of Mariel is financed by a \$680 million loan from the government of Brazil given through its development bank (BNDES), and operated by Singapore's PSA International. Additionally, the first phase of the new port will include a 700-meter terminal along with a 15-meter channel and a handling capacity of 1 million TEU the port is part of a larger \$ 900 million, 466 square kilometers Mariel Special Trade Zone (Frank, 2013). Licensees and operators in free trade zones are fully exempt from tax on profits from 5 to 12 years. Depending on the designated activity of the zone exemptions can reach up to 50% of the tax on the countries investment act. This legislation also allows exemptions from payment of customs tariffs and duties. Additionally, the use of a foreign workforce is allowed for 3 to 5 years, depending on the activities. incentives, including partial and full tax exemptions (Frank, 2015).

#### **4.4 Dominican Republic**

Caucedo is a private container terminal operated by Dubai Port World (DPW). The terminal is located 25 kilometers east of Santo Domingo, in close proximity to the international airport and adjacent to the central free trade zone. The terminal is a modern facility with new port infrastructure, which commenced operation in December 2003. The port has developed a track record of being one the most efficient port in the Caribbean, whereby it had achieved a port productivity of 41 moves per hour in 2012. Additionally, the port has sought to expand its existing structure by adding an additional 300 meters of land in order to improve the berthing space to 900 meters. Moreover, this has been done to accommodate the newer container vessels being constructed (DPW Annual report, 2016). The terminal has a free trade zone, located in Punta Caucedo, 25 kilometers from the city of Santo Domingo. The Port of Caucedo main drivers for efficiency, is the combination of land, air, and ocean transportation, this integrated system the objective of the terminal administrator's goals of projecting the Port of Caucedo as a strong competitor in international maritime markets.

In addition to being a global leader in terminal operations and development DP World has integrated logistics services into the operations of the port. The dynamism and knowledge of DP World has been integral for Caucedo, to have achieved such extraordinary levels of efficiency and productivity. DP World Caucedo has achieved good ranking on the liner connectivity indexes in the Caribbean region. In light of this the port has handled more than 1.68 Million TEUs annually. Furthermore, this port handles about 60% of the seaborne trade of the Dominican Republic.

The facilities of the port include advanced security systems, a modern cargo handling equipment adequate berthing services for vessels. The has also achieved international certification therefore giving global credibility to the ports performance. Moreover, the Port of Caucedo has the full support of the closely with the customs authority as well as the various shipping associations operation within the port. This is done in order to offer importers and exporters a complete logistic chain solution, moreover various tax incentives are available for free zone operators, they are provided with 100% exemption from taxes and national contributions (DPWORLD Annual Report, 2016).

#### **4.5 Panama**

Colon Container Terminal is located in the Atlantic entrance of the Panama Canal particularly in the Coco Solo North, province of Colon. Due to its strategic location it has become an ideal point for transshipment of cargo going inbound or outbound from the Colon Free Zone. The Colon Container terminal CCT serves the regional markets of the Caribbean, North, South and Central America with shipments particularly originating from the Far East Asia. The infrastructure of the terminal comprises of 74.33 hectares, with an access channel of 16.4 meters' draft and a turning basin of 600 meters in radius for vessel's turnaround. Additionally, the port infrastructure includes four container berths, thirteen quay cranes and other yard equipment which allows the port to handle a capacity of 2.4 million TEU. The breakwater entrance 200 meters wide allowing vessels into Manzanillo Bay. The expansion plan includes additional container storage areas near the actual port site as well as additional equipment for more efficient container handling operations.

Additionally, the port is mainly dedicated to receive and handle containers, furthermore 75% of the cargo is for transshipment. The terminal is appropriately equipped to handle the current volumes of arriving cargo, an existing idle capacity allows potential customers to bring cargo to the seaport and benefit from its closeness to the railroad terminal, which is a short distance by road. Colon Container Terminal handled 502,706 TEUs in 2014 with 64.2% of total throughput as transshipment. In 2015, TEUs movements increased 57.1% reaching 789,663 TEUs, with 77.6% as transshipment movements. Furthermore, in 2016 the total throughput decreased 19.9% reaching 632,845 TEUs with transshipment operations as 75.9% of total movements.

The connection of the Panama Canal to the Port of Kingston is of significant importance as vessels which are coming from North East Asia transiting to the US East Coast via the Panama Canal utilize the ship lines to carry intermediate cargo by deploying it at a Caribbean hub port such as Jamaica. The connection of the Panama Canal to the Port of Kingston is further applicable for shipping line which have vessels deployed on back haul from the US East Coast use the Port of Kingston for consolidation before transiting through the canal, meanwhile feeder services to the Americas are conducted at the port. Additionally, various incentives are provided to lower tax rates and exemptions for free zone operators as in the case of the Colon Free Trade Zone (Panama Logistics Portal, 2017).



#### 4.6 Trinidad & Tobago

The Port of Spain (POS) is essentially a government owned and operated port, with the business unit of the Port Authority of Trinidad and Tobago managing the operations of the port. The port is accessed via the Grier Channel, which creates significant restrictions on ship size due to navigation constraints on ship turns. The road access to the port is through the main access road to the capital city of Port of Spain, creating traffic and congestion delays for trucks entering and exiting the port during rush hours. The total marginal berth length of the port estimated to be 2,000 meters, which provides roughly over 1,500 meters for cargo handling for the eight berths at the port. There are only three container berths. POS has embarked on a complete upgrade and maintenance project to improve the efficiency and productivity as well as improving the existing infrastructure.

Hence in 2015, the port has started to receive vessel arrivals from the Hyndau Glovis Line. The shipping line started to capitalize on the central distribution of the Port of Spain, the eastern Caribbean and South American countries for its which is a ro-ro line and general cargo operations. (World Port Source. 2017). Moreover, Free Trade Zone are conducted near the port with operators given incentives including no customs duties for manufacturing. Goods imported into these zones are also treated as extra-regional imports. Additionally, these incentives are graded based on the nature of the operations being conducted and are subjected to the control of the ministry of finance. (MOFTT, 2016).

**Table 2. Comparative Analysis of Major Caribbean Ports**

Country	Advantage	Disadvantage
<b>Cartagena, Colombia</b>	<ul style="list-style-type: none"> <li>• High liner connectivity</li> <li>• Multiple shipping lines</li> <li>• Modern port infrastructure</li> </ul>	<ul style="list-style-type: none"> <li>• Limited expansion</li> <li>• Free Trade Zone not integrated into port</li> </ul>
<b>Colon, Panama</b>	<ul style="list-style-type: none"> <li>• High liner connectivity</li> <li>• High cargo volumes</li> </ul>	<ul style="list-style-type: none"> <li>• Severe port congestion</li> </ul>

	<ul style="list-style-type: none"> <li>• Integration of Free Trade Zone</li> </ul>	
<b>Dominican Republic</b>	<ul style="list-style-type: none"> <li>• Modern port infrastructure</li> <li>• Integrated free trade zones</li> <li>• Good internal logistics</li> <li>• Stable liner connectivity</li> </ul>	<ul style="list-style-type: none"> <li>• Inadequate trade policies</li> <li>• Prolonged time for customs clearance</li> </ul>
<b>Port of Kingston, Jamaica</b>	<ul style="list-style-type: none"> <li>• Integrated logistics networks</li> <li>• High port efficiency</li> <li>• Good strategic location</li> </ul>	<ul style="list-style-type: none"> <li>• Insufficient customs procedures</li> <li>• Limited port infrastructure</li> </ul>
<b>Mariel, Cuba</b>	<ul style="list-style-type: none"> <li>• Strategic location</li> <li>• Strong legislation</li> <li>• Integrated Free Trade Zone</li> </ul>	<ul style="list-style-type: none"> <li>• Higher barriers to entry</li> <li>• Low liner connectivity</li> <li>• Insufficient port infrastructure</li> </ul>
<b>Port of Spain, Trinidad &amp; Tobago</b>	<ul style="list-style-type: none"> <li>• Connected to free trade zone activities</li> <li>• Provides transshipment from Eastern Islands</li> </ul>	<ul style="list-style-type: none"> <li>• Limited intermodal connection.</li> <li>• Limited Vessel Access</li> </ul>

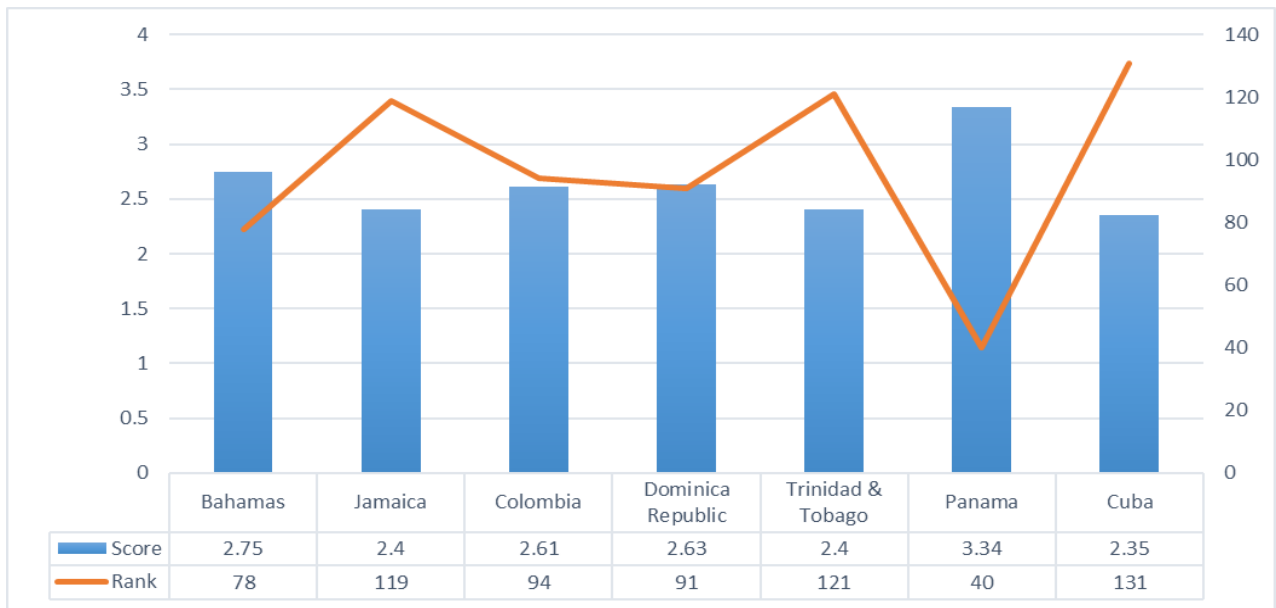
*Source, Author 2017.*

#### **4.7 Logistics Connectivity**

Efficient logistics connects people and firms to markets opportunities, which helps firms to achieve higher levels of productivity and welfare. The Logistics Performance Index (LPI) is a practical measuring criterion which is used to reveal a countries the challenges and opportunities which impact their performance in trade and logistics. It also indicates the corrective methods to improve their performance and providing feedback on the logistics adaptability within the country of operation and its trading partners.

The index also combines qualitative information of the countries and assesses their trade level within the global logistics environment. Conversely the area of focus includes the time and costs associated with logistics processes, port processing, customs clearance, transport, and other logistics services. Furthermore, the LPI measures performance along the logistics supply chain within a country and offers two different descriptions giving both the international and domestic level while taking into account transparency and service quality, predictability, and reliability. The result of the process results in a global ranking with the score ranging from 2.36 to 4.23 to reflect ease of logistics operations (The World Bank LPI, 2016).

**Figure 1.6 Logistics Performance Index**



*Source: The World Bank 2017*

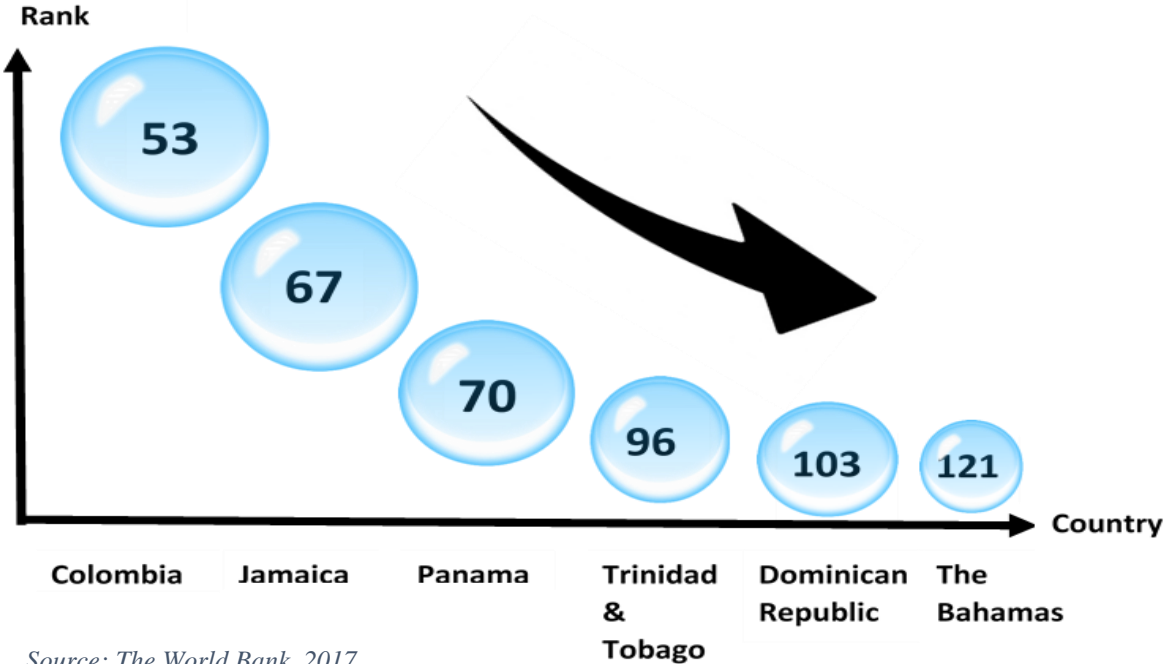
The LPI 2016 as illustrated in Figure 1.6, is used to reveal the level of logistics connectivity in comparison to its major competitors in Latin America and Caribbean region. When analyzed, the LPI has illustrated that Jamaica is presently ranked at 119 with an LPI score 2.40, while the main rivals to the country Panama and Colombia had achieved significantly higher LPI rank being 40 and 94 respectively. These high rankings could be attributed to their proximity to the Panama Canal, as well as their developed inland logistics connections.

However, Jamaica had shown reasonable progress in comparison the rest of the Caribbean countries this is mainly attributed to the high level in port infrastructure development which the country is currently undergoing. Furthermore, Jamaica has implemented new trade legislation particular that of the SEZ ACT 2016 this has had a significant impact in attracting international companies to conduct their operations within the country. Importantly Jamaica's proximity to the Panama Canal and to east to west trade lanes complements the countries logistics connectivity.

The Dominican Republic and The Bahamas have achieved higher LPI rankings based on the fact that these country have more modern port infrastructural as well as integrated connections to free trade zones. Conversely Trinidad and Tobago and Cuba had received lower LPI ranking, which is largely attributed to the limited port infrastructure and minimum trade.

Their performance can be explained by their highly developed port infrastructure along with integrated modes of transport which are supported by the high volumes of trade originating from their free trade zone. The results of the LPI prove that there is a relationship between Logistics performance and port infrastructural development.

**Figure 1.7 Doing Business Ranking of Caribbean Countries**



The doing business ranking is as illustrated in Figure 1.7, and is a primary indicator of the level of business competitiveness of a country. It measures objectively the business regulations across the economies of countries at both the sub-national and regional level while reflecting the trade levels within these countries. Economies are subsequently ranked on the ease of doing business from 1- 90. A high ease of doing business reveals that the regulatory framework within that country is conducive to enabling business.

The findings from the doing business report 2016 have revealed that Colombia is ranked as the highest at 53 among Jamaica’s competitors with a rank of 67 (Doing Business report, 2016). Jamaica’s ranking is a result of the drive by the government to improve business operations boost employment and increase the FDI by implementing legislation such the SEZ ACT 2016. which provides investors with very lucrative tax incentives which are tied to the Free Trade Zone operations. Conversely, both Panama and Colombia achieved positive a rank, this is based on their free zone regime which created business friendly environment for investors. Contrastingly Trinidad & Tobago, The Bahamas and the Dominica Republic

respectively have received low ranks which can be explained by the insufficient trade policies and lack of a business friendly environment for investors.

**Chapter 5: Free Trade Zone Analysis**

The Port Authority of Jamaica had commissioned the development of a commercial free trade zone and distribution hub in 2014. This facility was dedicated to providing logistics and business solutions for clients within the North, Central and South American markets. The activities within the free trade zone would involve warehousing, assembling operations, logistics services, distribution and value-adding services, for the operator within the zones illustrated in Figure 1.8.

In addition, goods which have been discharged at the terminal would be moved from the terminal to the free trade zone for logistics activities. These activities entailed stripping, repackaging and consolidating. The goods would be then forwarded to the companies' clients anywhere in the world duty-free. Accordingly goods can also be fully manufactured within the free trade zone. The Kingston FTZ conduct its operation., on lands adjacent to the Kingston Container Terminal as a result, the Kingston Container Terminal functioning as a logistics hub, which further enhances the capacity and reach of the operations to distant markets in an efficient and business conducive manner (PAJ, 2016).

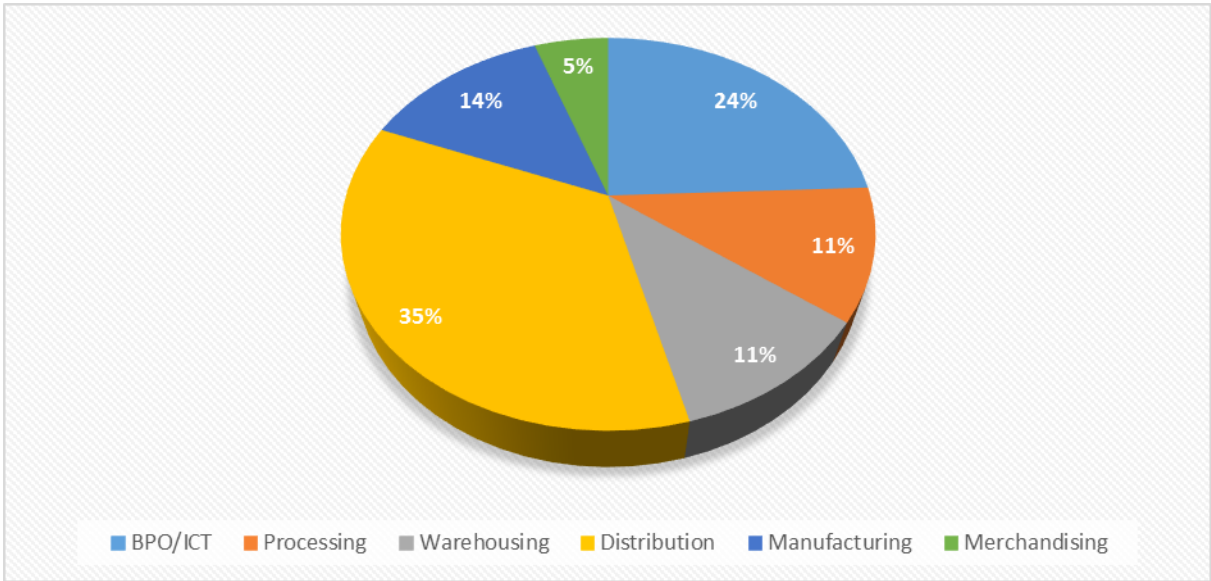
**Figure 1.8 Free Zone Cargo Flow Chart**



*Source: Author, 2017.*

Logistics providers have to now cater to the needs of shippers, by adjusting their systems to offer efficient and environmentally conducive systems which enable supply chains with high logistics quality to expand the focus of operations from the seaports to the hinterland. Furthermore, a regulatory framework through legislations and incentives and financial support from policymakers are critical in order to ensure efficiency is achieved to maintain competitive advantages against rival port hinterlands (Taylor, Francis, 2017).

**Figure 1.9 Kingston Free Trade Zone Activities**



*Source: Port Authority of Jamaica, 2017.*

Importantly Figure 2.0 illustrates the activities conducted within the Kingston Free Zone activities, they are primarily centered around; distribution, manufacturing warehousing, processing, merchandising and business process outsourcing. However, the leading activity is the distribution at 35% followed by business process outsourcing at 24%, then manufacturing at 14% with warehousing and processing activities being conducted equally at 11% and merchandising activities at 5%. The high level of distribution activities which take place within the zone is a result of the strategic location of the Port of Kingston near the Panama Canal and major east–west trade route. Essentially the port is utilized for its transshipment and liner connectivity, while the other activities are being supported by the business enabling environment supported by the incentives (MICAF, 2016).



In light of the developments in international trade and the common trend of industrial distribution, it can be accepted that these developing trend significantly influence the developments of logistics facilities as they contribute to their competitiveness and attractiveness (Cullinane and Song, 1998). Thus the use of FTZ's zones by shippers provides the applicability of features which are found in logistics zones, along with the same operations that are done in logistics centers, freight terminals, distribution centers, warehouses, intermodal terminals and international transport terminals.

The nature of operations done within these designated areas is mainly sanctioned for the transport of goods to be distributed to both the local and international markets on a commercial basis by the operators within these zones (Song, Panayides. 2015). The Logistics center provides various advantages and chief among these are cost reduction whereby goods which are processed within the zones they require circulation warehousing and administrative and other associated cost are greatly reduced. Further activities which take place within the logistics zone include cargo transshipment, cargo synchronization, business facilitation and trade (UNESCAP, 2002).

However, a fundamental requirement to ensure the successful operation of a logistics zone is its location should be in close location to a nodal point of a transportation network, which has adequate infrastructure to enable intermodality and logistics and transportation services. Moreover, logistics zones are established conventionally as a catalyst for foreign direct investment due to its feature of being international free trade zones. Presently modern port logistics systems have moved from beyond simply the loading and unloading of cargoes to and from a vessel, to providing value-adding services apart from the basic operations of warehousing packaging, storage and providing intermodal transportation (Song, Panayides, 2012).

Additionally, many industrial firms consider locating within a maritime industrial development area due to the benefits which are attributed to operators within these areas. More so the primary benefit attributed to operators within these areas cost-efficient transportation of cargo within the zones as well as expedited documentation and processing of goods which are being handled within these zones (Alicke, 2007). In light of the increased competition among hub ports regionally a new wave of emerging growth among ports of lesser developed has occurred. Therefore, national economic support has been placed into developing port infrastructures so as to become competitive with the existing hub ports.

Based on this intense competition among ports, this condition has presented to major shipping lines with an advantageous bargaining option which allows them to negotiate for concessions for dedicated terminals as well as for determining ports of call due to their growth in bargaining power.

Consequently, ports are now being faced with having reduced bargaining power, the result of which means that port now have provided to specific needs of the shipping line whereby over features in their ports which include providing deep-water ports, ensuring quality services, productivity, efficiencies, adequate hinterland infrastructure connectivity which include rail and road. Additional requirements of shipping lines often include ports to offer lower port tariffs, quick vessel turnaround times, accommodation for super large vessels and associated quality services. Due to trend towards containerization, larger vessels, consolidated their operations providing shipping lines with more leverage.

Therefore, the evolving requirements of major shipping lines to ports are based on their leverage of container traffic which they can provide to that port. However, in the eventuality where a port is unable to completely satisfy the requirements of the shipping line the port in most cases tends to lose its major clients. Furthermore, port and container terminal operators are as result constantly under strong pressure from their clients, this results in them reluctantly having to take part in the competition among other rival ports to both retain and attract new clients. Ports are now driven to actively enhance their productivity by investing a significant amount of money into the port development in order to remain agile and competitive and successful.

The modern trend in the port industry is to develop logistics related zones such as free trade zones or international logistics zones so as to accommodate value-added logistics activities as well as to attract global logistics companies. Furthermore, the advantage of specially designated logistics zones, where there feature maybe to offer tax incentives, they are a stimulus for attracting foreign investment and create job employment opportunities. Furthermore, successful logistics zones are able to secure freight volume which can generate by established logistics companies and can also integrate the operations into the hub port. The drive by many ports seeking to attain the level of hub port is primarily due to the advantage of these benefits which are derived in the long term after the development of the necessary infrastructures (ESCAO,2005).

Logistics zones also provide value-added logistics which is a combination of logistics and industrial activities which are done in order to meet specified customer requirements. Moreover, these operations are conducted as much as possible downstream in the supply chain. Hence value-added logistics (VAL) provides the manufacturer with increased flexibility as well as reduced logistics costs, obsolescence risks and import duties. VAL comprises of the following activities which include product configuration, blending and mixing, adding parts, packaging, labeling, sterilizing, preparing documentation, billing customers, customer service by phone, quality control, repairs and the handling of returned goods.

FTZ cover large areas, which can include residential areas such as hospitals, schools and other supporting facilities of businesses and infrastructures. Moreover, free trade zones promote FDI by enabling a good business environment while offering several incentives, globally accepted labor regulations with allowed repatriation and reduction of taxation for foreign investment. These zones are governed outside of national regulation catering to the appropriate nature of the facility within the type of zone. Importantly all economic activities allowed in the zone is outside of customs territory. Moreover, FTZ, which are established often function as a microcosm of a country. A free trade zone is focused on international trade, especially value-added logistic activities involving light manufacturing and processing (ESCAO,2005).

### **5.1 Hypotheses**

If Jamaica can improve and develop it's existing free trade zone and maritime operations, this will result in significant increase in port development. This will also enable the country to maintain its position as a regional container hub. In order to test this hypothesis, a series of statistical tools have been utilized and the appropriate findings of the results explained. The data which will be utilized in the following statistical modeling techniques are comprised data ranging from January 2008 to December 2016. Furthermore, the data source for the vessel arrival numbers, cargo volumes (metric ton) and TEU movements through the Port of Kingston is contributed by the Port Authority of Jamaica while the Free Trade Zone value of trade and types of operation was sourced from the Jamaica Free Zone Authority along with the Statistical Institute of Jamaica.

## 5.2 Regression Analysis

The regression analysis is a statistical tool which is used to determine if a relationship exists among variables. The technique models and analyze the trends and patterns of the variables to reveal the extent to which the dependent variable is influenced by the changes in the independent variables (Raykov, Marcoulides, 2013). The dependent variable is the TEU monthly values of the Port of Kingston and the independent variables include the vessel arrival figures, Monthly cargo volumes at the port and the free zone value of commodities every month the data set ranges from January 2008 to December 2016. The conduct this group regression analysis to determine to what degree in the dependent variable TEU is influenced or explained by the independent variables cargo volumes, free zone values and vessel arrival numbers. The Econometrics Views software (EViews) is a data analytics software and statically modeling will be used to run a multiple regression to determine if there exist variances (Eviews, 2017). The multiple regression formulae as follows.

$$Y = a + b_1 X_1 + b_2 X_2 + b_3 X_3 + u$$

$$Y = \text{TEU}$$

$$X_1 = \text{Cargo Volumes}$$

$$X_2 = \text{Free Zone Value}$$

$$X_3 = \text{Vessel Arrivals}$$

**Table 3 Regression Analysis**

Dependent Variabl: TEU				
Method: Least Squares				
Included observations: 108 after adjustments				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	92064.45	24282.70	3.791360	0.0003
Cargo Volume in Metric Tons	0.133788	0.011734	11.40182	0.0000
Freezone income in US\$	0.019195	0.002534	7.573786	0.0000
Vessel arrival	- 453.7247	154.1165	-2.944036	0.0040
R-squared	0.589494	Mean dependent var		135786.6
Adjusted R-squared	0.577652	S.D. dependent var		30405.42
S.E. of regression	19759.96	Akaike info criterion		22.65704
Sum squared resid	4.06E+10	Schwarz criterion		22.75638
Log likelihood	-1219.480	Hannan-Quinn criter.		22.69732
F-Statistic	49.78187	Durbin-Watson stat		0.384103
Prob (F-statistic)	0.000000			

*Source: Author, 2017.*

The results of the regression analysis are illustrated Table 3. For this purpose, the regression analysis utilizing the Eviews software revealed that the dependent variable was TEU which represents the port infrastructure and the independent variables comprised of cargo volumes, free zone values and vessel arrivals. The results displayed an R<sup>2</sup> of 0.58 or 58%, this reflects a good measure of the variability of the dependent variable which is acceptable. Whereby an R<sup>2</sup> close to 1 indicates the most variability is explained while a R<sup>2</sup> of 0 or close to 0 is an indication of little variability being explained. Additionally, based on the P values of 0.0003 reveals that there is a statistically significant relationship between the variables (Raykov, Marcoulides, 2013).

Moreover, the result proves that Free Trade Zone values and Vessel arrival numbers and cargo volumes do have a considerable influence over TEU capacity in the Port on Kingston this result underscores the fact that port development is the outcome of a combination of the observed factors, which are largely based on efficient port infrastructure, port productivity and support trade regulations present by the special economic zone and previous Free Trade Zone Act.

**5.3 Correlation Analysis**

This explains the degree of relationship between the variables observed. It shows the existence of any direction as an effect between two or more variables. Therefore, a positive correlation between two variables means that the increase of one corresponds to an increase of the other one; while a negative correlation refers to different senses taken by the variables. In terms of the strength of the relationship and be described as being either positive negative or no correlation (Weiss, 2006). Therefore, each independent variable will be analyzed against the dependent variable in order to determine the nature of their relationship.

**Table 4: Pearson’s Correlation Coefficient Table**

<b>TEU</b>	1
<b>CARGO VOLUMES</b>	0.542721002
<b>TEU</b>	1
<b>FREE ZONE VALUES</b>	0.26623638
<b>TEU</b>	1
<b>VESSEL ARRIVALS</b>	0.130327927

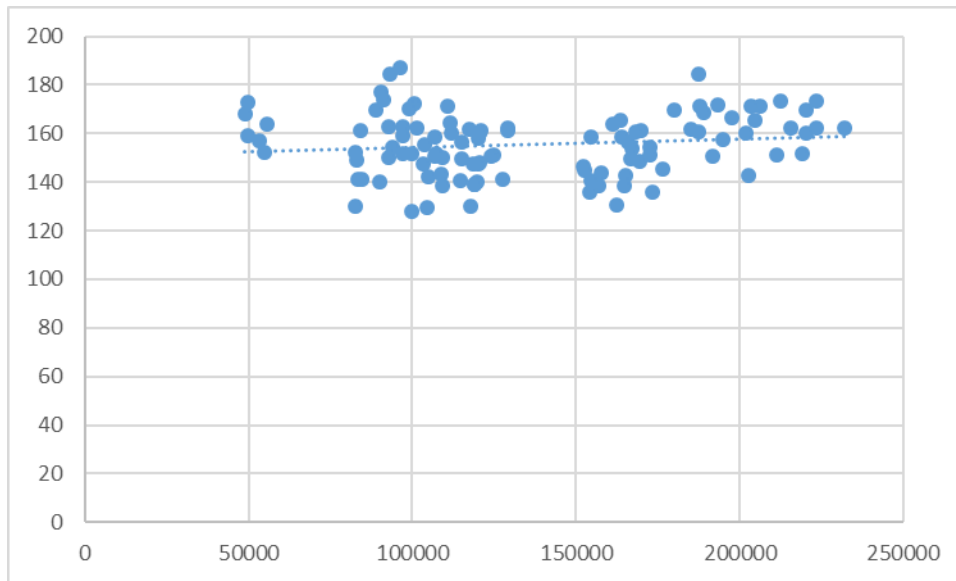
*Source: Author, 2017.*

The Pearson's Correlation Coefficients shown in Table 4 revealed that there was a strong correlation between TEU capacity and cargo volumes. This was reflected with the data showing a 0.542 or 54% correlation. However, the results began to differ when Free Zone Value was assessed against TEU capacity, the results showed that the relationship was weak because the value showed 0.266 or 26%. Similarly, vessel arrivals had limited correlation among TEU capacity which was indicated by the relationship values of 0.13 or 13% therefore of all the variables cargo volumes has the strongest relationship with TEU capacity.

**5.4 Scatter Plot analysis**

Based on the data which was collected a series of scatter graphs were created to further try to establish the nature of the relation between the dependent variable (TEU) as opposed to the individual variables.

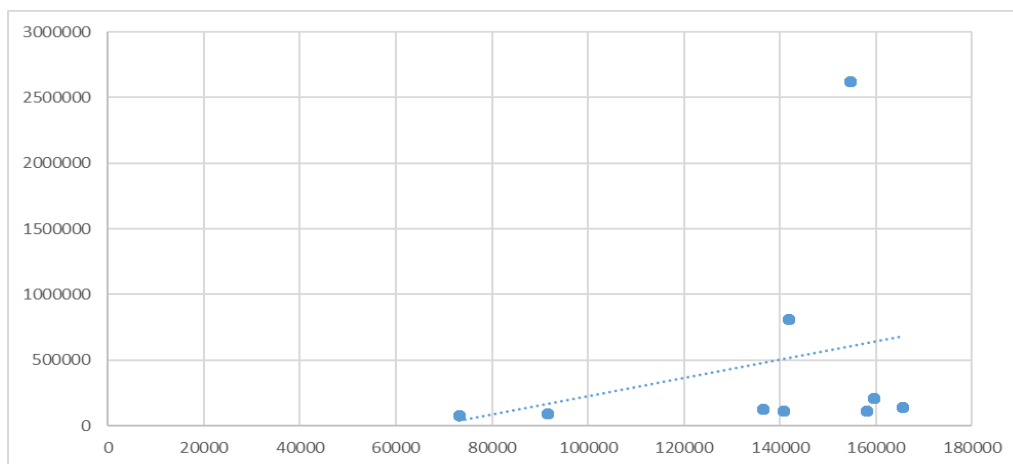
**Figure 1.10 Vessel Arrival Analysis**



*Source: Author, 2017.*

Based on the representation of Figure 1.10 the points cluster in a band from lower left to upper right and this is a good reposition to indicate that Vessel Arrival and TEU capacity a positively correlated as x increases and y increases. Additionally the numbers are increasing on both axes’.

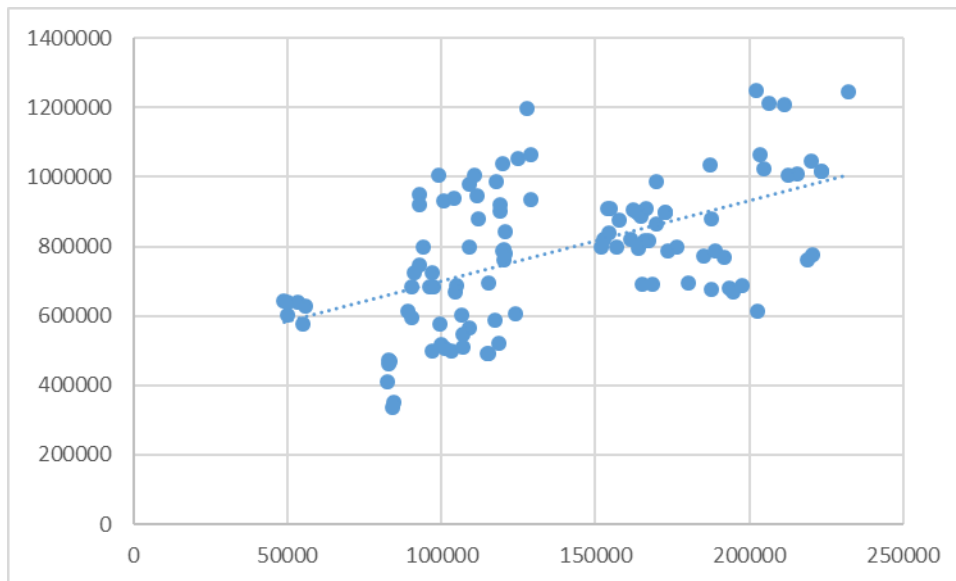
**Figure 2.0: Free Zone Values Analysis**



*Source: Author, 2017.*

Free Zone Values in Figure 2.0 also have positive correlation to TEU capacity. The points cluster band together increasing to the upper right, furthermore the values are also increasing on the x and y axis.

**Figure 2.1 Cargo Volume Analysis.**



*Source: Authority, 2017.*

Cargo volumes appear to have the strongest correlation with the dependent variable being that the points cluster in a band running from lower left to upper right, to strongly support a positive correlation  $x$  and increases respectively clearly depicted in Figure 2.1.

**Table 5 Sensitivity Analysis**

Scenario Summary				
	Current Values:	AVERAGE CASE	WORST CASE	BEST CASE
<b>Changing Cells:</b>				
FZ	3083281	476821	41730	3083281
CV	1248794	785149	334973	1248794
VA	187	155	128	187
TC	232197	476821	48824	232197

*Source: Authority, 2017.*

The summary analysis displayed in Table 5 illustrates three case scenarios to which the Port of Kingston was exposed to namely: fluctuating impacts of free zone values(FZ) cargo volumes (CV) vessel arrivals (VA) and teu capacity(TC).



In order for the port to achieve the best outcome significant infrastructural development is required, along with trade supporting policies. The average case reflects a situation where normal figures for vessel arrivals, cargo volumes and free zone values has resulted in positive numbers for TEU capacity. This case is likely to occur as result of the existing trade policies and efficient port operation at the Port of Kingston. However, the worst case can be attributed to a lack of development of the port infrastructure which adversely affects worst case vessel arrivals have significantly been reduced and TEU capacity. This causes a ripple effect leading to significant decline in the values of the other variables. Moreover, this case can be the result of a failure on the part of the administrators of the port to implement efficient polices, in addition to insufficient port infrastructure.

On the other hand, the best case situation shows acceptable vessel arrival values which clearly improves the values of the other variables. Therefore, for successful TEU values to be achieved in the Port of Kingston. The operators of the port must make the appropriate adjustments to maintain and increase vessel arrival numbers. This can be achieved through improved port infrastructure and efficient operations as well as good trade policies that takes into consideration customs procedures and tax incentives.

## **Chapter 6: Conclusion**

This research has demonstrated that Free Trade Zone activities and maritime activities positively influence port development. In light of the anticipated growth of the global economy, it is only logical that expectations will be great on the demand for port capacity to keep pace with the projected growth of the world economy. Therefore, additional investment in port infrastructure has become inevitable for ports in order for them to maintain their viability and success in the future. Specifically, in the case of the Port of Kingston the findings of the LPI and Doing Business report has proven that Jamaica is competitive in the Latin American and Caribbean region due to its geostrategic location and the efficient services provided at the port. Moreover, the policies implemented by the government e.g. the SEZ ACT 2016 created an enabling business environment which benefits investors, shipping lines, maritime stakeholders and free trade zone operators. The outcome of this policy is evident in the increased cargo volumes and vessel arrival numbers.

Consequently, the research has proven that a country is able to develop its economy through the implementation of Free Trade Zones around its ports of entry. Hence the zones attract foreign direct investment and increase employment numbers. Additionally, logistics and distribution companies have located to the to the Kingston Free Trade Zone due to the strategic locations of Jamaica to the Panama Canal and to major trade routes to conduct mainly distribution and manufacturing activities. Surely with Jamaica seeking to develop as a logistics hub port development is an important aspect. whereby it is an indication of a port reaching its fifth and final stage of development. Moreover, the combination of an efficient transshipment port fully integrated with the free trade zones offer a unique opportunity to stimulate economic growth and national development which has eluded the country of Jamaica in recent years.

The findings from the research with aid of the statistical tools utilized have illustrated that port development can be explained by the variables which were observed in the study. Individually each variable has a different levels of influence on the port development, however when taken as combination vessel arrival numbers, free zone values and cargo volumes collectively create a strong influence on port development. This was definitively supported by the Eviews Regression model therefore validating the basis of the hypothesis of this research.

Additionally, with the aid of the sensitivity analysis the research can definitively hold the view that vessel arrival is the most important variable which has a major influence on port development. Moreover, in the best case scenario all variables responded positively to the dependent variables however in the worst case scenario, the influence of the independent variables moderately impacted the dependent variable thereby proving that development in the Port of Kingston is dependent on vessel arrivals, cargo volumes and free zone operations.

## 6.1 Recommendations

In light of the findings of the research which have been presented, the following recommendations are made in order to provide possible actions that can be taken by the Port of Kingston administrators and the directors of the Kingston free trade zone to encourage a sustainable growth for the Port of Kingston and further its ambition of being a global logistics hub.

1. Provide an effective policy which allows the Kingston Free Trade Zone to extend its boundaries to incorporate more land adjacent to the port. Furthermore, from a policy standpoint a training institution should be established from which a skilled labor force can be readily pulled to fill the job requirements which will occur as a result of the port development.
2. A cohesive system needs to be implemented on the port terminal to effectively synchronize the operations of the Kingston container terminal to that of the Kingston Free Trade zone through a state of the art computer software. This should be done using block-chain logistics principles which can reduce the multiple interventions of customs officials for the clearance of goods and reduce the delays of the maritime operators.
3. To effectively transition into a logistics hub, the Port of Kingston must expand its present arrangement of port infrastructure so as to attract other major shipping lines. This could be achieved by offering the shipping lines their own dedicated terminal as a means to prevent traffic congestion at the port.
4. In order to increase its cargo volumes at the Port of Kingston the managers should commercially approach major logistics providers from East Asia such as Alibaba who would like to expand their market share into the USA eastern seaboard market. Jamaica's transshipment capabilities can also be leveraged, and by extension the Kingston free trade zone can be presented as an ideal location to conduct postponement logistics operations.

5. The Jamaica Special Economic Zone Authority must seek to revise the present SEZ ACT with focus on improving the incentives which are offered to the firm operating in these zones. This must be done so that the zone can remain competitive against rival zones in other countries. This can be done by offering a 0% income tax rate to operators in order to stay ahead of the competition.

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