Development of Panama as a Logistics Hub and the Impact on Latin America

by

Daniel Muñoz
B.S. in Industrial Engineering, Florida State University, 2005

And

Myriam Liliana Rivera
B.A. Economics, Universidad de Los Andes, Colombia, 2003
M.S. Environmental Economics, University of Maryland - Universidad de Los Andes, Colombia, 2004

Submitted to the Engineering Systems Division in Partial Fulfillment of the requirements for the Degree of

Master of Engineering in Logistics

at the

Massachusetts Institute of technology

June 2010

Signature of Authors.....
Master of Engineering in Logistics Program, Engineering Systems Division
May 7, 2010

Certified by.....
Dr. Edgar Blanco
Executive Director, MIT SCALE Latin America
Research Director, Center for Transportation and Logistics
Thesis Supervisor

Accepted by.....
Prof. Yossi Sheffi
Professor, Engineering Systems Division
Professor, Civil and Environmental Engineering Department
Director, Center for Transportation and Logistics
Director, Engineering Systems Division

Abstract

The Panamanian government is executing an aggressive economic growth initiative to transform the country into a regional logistics hub, like Singapore or Dubai. Two elements of the initiative are expansion of the Panama Canal and development of the Panama Pacifico Project, a large logistics park. The government initiative is analyzed with respect to the logistics hubs in Singapore and Dubai by 1) identifying a structure of critical factors for developing a logistics cluster, 2) using this structure to analyze the feasibility of Panama becoming a major logistics hub, and 3) exploring the impact of a logistics hub in Panama on the Latin American network of ports. We make recommendations so that Panama can speedily develop its logistics hub, and so that Latin American ports whose existence is threatened by this development can adapt.

Table of contents

FIGURES

TABLES

1. Introduction

A hub is defined as a regional cross-docking point, where products from multiple supply sources arrive and are sorted in accordance to the needs of the destination points. Products are then delivered to these points without being stored at the hub (Ashton, 2006). Some elements are required to develop a logistics hub, however there is not a consensus about them. While some authors say the key factors are natural endowments, others assure it is the role that the government plays what makes the difference. So far, traditional literature has focused on the key elements rather than in their interaction. There is not work on the prioritization of the elements or specific methodologies for development of logistics hubs.

This thesis proposes a structure of seven critical factors needed for developing logistics hubs, resulting from the analysis of the Dubai and Singapore logistics hubs developments. To analyze these cases, we use Michael Porter's methodology on clusters analysis. In this thesis, cluster and hub have the same meaning, a geographic concentration of interconnected businesses, suppliers, and associated institutions in a particular field linked by commonalities and complementarities, where products from multiple supply sources arrive and are sorted in accordance to the needs of destination points. The proposed structure identifies the key success factors and how they need to be developed by a government to successfully develop a logistics cluster. To catalyze and guarantee sustainability of the logistics hub a continuous improvement towards more value added products and services is needed. Ideally, the cluster should identify and promote activities that make it unique and differentiate it from other logistics hubs.

The proposed structure of critical factors is used to analyze the development of a logistics hub in Panama. A comparison between Panama's current situation and future plans in these seven areas against Singapore and Dubai's is presented.

When a hub develops it has an impact in the region, especially in the logistics infrastructure. Robinson (2008) explains a hub development impacts other ports in the region and changes the importance of ports in shipping networks. Furthermore, (Fujita & Hisa, 2004) specify a hub development shifts trade patterns and infrastructure needs. The Panama logistics hub development will have an impact in the Latin American system of ports, which will have to decide to compete, or to cooperate and compete. To produce an integral study of the Panama logistics hub development this thesis analyzes also the Latin American shipping network and identifies the ports that will be impacted directly in the short term. To do so, a qualitative analysis supported by interviews with agents involved in the Latin American Shipping networks is used. Recommendations for both the Panama government and the Latin American affected ports are provided to maximize the benefits from the hub development.

The structure of this thesis is as follows. Chapter 2 presents the background, which explains the two parts of the Panama initiative, the Panama Canal expansion and the development of Panama Pacifico. Sections 3 and 4 present the literature review and the methodology. Cases of Singapore and Dubai, which developed successful logistics hubs, are analyzed in chapter 5 to propose the structure of critical factors for developing a logistics hub in chapter 6. In section 7, we applied the proposed structure to analyze the case of the Panama logistics hub. Chapter 8 analyzes the impact of the Panama hub development in the Latin American port network. Finally, section 9 presents conclusions and recommendations for the Panamanian government for faster development of the Panama Logistics Hub and for the Latin American affected ports to manage it.

2. Background

The Panamanian Government is strategically transforming Panama into a regional logistics hub, similar to the way Singapore was transformed for southeast Asia and Dubai for the middle- east. The main two elements of the Panamanian government strategy are the expansion of the Panama Canal and the development of the Panama Pacifico Project. After describing these two elements, the benefits of the Law 41, passed to facilitate the hub development, will be discussed.

First, the Panama Canal expansion program consists in the construction of two new sets of locks in addition to the existing ones, one on the Pacific side and one on the Atlantic side of the Canal. Each lock will have three chambers and each chamber will have three water reutilization basins. The project requires the widening and deepening of existing navigational channels in Gatun Lake and Culebra Cut (Master Plan, Panama Canal Authority 2006). This expansion increases the now 4,400 MAX TEU per panamax ship to 12,600 TEU per post-panamax ship by 2015, while investing of $5.25 Billion dollars.

Panama Pacifico is a 40 years master project to create a logistics hub by developing the 3,500 acres of land on the site of the former U.S. Howard Air Force Base. This base was located at the entrance of the Panama Canal on the Pacific Ocean, directly across the canal from Panama City. The initiative wants to turn this property into a business hub with a variety of uses and services including corporate headquarters, call centers, offices, logistics facilities, new homes, retail, schools and other amenities.

Panama Pacifico has been defined as a Special Economic Zone, which offers legal, customs, immigrations and labor benefits, extensive tax incentives, and a single government agency created to expedite permitting and assist businesses (Master Vision, Panama Pacifico, 2008).

Expansion initiatives around the world of the kind going on in Panama, like the development of Singapore, Hong Kong, and Dubai port facilities, illustrate that regional shipping networks make countries and their ports relative winners or losers. The planned logistics investments in Panama will impact Latin American shipping network. Additionally, the government created a one-stop shop for all transactions dealing with starting and maintaining operations in Panama Pacifico by integrating all governmental agencies into one called The Agency for the Special Economic Area of Panama Pacifico, abbreviated as AAEEPP for the Spanish name.

Agencies included in the AAEEPP represent thirteen governmental organizations and guarantee efficient services, reducing bureaucratic delays for new business. The area is designed to attract added value services and to complement the Colon Free Trade Zone. Panama Pacifico provides services for all logistics operations, service of maritime and aerial fleets, light manufacturing and assembly, call and service centers. The largest benefits, result from Law 41 of 2004 and 2007[1], are mostly directed to companies that decide to open operational headquarters.

[1] Law 41 was first introduced in 2004 to address the initial benefits of the special economic zone. The modified Law 41 of 2007 addresses special benefits for companies' headquarters moving to Panama.

3. Literature review

The literature review will focus on hub development and the impact and interaction of logistics hub in other ports.

3.1 Hub development

To develop a hub some natural characteristics and some catalyst are required. The natural characteristics like location, industrial base, good infrastructure and efficiency in logistics activities, translate in competitive costs advantages (Hayes, 2006). Cullinane (2004) defines interaction with adjacent networks of cargo and location as the two most important characteristics for the development of regional hubs.

Government support has been identified as the most important catalyst for the success of a hub (Hayes, 2006). Government support guarantees economic incentives for companies not only located in the hub, but also doing business with other hub companies. Government support motivates an increase in international investment in the country. Also, Hubner (2005) in a study on "The role of changing transport costs and technology in industrial relocation" states that the success of a hub depends on the competitive advantage in labor cost, which is critical as relocation decisions are made on the basis of competitiveness factors for production. As Robinson (1998) describes, successful hub developments in Singapore and Hong Kong had been enhanced for these natural characteristics and catalysts.

In the case of Panama, the country natural advantages like localization and developed infrastructure has been recognized. The Canal presence provides strategic localization and a promise for faster development (ACP, 2006). Brito (2010) realizes a feasibility analysis of a global logistics hub in Panama. The purpose of the survey was to get respondents to rank the

elements they believe are more important when making a decision about placing a global logistics hub in a specific location. The original questions where divided in four main areas: physical and technical infrastructure, cost environment, political and administrative perspective and geographical location. The results in table 1 represent the key elements for a successful global logistics hub, however they do not present a structure process to be followed for developing a logistics cluster.

Table 1 Survey results ranked modified

Rank	Description	Original Sub Division	Critical Factor
1	Global Strategic Position	Location	Strategic location
2	Hinterland Size, development and potential	Infrastructure	Strategic location
3	General GLH Accessibility	Infrastructure	Strategic location
4	Vorland Development	Location	Strategic location
5	Proximity to Import/Export Areas	Location	Strategic location
6	Intermodal Network development	Location	Strategic location
7	Freight and Transshipment Costs	Costs	Cost of Operation
8	Industrialization Costs	Costs	Cost of Operation
9	Land Availability and Cost	Costs	Cost of Operation
10	Adequacy infrastructure Facilities	Infrastructure	Infrastructure
11	Cost of labor	Cost	Human Resources
12	Taxes/Subsidy to Business Activities	Administrative	Effective Processes
13	Administrative efficiency	Administrative	Effective Processes
14	Customs Regulations	Administrative	Effective Processes
15	Political Stability	Administrative	Government Commitment
16	Soundness of Investment System	Administrative	Government Commitment
17	International Trade Soundness	Administrative	Government Commitment
18	Business tradition/Potential	Administrative	Government Commitment

Source: Brito, 2010.

Similarly, the World Bank in its Logistics performance indicator (LPI) has identified six dimensions to determine the logistics friendliness of a country. The LPI is the result of surveys to different industries that use or serve the logistics of a country. The six factors are:

- Efficiency of the clearance process (i.e. speed, simplicity and predictability of formalities) by border control agencies, including Customs;

- Quality of trade and transport related infrastructure (e.g. ports, railroads, roads, information technology);
- Ease of arranging competitively priced shipments;
- Competence and quality of logistics services (e.g., transport operators, customs brokers);
- Ability to track and trace consignments;
- Timeliness of shipments in reaching destination within the scheduled or expected delivery time.

The result from the survey measured specific dimensions without analyzing interrelations and the order or structure in which they need to be developed or prioritized.

3.2 Impact of hub development in other ports

The development of a hub or competitive ports has been the topic of several academic journals. Robinson (1998) describes the dynamics of network changes with the development of Hubs. While Fleming (1999) has described in detail the meaning of competition, and Cullinane (2004) has described specific examples of this dynamics between ports. Song (2003) developed more theoretical frameworks of the reaction of ports to the development of logistics hubs. Graham (1998) discusses in detail the imbalance of competition in the container shipping market, given the competitive pressures of the industry and illustrates the relationships between shipping lines, port operators and governments to react to the changes in the market.

Network methodology is most often used to analyze the development of hubs. Robinson (1998) characterized the inter-container network of the Singapore-Japan into the mid 1990's to understand the networks structural growth and dynamics based on high efficiency/ high cost operators with the support of lower order network. Concluding that the emergence of hierarchical

port/shipping networks handling containerized cargo under conditions of rapid growth follows three steps: 1. Conventional liner break-bulk services, 2. Decomposition of the port/shipping network into mainlines links supported by feeder shipping links (that will become new networks), 3. Reorganization of port system networks (main and feeders) depending on the flows of cargo among them. The transformation of the network will be driven by dynamics of competition or cooperation.

Competition, cooperation and coopetition [*sic*] are the strategies that ports can adopt in order to handle hubs and other ports in the regional system. Fleming (1999) defined competition of ports as a relation between both port authorities and carriers. Port authorities compete with each other to offer more and better services while carriers find cheaper and faster ways to move cargo Fleming also explains the six elements that provide competitive advantage for ports over others: tradition and organization, accessibility, state aids, productivity, carrier's preferences, and comparative location advantage.

Song (2002) explores the regional port competition and cooperation in Hong Kong and South China. He concludes it is better to cooperate than to compete and there are seven elements that support the cooperation of ports: risk reduction, economies of scale, rationalization, technology exchanges, blocking competition, overcoming investment barriers, and facilitating international expansion. Kevin Cullinane (2005) describes in detail the competition between Shangai and Ningbo growing as a hub, focusing mainly in the relative competitiveness of the two ports based on price and quality of service. Concluding that Ningbo will have greater market share of the growing demand of port services in the region given its advantages in its natural endowments, price and quality of service. Besides, competition and cooperation, Song (2003) proposes a new strategic option known as coopetition, which is the combination of the

competition and cooperation. After analyzing the case of container ports in Hong Kong and South China, the paper concludes that ports decide cooperate to compete against another port, if profits using this strategy (coopetition) are higher than profits cooperating with the other port or hub.

4. Methodology

To analyze the initiative to turn Panama in a logistics hub and its impact on other ports in Latin America, this thesis uses a case analysis methodology. Singapore and Dubai logistics hubs cases are analyzed following Porter (2008), considering the history of hub development, the cluster map and factors for success. The hub development history provides a framework to understand the critical issues behind each cluster growth. The cluster map provides a clear picture of the agents and their relationships in the hub. The factors for success identified in these cases will be used to explain the cluster development.

A cluster or hub is a geographic concentration of interconnected businesses, suppliers, and associated institutions in a particular field linked by commonalities and complementarities. The geographic scope of a cluster goes from part of a city to a group of countries. Clusters have the potential to affect competition in three ways by increasing the productivity of the companies in them, by driving innovation in the field and by stimulating new businesses in the field (Porter, 2008). Three types of clusters, based on different kinds of knowledge, are recognized. First, techno clusters: highly technologically oriented, well adapted to the knowledge economy, and typically have renowned universities and research centers in its core, like Silicon Valley. Second, historic knowhow-based clusters, often industry clusters, are based on more traditional activities that maintain their advantage on the know-how over time like London as a financial center. Third, factor endowment clusters are created because they might have a comparative advantage linked to a geographical position, for example logistics and transportation clusters (Porter, 2008).

Based on cluster map structure in Porter (2008) we analyzed logistics hubs using the cluster map presented in Figure1. This structure incorporates four components of a logistics cluster: 1) the cluster core, comprised of logistics services, transportation services and logistics

operators; 2) supported industries; 3) related industries; and 4) other critical institutions, which enhance the cluster development.

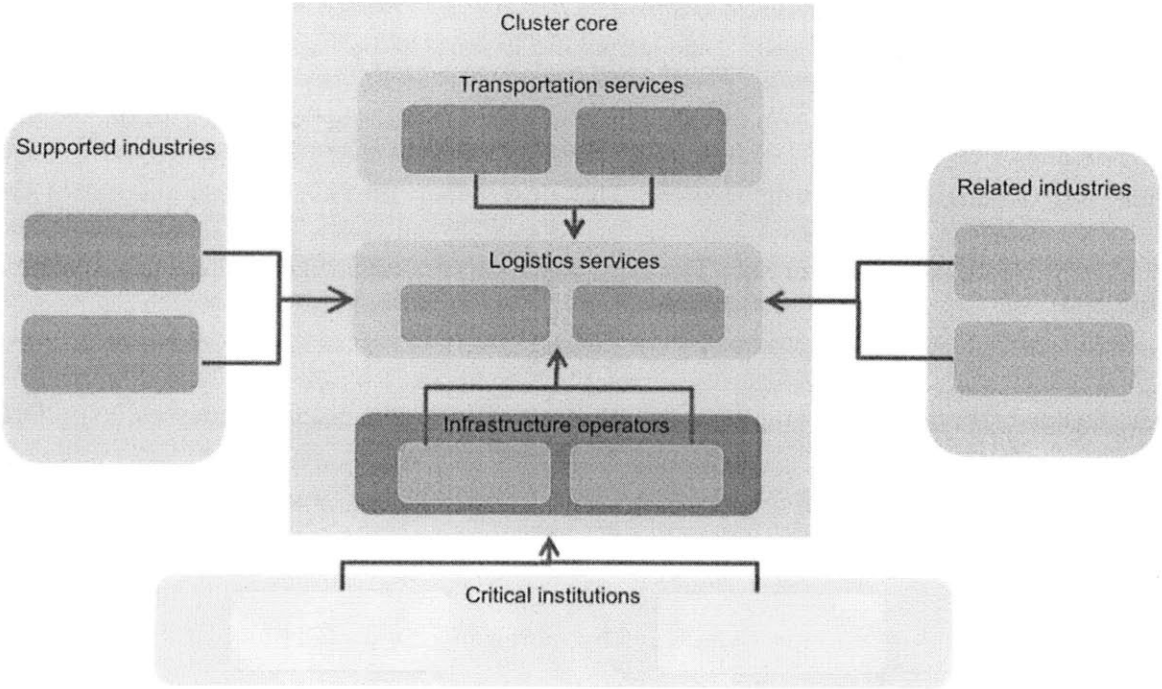

Figure 1 Framework for logistics cluster analysis

After analyzing the clusters' similarities, a structure of critical factors for the developing of a logistics cluster is proposed. To analyze the Panama hub development's initiative, the structure in figure 1 and the Porter (2008) methodology were used, as well as benchmarking with Singapore and Dubai. The impact of the Panamanian initiative in other Latin American ports is approached using a deductive analysis, considering secondary information and interviews conducted with several agents involved in the Latin American system of ports.

5. Cases of successful logistics hubs

5.1 Case of Singapore

Singapore is located in the southern end of the Malay Peninsula. It has a strong and free economy, in which the logistics and transportation sector plays a determinant role. The share of the transportation and communication sector in GDP in 2007 was 14.6% with a real growth of 8.8% in the previous five years (World Bank, 2009). The city-state is a global shipping and logistics hub and many multinational firms have chosen Singapore to establish their headquarters and company's offices.

Figure 2 Singapore logistics hub

5.1.1 History

Over a period of 30 years, Singapore was transformed into a developed country. At its independence in 1959, the country had cultural differences, a weak private sector and a 14% unemployment rate. To develop the country, the government decided to concentrate on six policies: investment in the state, active encouragement of foreign investment, pro-business environment, free trade, a tight monetary policy, and high savings rate (Porter, Neo, & Ketels, Remaking Singapore, 2010). All these policies were key foundation for the development of the Singapore logistics hub consisting of three main stages: institutions and infrastructure development, foreign direct investment (FDI) attraction, and value added services and capacity expansion (figure 3).

Stage	Year	Event
Infrastructure Development	1937	Kallang Airport was opened
	1955	Paya Lebar Airport opened
	1969	The Port of Singapore Authority (PSA) was formed
	1972	Tanjong Pagar first container port in SE-Asia (1)
	1972	Singapore Airlines created
	1975	New airport at Chanhi replaced Paya Lebar Airport
FDI Attraction	1980	PSA became High-Tech
	1981	Changi Airport opened for operation
	1991	New Terminal and Tanjong Pagar (2)
	1995	Creation of the Maritime and Port Authority of Singapore (MPA)
Value Added Services and Expansion	1996	Expansion terminal 1 and 2 finished
	2003	Expansion in cargo infrastructure
	2006	Opened low-cost terminal

Figure 3 History of Singapore logistics cluster

5.1.1.1 Institutions and infrastructure development

In its post-independence days, Singapore established government-linked companies and statutory boards to provide an infrastructure necessary to improve living conditions and to make the country attractive to foreign direct investment. The Government soon had stakes in almost all areas of the economy. However, these companies were different from the usual governmental companies. Government owned firms in Singapore were not dependent on the government for their survival; they were managed as private businesses, administrated by technocrats (not bureaucrats) and focused on achieving greater return on investment. Some of these companies in logistics activities were the Port of Singapore Authority (PSA), in charge of port operations, and Singapore Airlines.

In 1969, the PSA was formed to take over the functions, assets and liabilities of the Singapore Harbour Board. With the development of Jurong Industrial Estate, a large international business park, the Jurong Port was opened in 1965. Further expansion followed in the 1970s when Singapore built the first container freight terminal in at Tanjong Pagar and introduced a 24-hour berthing service. Also, the PSA converted the British Naval Base Store Basin into the Sembawang Wharves, a ship-repair center that grew rapidly. Pasir Panjang Wharves was set up in 1974; at that time, PSA operated five maritime gateways: Keppel Wharves, Jurong Port, Sembawang Wharves, Tanjong Pagar Container Terminal and Pasir Panjang Wharves. There were about 12 km of wharves and more than 1.5 million square meters of warehouses (Chee, 2002).

Singapore International Airlines (SIA) is another example of Singapore's successful government linked companies. SIA was formed from the remaining of Malaysia Singapore

Airlines (MSA) in 1972. It grew from a small regional airline to one of the world's leading passenger carriers and cargo top operators in the world. In 1975, the Singapore government decided to develop a new airport at Changi to replace Paya Lebar Airport which opened in 1955 and operated at a maximum capacity of 4 million passengers a year. As soon as it was opened in 1985, it handled 8.1 million passengers in its first year, 193.000 tons of airfreight and 65,054 aircraft movements, doubling the airport capacity in the country (Singapore Airlines, 2008).

By the 1980s, the volume of container traffic at Tanjong Pagar Container Terminal and the overall increase in cargo handling was stretching the capacity of its staff. As a result, the PSA decided to implement high-tech using automated and computerized machinery for port operations. Operations efficiency increased and the use of advanced technologies spread to other infrastructure operators.

5.1.1.2 Foreign Direct Investment (FDI) attraction

With no capital of its own in the 1960s, the Singaporean government saw the importance of foreign direct investment as a route to growth. In the1960s the government had the first Economic Expansion Incentives Act passed to attract manufacturing firms. The act provided tax relief "Pioneer" status, tax exemption for a period of five to ten years, given to both start-up companies and multinational corporations making significant investments in Singapore.

Singapore selected specific sectors to concentrate the investment flowing into the country. These sectors were petrochemicals, transportation and logistics, finance, and information technologies. The first strategy was to attract one or two large multinationals to the country. After one or two anchor companies were established in Singapore, the investment flow increased. For example, in petrochemicals the government attracted Shell and Esso to establish oil refineries. By the mid 70s, Singapore became the third largest oil-refining centre in the world.

By the 1980s, the Singapore government encouraged the presence of multinational giants even more by providing them with skilled and technically sound manpower and infrastructure, not only in transportation and logistics, but also in information technologies. The government set up the International Enterprise Singapore in 1983 to promote the export of goods from Singapore and establish it as a major international hub. Free Trade TradeNet, the first e-trade processing system, was launched in 1989 by the Trade Development Board. The total number of foreign multinational companies operating from Singapore reached 7,000 by this time (Lim, 2009).

As the number of companies increased, the demand for transportation and logistics services grew, having a positive effect in the development of the cluster. Furthermore, although multinationals remained at the core of Singapore's economic strategy, the government also improved the conditions for local companies by creating the Productivity and Standards Board to identify and nurture promising small and medium enterprises to become Asian multinational corporations.

5.1.1.3 Capacity expansion

Further capacity expansion in infrastructure and improvements in administrative processes have been constantly made to satisfy demand requirements. In the 1990s the second Terminal in the Changi airport was opened and five years later the first major renovation of Terminal 1 was completed at a cost of US$120 million. Further expansions in Terminals 1 and 2 and the approval for building the terminal 3 were done in 1996. The main objective of the new terminal was to extend airport capacity to accommodate more than 70 million passengers. In 2002, Changi Airport Mass Rapid Transit (MRT) station started operations, enhancing ground access to and from Changi Airport. In 2009 Changi Airport was corporatized. Consequently, Changi

Airport Group has managed the airport as the airport operator while CAAS has continued its regulatory functions. The move was aimed to create a more nimble and competitive organization to strengthen Singapore Changi Airport's position as a premier air hub (Changi Airport Group, 2009). Several expansions and improvements have also been made to maintain the large port's capacity. The Singaporean government has viewed the port as its lifeline, devoting as much capital to augment the facilities as it could afford. The result has been a perpetual state of expansion and upgrading.

5.1.2 The logistics cluster in Singapore

Singapore is the most important logistics hub in the world. A graphic representation of the logistics cluster is presented in figure 4 with a detailed description of its elements.

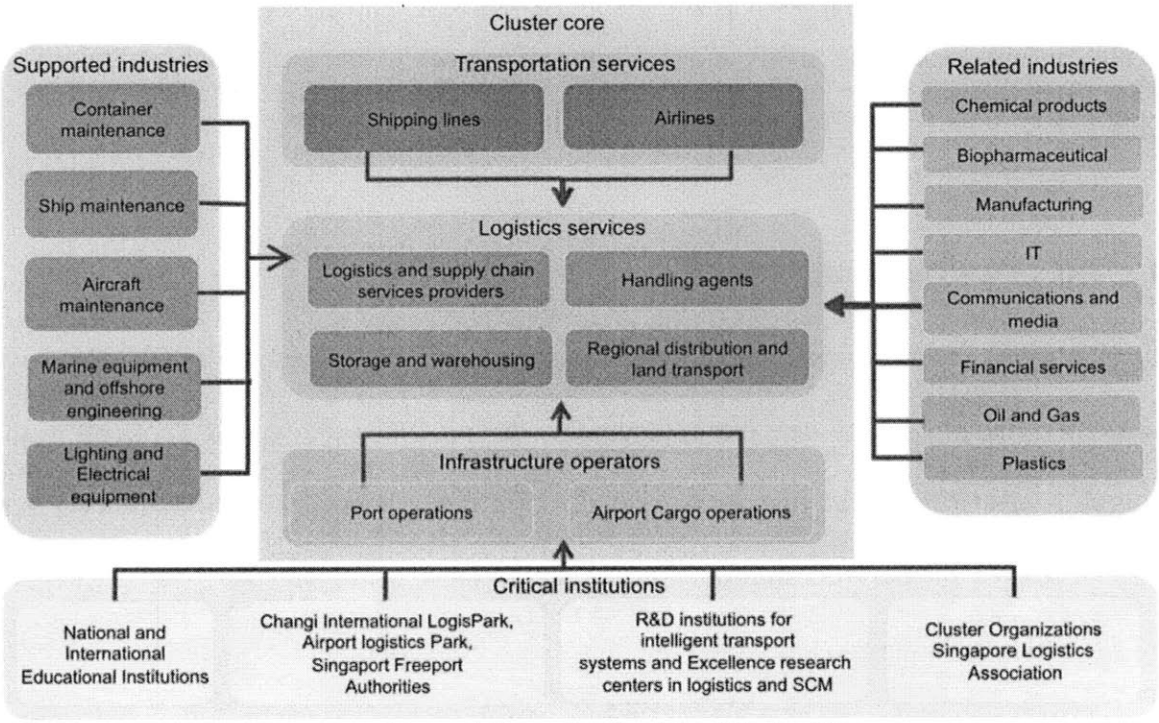

Figure 4 Singapore Logistics Cluster Map

Logistics services, transportation services and infrastructure operators form the core of the Singapore logistics cluster. The success of the logistics cluster in Singapore has been the result of

the integration of four industrial sectors. On one hand, aviation, maritime and land transport, which provide transportation services, and on the other logistics and supply chain management (SCM) services, which provide specialized high value logistics services.

Logistics services like storage and warehousing, cargo handling and distribution are offered in Singapore. However, the country has been able to move forward in the value chain and provide value added logistics and supply chain management services. The Logistics and SCM sector incorporates companies that configure solutions for the global supply chain of manufacturing and services industries. With more than twenty of the top 25 third party logistics companies (3PLs) providing their service there, Singapore gives access to world-class supply chain solutions. Furthermore, most of these 3PLs, including DHL Exel Supply Chain, UPS and Schenker, have established regional headquarters functions in Singapore, providing local manufacturing and trading companies with the ease to move freight all over the world. Together with other supply chain management companies in Singapore, these 3PLs have developed innovative solutions beyond the traditional functions of cargo handling, inventory logistics management and transport arrangement to assist their Singapore based and regional clients in managing complex global supply chains. Also, through the heavy investment of 3PLs, Singapore has also developed facilities and capabilities for specialized handling of products such as temperature and time-sensitive clinical and diagnostics materials to meet the needs of customers in the pharmaceutical and biomedical industries (Compare Infobase Limited, 2010).

Regarding transportation services, Singapore has a geographic advantage, which has been exploited through infrastructure development. Singapore is a crossroads of international shipping routes and a major maritime hub. It is host to several multinational-shipping giants such as

Pacific International Lines (PIL), Neptune Orient Lines (NOL), APL, NYK, Mitsui, P&O Nedlloyd and scores of other ocean liners. Singapore is linked to more than 600 ports worldwide by over 200 shipping lines in 123 countries (PSA Singapore Terminals, 2010). In Aviation, the hub has a critical mass of world-class players and excellent aerial connectivity. With over 80 airlines, it is connected to 200 cities in 60 countries. Singapore Airlines (SIA) is one of the largest operating fleet all over the world. SIA Cargo is the world's third-largest cargo airline in terms of international freight ton-kilometer (FTK). It has a flight network spanning 36 cities in 18 countries, managing an 8 billion FTK capacity(Changi Airport Group , 2009).

Infrastructure operators include port and airport cargo operations. The Port of Singapore Authority (PSA) is one of the world's busiest ports handling a large volume of container traffic daily. The PSA has several terminals, which regulate the movement of cargo containers meant for export. PSA Singapore Terminals are the world's busiest transshipment hub, handling about one-fifth of the world's total container transshipment throughput, and 6% of global container throughput. It is also one of the world's largest refrigerated container (reefer) ports with about 6,000 reefer points, with a handling capacity of more than a million reefers. In 2009, it was voted "Container Terminal Operator of the Year" at the Lloyd's List Asia Awards for the 9th time, and the "Best Container Terminal Operator (Asia) for the 20th time at the Asian Freight & Supply Chain Awards(PSA Singapore Terminals, 2010; Changi Airport Group , 2009). Changi Airport is operated and managed by Changi Airport Group. It is one of the world's busiest airports for air cargo, handling over 1.9 million tons annually, half of which is transshipment volume.(Changi Airport Group , 2009)

Regarding supported and related industries, which enhance the economic activity of the cluster, Singapore's marine and offshore engineering industry is known worldwide for its

strengths in offshore exploration and production platforms. Local shipyards have captured more than 60 percent of the world market for new jack-up rigs since 1996. (Compare Infobase Limited, 2010). Singapore is also a leading player in global shipbuilding and repair markets as well as being home to key oil & gas infrastructure and equipment companies. Container and aircraft maintenance industries are well developed, as well as electrical and communication equipment. Singapore has a one-stop aerospace repair and overhaul services and related services; component and system manufacturing(Ravindran, 2007). Singapore is a diversified economy with many other clusters related to logistics activities like chemicals, biopharmaceuticals and plastics, IT, financial services and manufacturing. For example, Singapore has several regional headquarters for automotive companies, plus development and manufacturing operations for high-value components.

Singapore has several national and international educational institutions in logistics and supply chain with a wide offer that ranges from technical training courses to PhD studies. There are also efforts in R&D and test bedding, which include emerging transport technologies such as intelligent transport systems and research centers in logistics like the Logistics Institute - Asia Pacific, product of the collaboration between the National University of Singapore (NUS) and the Georgia Institute of Technology (Georgia Tech), focusing on global logistics, information technology, industrial engineering and supply chain management. Singapore has also some logistics business associations and specialized infrastructure in free zones. Singapore's specialized infrastructure includes the Airport Logistics Park of Singapore (ALPS), which enables value-added logistics and regional distribution activities to be undertaken within a free trade zone. Finally, the Changi International LogisPark that facilitates regional distribution and the Singapore Freeport.

5.1.3 Factors for success

There are eight factors that contribute to the success of the Singapore logistics hub. The factors are described below.

5.1.3.1 Government and economic stability

Historically, Singapore has had a stable government and economic policy. In 40 years it has had four prime ministries with a strong continuity on policies, rules and institutions. Singapore does particularly well on the effectiveness of its public institutions. The government picked up the logistics and transportation sector 30 years ago, thinking that the country should build on its natural advantages, and created the proper regulation and incentives to increase its development. The government has prioritized macro-policies that impact this cluster and others like minimizing the documents, timing and costs for international trade. Singapore ranks second and first worldwide in offering the cheapest cost for exports and imports respectively. To export a container in Singapore requires 4 documents, takes 5 days, and costs US456, ranking second in the world below Malaysia. To import a container it requires 4 documents, takes 3 days and cost US$439, ranking as the cheapest place for importing (World Bank, 2009).

5.1.3.2 Infrastructure development

The Singaporean government identified infrastructure development and improvement as required conditions for enhancing economic growth and social integration. The government developed transportation and urban infrastructure mostly in the 70s and 90s building on previous British facilities. In recent years it has privatized some of this infrastructure but still keeps most of the control over them. Additionally, IT infrastructure was developed to stay ahead in the quality of services offered. Its port, the world's busiest for the fifth consecutive year and the most efficient,

overtook Hong Kong to become the world's largest container port (in terms of the number of containers handled). Changi Airport was voted the world's best airport for the third straight year and Singapore Airlines, regularly named the best airline in the world, was also the most profitable(Porter, Neo, & Ketels, Remaking Singapore, 2010).

5.1.3.3 Tax policy and anchor of companies

Tax incentives have been used to help move Singapore up in the value chain as its economy matured. They were given specially to manufacturing companies in the 1960-70s, financial service firms in the 1980s and technology in the 1990s. The industrialization transformed the manufacturing sector to produce higher value-added goods and achieved greater revenues. The service industry also grew during this time, driven by demand for services by ships calling at the port and increasing commerce. In Singapore history economic incentives have been used to drive the development of specific sectors and to move forward in the value chain. Although the country has offered tax incentives, it has also enhanced competition and avoided paternalist behaviors, with private and public sectors.

Singapore particularly excels on its openness to global trade and investment. That is why it exhibits a high level of integration with the global economy. While this openness has exposed the country to negative externalities of an international crisis, it is one of the key drivers of its sustainable prosperity. As an investment location, Singapore has been highly attractive for foreign companies. Its excellent business environment, qualified human capital, well-maintained infrastructure and government transparence provides incentives for firms to move to the country. Furthermore, Singapore consistently ranked among the top countries in the world openness and freedom for private business operation. Singapore has a growing number of free trade agreements (FTA) and an active outward investment approach of government-linked companies.

5.1.3.4 Zero corruption

Singapore continues to be ranked as the best country in the world in terms of rules and regulations affecting business (World Bank, 2009), while corruption has been all but non-existent (Porter, Neo, & Ketels, Remaking Singapore, 2010). In World Bank's Doing business report, companies recognize Singapore as a zero corruption country, where processes are transparent and efficient to minimize transactional costs. Government-linked companies act as private companies aiming for profit maximizing and minimizing costs while managed by technocrats, who are promoted using a meritocracy process. The evidence suggests that government linked companies can match the performance of their best private sector-owned peers, if they are appropriately governed and the market environment is right. Furthermore, Singapore's public administration was increasingly seen as a global role model that attracts visitors and study missions from all around the world (Ketels, Lall, & Siong, 2009).

5.1.3.5 Human capital

Singapore's prosperity has been driven by a qualified human capital. At the beginning Singapore didn't have the highly educated workforce needed to attract world-class companies to the country. To attract high-level workers, incentives like high salaries and good quality of life were provided, while developing an aggressive educational policy to enhance quality. (Table 2 shows the increase in the share of non-residents in Singapore total population). Investment was directed to increase coverage and quality of education focused on science and math, and match the skills needed in chosen sectors(Ketels, Lall, & Siong, 2009). BERI's 2005 Global Labor Force study rated Singapore as having the best workforce, although the average years of schooling of workers still lagged behind other Asian countries (Porter, Neo, & Ketels, Remaking Singapore, 2010).

Table 2 Share of non-residents in total population

Year	1970	1980	1990	2000	2009
Non-residents	2.90%	5.50%	10.20%	18.70%	25.30%

Source: Singapore Department of Statistics

Although, Singaporean productivity has growth for 30 years, there have been problems. For example while attractive to unskilled workers, Singapore had encountered difficulty attracting skilled workers from elsewhere and retaining its own. At the beginning of the 90s many families left the country and this brain drain was prevalent particularly among Singaporeans of Malay and Indian descent. As a response, the government used a wide range of policies. From relaxing the stringent resident status criteria for up to 25,000 skilled workers from Hong Kong and their dependents, to founding a matchmaking service aimed to find husbands for well-educated Chinese women, who were marrying at a later age and having fewer babies. (Porter, Neo, & Ketels, Remaking Singapore, 2010).

5.1.3.6 R&D

Singapore provides a strong mix of world-leading quality in education with high R&D spending, solid quality of research institutions, and effective collaboration between companies and universities. Educational and research centers work on applied research aligned with the needs of the productive sector. Singapore ranked 9th in spending on R&D and 13th on the number of researchers in the workforce. The National University of Singapore (NUS) was ranked 30th globally, behind one Australian and two Asian regional competitors and 11th in the disciplines associated with technology.(Porter, Neo, & Ketels, Remaking Singapore, 2010)

5.1.3.7 Related and supported industries

Singapore has a group of well-developed industries. As more manufacturing companies outsourced activities that were formerly done in-house, related business services such as legal counseling, accounting, management consultancy, advertising and logistics have grown rapidly. Also, Singapore has been actively promoting high value-added, knowledge-based and internationally exportable services since they have strong growth potential. These include service clusters such as IT, communications and media, logistics, education and healthcare (Singapore Department of Statistics, 2008). Remarkably for a relatively small economy, Singapore ranks relatively high on clusters development and supporting and related industries. This is a clear reflection of the economy's high level of specialization, and the government's focus on developing specific sectors (Asia Competitiveness Institute, 2009).

5.1.3.8 Continuous improvement

Singapore has had the talent to move forward in the value chain. Its economy drivers have moved from manufacturing industries to a strong services sector. As soon as productivity steadies, the government calls for a high level public-private advisers committee formed by company CEOs, Ministries and well-known public figures, University' Deans and other high level leaders to analyze what the next step should be. That's how Singapore has been changing the focus sectors and moving up to more value added ones. The role of government in this process has been important. The government has set up a number of programs to strengthen skill development, achieve operational upgrading, assist small and medium enterprises in the use of IT, and support entrepreneurship in the cluster (Porter, Neo, & Ketels, Remaking Singapore, 2010).

5.2 Case of Dubai

Dubai's logistics hub is the dominant logistics hub in the Middle East. Its privileged location in the south of the Persian gulf on the Arabian peninsula gives it natural competitive advantages not only for regional trade, but also for trade between Asia and Europe. The logistics cluster in Dubai has been a key driving force of economic growth and development. Currently the logistics and communication sector represents 12.6% of Dubai's GDP[2] and 7.5% of employment (World Bank, 2009). Its location, infrastructure and efficiency have made Dubai the third largest re-export hub after Hong Kong & Singapore (Commit FZE, 2008).

Figure 5 Dubai Logistics Hub

5.2.1 History

The analysis of the history of the Dubai Logistics Hub starts in the 1950s until today. Considering this time line, the consolidation of the Dubai Logistics cluster can be split into three

[2] Dubai represents approximately 29% of the United Arabic Emirates (UAE)'s GDP.

main stages: first, infrastructure development, second, anchor of companies and third, expansion (figure 6).

Stage	Year	Event
Infrastructure Development	1959	Dubai International Airport established
	1967	Port Rashid
	1975	Port Hamriya
	1976	Port Rashid Expansion
	1979	Jabel Ali Port opened
	1983	Dubai dry dock opened
Anchor Companies	1985	Emirates Sky Cargo established
	1985	Jabel Ali Free Zone created
	1991	Dubai Port Authority and Cargo village launched
	1999	Dubai Port International created
Expansion	2006	DP World Created / Acquireed P&O terminals / Airport expanded
	2008	Dubai World Central

Figure 6 History of Dubai Logistics Cluster (Dubai Economic Council 2009)

5.2.1.1 Infrastructure development

During the 1960s and 70s an aggressive infrastructure development initiative was pursued to develop Dubai's key strengths in terms of its location and historical legacy as a trading point for the region. Roads, airports and port facilities were created or upgraded using credits from other parts of the Gulf. At the beginning of the 60s the first airport construction was started to create access by air, until this point Dubai had only been accessible by sea. In 1967 the Port Rashid was built. Agents in the region initially viewed its capacity as too large. However, as soon as the port opened in 1971 demand exceeded capacity and expansions had to be done a few years later.

In 1979, a new port was created at Jebel Ali and in 1983 the large Dubai Dry Dock was built. Jebel Ali Port located 35 km southwest of Dubai became the world's largest man-made harbor and the biggest port in the Middle East. This port led the growth of maritime transport to and from the United Arabic Emirates (UAE), as well as the development of major shipping and transshipment activities, shipbuilding, repairs, and maintenance services.

5.2.1.2 Anchor companies

From the 1980s and 1990s, Dubai focused on two tasks. First, it created government-linked companies in logistics like Emirates Airlines in 1985, which had a capital infusion from the Dubai Government of USD$10 million (Emirates Group, 2007). Secondly, it focused on improving the conditions for foreign companies to operate in Dubai. Until this point, UAE's key trading partners were India, Iran and Eastern Africa. The UAE made it a strategic priority to establish Dubai as a major aviation and maritime transport hub between Europe and Southeast Asia (World Trade Organization, 2006).

The development of a transport and logistics cluster in Dubai really took shape with the establishment of the Jebel Ali Free Zone Authority (JAFZA) in 1985 (Ashai, Dahshan, Kubba, Talati, & Youssefi, 2007). JAFZA is an industrial and distribution facility dedicated to attracting foreign direct investment. In this area, located next to Jebel Ali Port, companies operated with 100% ownership, had access to dedicated administrative procedures, and were subject to a favorable tax regime. The Dubai Ports Authority (DPA) was created in 1991 and eight years later Dubai Ports International (DPI) began operating as an international port management company. In 2005, DPA and DPI were eventually merged to create Dubai Ports World.

In 1999 Dubai's first fusion business park and free zone was announced, the Dubai Internet City. One year later, the result was 30 square million feet of land with four buildings representing one million square feet of leasable space. One hundred and eighty tenants had joined in the first year including Microsoft, Oracle, IBM, Dell, Siemens, Canon, and Sony Ericcson (Matly & Dillon, 2007). This success incentivized the construction of more business parks all over Dubai including Dubai Media City, Dubai Studio City, Dubai Health Care City and Dubai Industrial City, among others.

5.2.1.3 Expansion

After 2005, Dubai has experienced strong growth. Local infrastructure had to be expanded and improved to satisfy increasing demand. A new big project is being developed, Al Maktoum international airport, will have higher capacity and a dedicated logistics zone, Dubai Logistical City (Dubai Economic Council, 2009).

5.2.2 The logistics cluster in Dubai

Logistical services, infrastructure operation and transport services are the activities in the core of the Dubai Logistics cluster. **Error! Reference source not found.** below presents the structure of the logistics cluster, which is explained in this subsection.

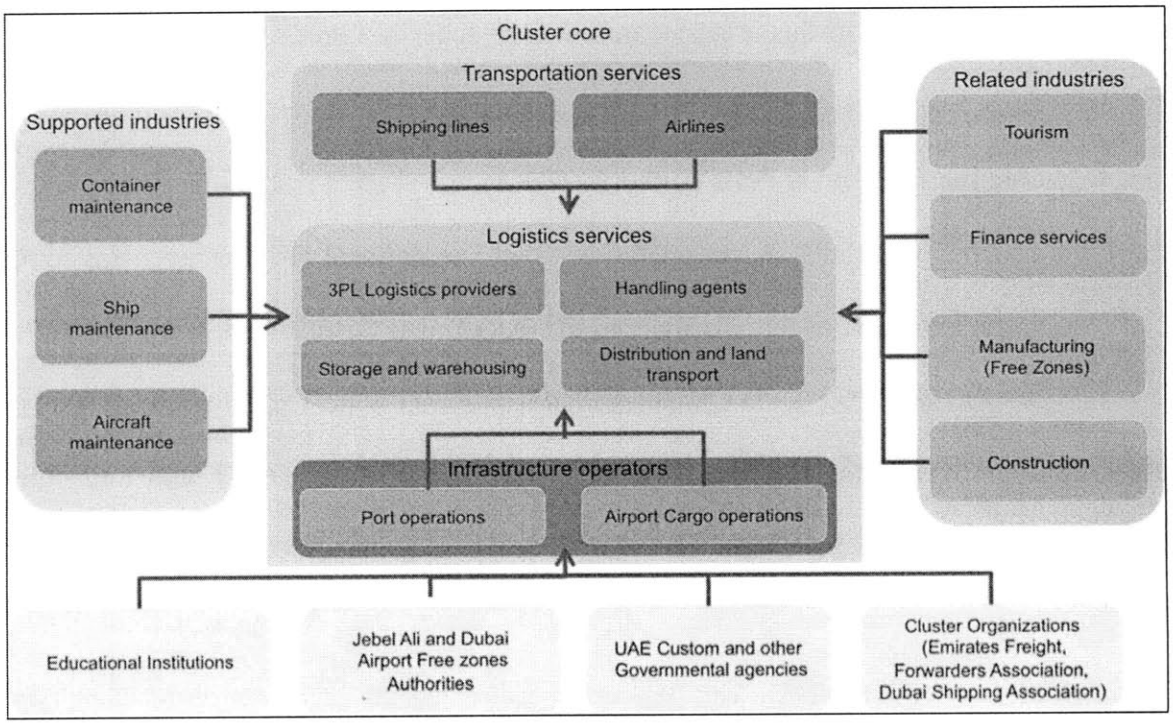

Figure 7 Dubai Logistics Cluster

The providers of logistical service are a large and heterogeneous group of companies, which include foreign and private domestic entities that provide services from warehousing and

handling to integration and other value-added activities. This group includes freight forwarders, freight brokers, and third party logistics companies. This group is comprised by 20 large companies according to market value. Among them, Danzas AEI Emirates, part of DHL Group, has a market share of 31% by volume, Swift Freight International 13% and the other 18 companies between 2% and 6% volume (Dubai Economic Council, 2009).

Government owned firms run the physical port and airport facilities needed to provide logistical services dominate infrastructure operations. DP World is the monopoly that operates Dubai ports. It also operates other international ports and ranks fourth among global port operations (Dubai Economic Council, 2009). In addition, Dubai's port ranked as the seventh busiest container port in the world in 2008 with 11.8 million TEU. The Dubai Dnata, part of Emirates Group, is the monopoly airport handling services provider. The International Airport is one of the fastest growing airports, with 15% year-on-year growth for the past decade and expected to grow by another 19% by the end of 2010 to reach a handling capacity of 60 million passengers. The airport ranked first in service quality by the Airports Council International in 2004 (Ashai, Dahshan, Kubba, Talati, & Youssefi, 2007)..

The providers of transport services include airfreight, express delivery services, airlines, maritime transport and road and rail transport and provide the logistical connections to other global locations. All major international shipping lines have Dubai in their regular schedules, and a significant number of airlines serve Dubai, the government owned Emirates Sky Cargo (the cargo division of Emirates Airlines) being the most important. It is ranked ninth largest cargo airline, has 82% of market share by cargo volume in air transport and was awarded Best Cargo Airline to the Middle East for 21 consecutive years (Dubai Economic Council, 2009 p.56). Of

the three sub-sectors, transport services accounted for 64% of total revenues in 2006, generating $2,179 billion (Standard & Poor's, 2006).

The Dubai cluster is also supported by a group of companies that provide logistical services like shipping, aircraft and container maintenance. These companies are usually smaller or part of global logistics operators. The free trade zones attract FDI to the region not only in the logistics and transportation sector but also in others like financial services, construction, tourism and manufacturing. The development of these related industries have increased demand and helped the Dubai cluster to be dynamic and competitive.

Governmental agencies, business associations, and educational institutions, at the bottom of figure 5, play an important role in the cluster. UAE's efficiency in rules and regulations related to international trade make it one of the five countries that offer the cheapest cost to export (US$593) and import (US$579) per container[3]. The free trade zones authorities and business associations like Emirates Freight Forwarders Association and Dubai Shipping Association serve as a communication channel between the government and the private sector. Educational programs in management and cluster-specific knowledge have been offered and are being improved currently. Figure 6 describes in detail all the components of the cluster.

5.2.3 Factors for success

The geographical location of Dubai is clearly an important advantage. However, it was a necessary but not sufficient condition to its development. There are several factors that have determined Dubai's success. The seven most important are government stability and continuous support to the hub's development, infrastructure development, human capital availability,

[3] United States cost to export is US$1050 per container and to import US$1315 per container (World Bank, 2009).

environment for competition, establishment of free zones and business parks, support from supplementary industries and shipping lines and airlines. These factors are described below.

5.2.2.1 Government stability

Dubai's government operates within the framework of a constitutional monarchy, and has been ruled by the Al Maktoum family since 1833. The current ruler, Mohammed bin Rashid Al Maktoum, is also the Prime Minister of the United Arab Emirates and member of the Supreme Council of the Union (SCU). The Government of Dubai has been stable, and its support to the logistics hub development has been a state policy.

5.2.2.2 Infrastructure development

Dubai's small geographical area contains two world-class airports and two major ports within 93 miles of each other (WTO, Trade Policy Note, p 62). This geographical proximity between the ports, airports, JAFZA and business parks facilitated the cluster development. Nowadays, regional ports rank among the ten largest container ports and the fifteen largest cargo airports in the world (World Bank, 2009). Jebel Ali Port is also home of DP World, one of the world's largest port operators, ranks 4th among global ports operators (Dubai Economic Council, 2009).

5.2.2.3 Human capital availability

The availability of employees, both low skilled basic labor and advanced specialists, is another advantage for Dubai. The high quality of life has attracted foreign specialists, while Dubai has traditionally also been open for low cost labor from South Asia (Ashai, Dahshan, Kubba, Talati, & Youssefi, 2007). In addition, there are few educational programs on logistics in Dubai; however it is not clear if these programs had significant impact on the worker's quality.

5.2.2.4 Competition Environment

A key factor has been the openness to foreign transport service providers, for example shipping lines and airlines, which allow efficient results from competition between alternative providers that offer logistical services via Dubai. Government owned companies operating key activities in the Dubai cluster have also used rivalry and competition to achieve high performance instead of capturing rents.

DP and Emirates have monopoly positions locally. However, these companies have also developed aggressive international growth strategies, which put them in direct competition with leading global rivals across many locations. Also the exposure to international markets for DP and Emirates allowed them to develop world class operations and practices and bring them back to Dubai, where they could have used a calm strategy depending on their local market power.

This environment of competition enhances global innovation, specifically in new offers in logistical services that set standards in terms of security and ecological sustainability (Dubai Economic Council, 2009).

5.2.2.5 Free trade zone and business parks establishment

A free zone created a more liberal regulatory environment which not only included freedom of ownership and management without taxes, but also a simplified approach to documentation and government regulations. This concept was well established by the Jebel Ali Free Zone, which offered an attractive environment for many logistical service providers and was a key factor in attracting foreign investments. JAFZA and its counterpart in the Airport Free Zone have acted as communication channels between companies and the government.

The creation of business parks dedicated to specific industrial sectors was also important because it demonstrated the international interest in Dubai. By 2006, one fourth of the world's

global 500 companies have a presence in Dubai (IMD International, 2006). In fact, between 2004 and 2009, Dubai has earmarked US$40 - US$60 billion to projects like Dubailand, The Palm and the Dubai International Financial Center (DIFC), a cluster initiative dedicated to the financial industry.

5.2.2.6 Support and supplementary industries

Dubai's logistics development has been supported by other complementary industries. The development of other clusters in Dubai's economy has led to significant demand for transport and logistics, particularly in the areas of tourism, real estate, manufacturing and construction.

Important related and supporting industries to transport and logistics are banking, finance, insurance, and consulting services. Dubai's financial services sector is well developed within the city, and shippers can insure their goods with ease. Also, JAFZA's "one-stop shop" provides customers easy access to insurance and financial firms within the free zone.

Other related industries include ship-repair, shipbuilding, and other port services. (Ashai, Dahshan, Kubba, Talati, & Youssefi (2007) say that the UAE ranks among the top five locations in the world for bunkering and other ship handling. Most port handling services, including crane lifting, loading, discharging, stevedoring and stowage, storage and warehousing, and pilotage, are supplied exclusively by the Emirates' port authorities One of the world's largest shipping agencies, the Gulf Agency Company (GAC) is entirely private and based in JAFZA. The GAC supplies spare parts and various services to vessels worldwide.

6 Critical factors for the development of a logistics hub

After analyzing the development of logistics clusters in Singapore and Dubai, and their respective unique processes to become logistics hubs, we found sufficient similarities to propose a set of critical factors and a methodology for the development of a logistics cluster. In so doing we were able to prioritize and order the way the hub should be developed. **Error! Reference source not found.** presents a graphic representation of the seven factors comprising this structure. The structure has three parts:

- The foundation, formed by location and government stability, which represents the preconditions for developing a logistics hub.
- The pillars comprising human resources, infrastructure, regulation and administrative processes, which represent required processes.
- The capstone form by foreign anchor companies, which represent a reinforcement element that guarantees the successful development of the cluster.

The roof in figure 8 represents the objective of successful development of a logistics hub.

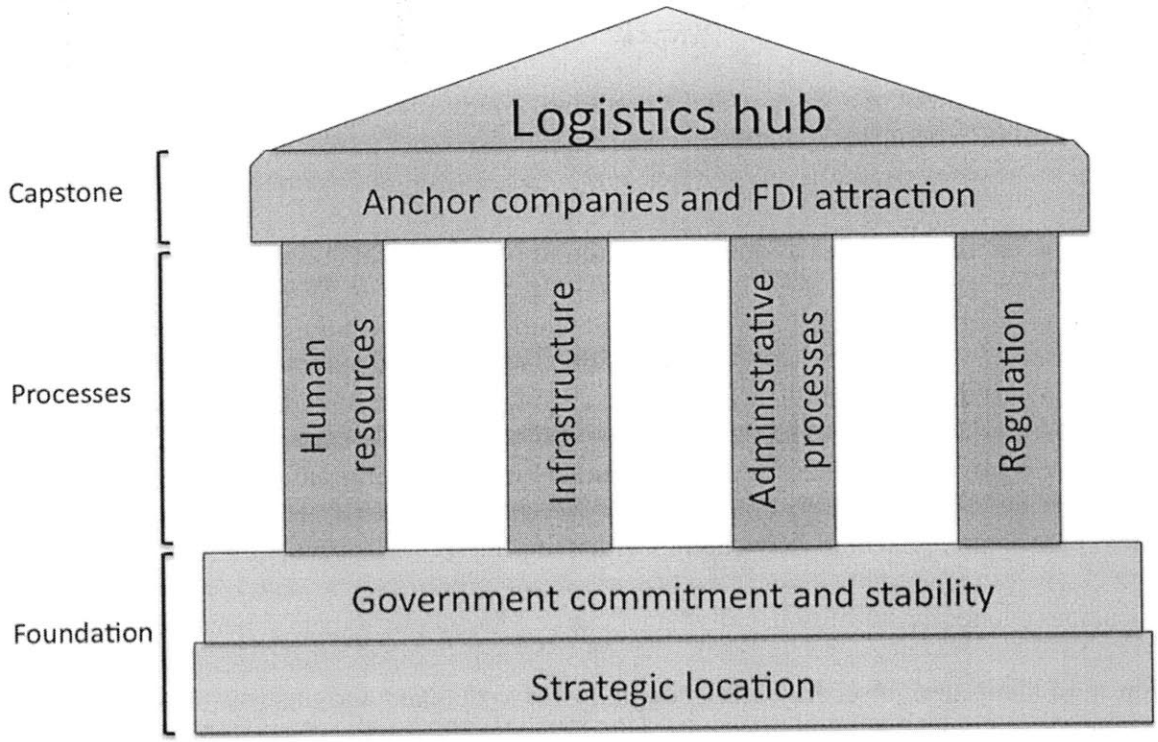

Figure 8 Structure of critical factors for the developing of a logistics cluster

6.1 Strategic location

Location is the first critical factor for a logistics hub. A country's geographic location is an endowment that has been discussed as a possible external factor influencing wealth. Location affects the ease with which countries engage in trade. For example because of having a long coastline, or short distance from large markets countries may have competitive advantages. (World economic Forum, 2009) Logistics hubs develop in regions located in between trade routes. Usually, location provides accessibility to both land and sea transportation and advantages to develop aero connectivity. A beneficial location also enhances connection to trade centers and markets of goods and services. A good location is a condition needed but not sufficient for the development of a logistics cluster. In the graphic representation, location is the basic factor in the foundation for the development of a logistics hub. However other factors are needed.

6.2 Government commitment and stability

Government commitment and stability is a required condition for development of a logistics hub because it guarantees continuity in policies and in the institutional framework for doing business. Government stability includes a long-term vision in both political and economic issues. Before making an investment or entering a new market, companies need to make sure conditions and rules will be sustained, and sudden and drastic changes will be avoided. Government stability does not mean governors or parties cannot change; but a long-term national vision prevails over political party policies, which may change with every governor's term. Countries that enjoy political and economic stability usually have a strong social participation because the private sector or an institution for change has enough power to demand and push sustained good policies and institutions and improvement of bad policies and problems. Government stability is the second factor in the foundation in figure 8.

6.3 Human capital

Once a country has the foundation factors, it should work simultaneously in four processes representing in the four pillars in figure 8. The first pillar is human capital. Human capital is the most important factor to assure the sustainability of a logistics clusters and has been determinant in both analyzed clusters. The quantity and quality of education given to the population increase the efficiency of each individual worker. Moreover, workers with little formal education can perform only simple manual work and find it much more difficult to adapt to more advanced production processes and techniques. Quality higher education and training in logistics is crucial for companies that want to move up the value chain beyond simple production processes and services. In particular, today's globalizing economy requires economies to nurture pools of well-educated workers who are able to adapt rapidly to their changing environment.

6.4 Infrastructure

The second pillar is infrastructure. Extensive and efficient infrastructure is critical factor for a logistics hub. It is a key to ensuring effective functioning of the economy, as it determines the location of economic activity and the kinds of activities or sectors that can develop in a particular economy. Well-developed infrastructure reduces the effect of distance between regions, resulting in the integration of the national market and connecting it at low cost to markets in other countries and regions. (World economic Forum, 2009)

Logistics and transportation services require a well-developed infrastructure such as quality roads, railroads, ports, and air transport to enable economic agents to get their goods and services to market in a secure and timely manner. Also, a solid and extensive telecommunications network allows a rapid and free flow of information, which increases overall logistics efficiency.

6.5 Administrative processes

Efficiency in administrative processes is the third pillar and is a critical factor to develop a logistics cluster. Transactional costs generated by delays and complex administrative processes decrease profitability of businesses. Logistics services depend on the efficiency of procedures like custom clearance and import/export documents. OECD (2009) says that the elements to enhance efficiency and effectiveness and generate competitive advantages for companies' location decisions are more transparent and predictable procedures, impartial and uniform administrative border requirements, simplified and electronic custom clearance systems, harmonization of administrative requirements, the application of internationally-agreed standards and regulatory co-operation (e.g. to enable pre-arrival clearance of shipments), coordination, and

risk management. Inefficient public sector generates a negative incentive for attracting companies. Companies analyzing investment opportunities have identified corruption and bureaucracy as two undesirable characteristics (World Bank, 2009).

6.6 Regulation for attracting FDI

Regulation is the fourth pillar for developing a logistics hub. A friendly business regulation is key for attracting companies, as well as its stability. A good regulation comprises a long-term vision of laws and jurisprudence and is stable along time. Also it is impartial and applies to every agent or company without any discrimination. Regulation, such as the existence of property rights and the ability to protect legal rights against private and public interest, has an important influence on the incentives to engage in economic activity, especially transactions with others. If property rights are weak, assets cannot be brought to their best economic use and productivity suffers. But even when property rights do exist, corruption can reduce their economic value by making it harder to establish them in a court of law or allowing harmful economic policies (World economic Forum, 2009). That is why, institutions to protect and guarantee fulfillments are also needed.

6.7 Anchor companies and FDI attraction

If these six factors are working, anchor companies will be attracted to the country or region. An anchor company is a large national or multinational company, well-recognized efficiency and competitiveness that settles and creates incentives for other companies to come to the cluster. These companies are not only logistics and transportation companies, but also manufacturing, commercial and services companies. Given their importance, governments may develop a marketing plan to attract them, targeting specific companies and thinking ahead about the

benefits that will be offered, its exclusivity and sustainability in the future. Currently, tax, migration and labor incentives are hardly used to attract companies. However, there is always the risk that other countries or regions offer a better plan and take away the companies. This is why, if a country or region wants to develop a logistics hub, it could use incentives at the beginning, but to be able to keep FDI in the long term, it should focus on improving the foundation and pillar elements mentioned above. Anchor of companies and FDI attraction is a catalyst, which enhance and faster the cluster development and that is why it is located in the capstone in figure 8.

6.8 How to develop a logistics hub?

To develop a logistics cluster the interaction of the seven critical factors is needed. The foundation of the structure is made up of the first two factors strategic location and government commitment and stability. The strategic location is an endowment and potential advantage for the hub development. However, until connection and infrastructure are developed the location itself does not have much value added. The strategic location is beyond the control of a government, but the connectivity is controllable. Then this potential advantage needs to be exploited with a clear vision and plan of action. As discussed above both Dubai and Singapore' developments were not accidental and required strategic planning and implementation. Developing a logistics hub is a long process and requires commitment and stability from the government and its policies; this is the second precondition, located over location and connection, but still in base of figure 8.

After having achieved a solid foundation four other critical factors need to be developed, shown in pillars in figure 8. They should be developed at the same time. We believe this four factors act as pillars because they can be worked in parallel and are equally important to develop

a competitive logistics hub. Human resources and infrastructure investments are the first two critical factors. They require not only capital, but also time. The lack of high-level human capital can be solved with educational policies, but it takes at least one generation. The construction of better roads, rails, and ports takes less time and is capital intensive.

The other two critical factors are regulation and efficiency in processes. Regulation is a key variable that can make the business environment investment friendly. Efficiency in processes minimizes the costs for doing business. Both factors increase the companies' trust and credibility of the government, providing support for logistics activities and attracting FDI. As in Singapore and Dubai, the combination of all these critical factors attract anchor companies that further push the development and sustainability of the logistics hub. The seventh critical factor is anchor companies and FDI attraction, which is the capstone in figure 8. As mention above, to attract companies a careful marketing plan should be developed providing the right incentives (tax exceptions, subsidize, immigration benefits, labor flexibilities). To keep these companies in the logistics hub in the long-term constant upgrade all of these factors and improving towards more productivity and value added products and services are required.

Finally, the roof in figure 8 represents the goal that is the development of a logistics hub; its achievement depends on the successful result of the development and interaction of these seven factors.

7. The case of Panama

Panama is located in the bottom of Central America and right above Colombia and with the shortest distance of 50 miles between Pacific and Atlantic seashores. It has a GDP of 24.5 billion dollars and the famous Panama Canal, which is the busiest canal in the world with more than 13 thousand transits every year (ACP, 2009). Panama is moving towards the next era in logistics by trying to become the hub of Latin America (Government of Panama, 2009). Currently the Canal and adjacent industries provide 20.4% of the countries jobs (ACP, 2006).

The country's GDP is 75.5% services, 18.2% industry and 6.3% agriculture (WTO, 2009) .The Canal generates secondary economies calculated to contribute around 20% of the GDP. All export services, including banking, port services, the Panama Canal and the Colon Free Trade zone account for 52% of the services sector (ACP, 2006).

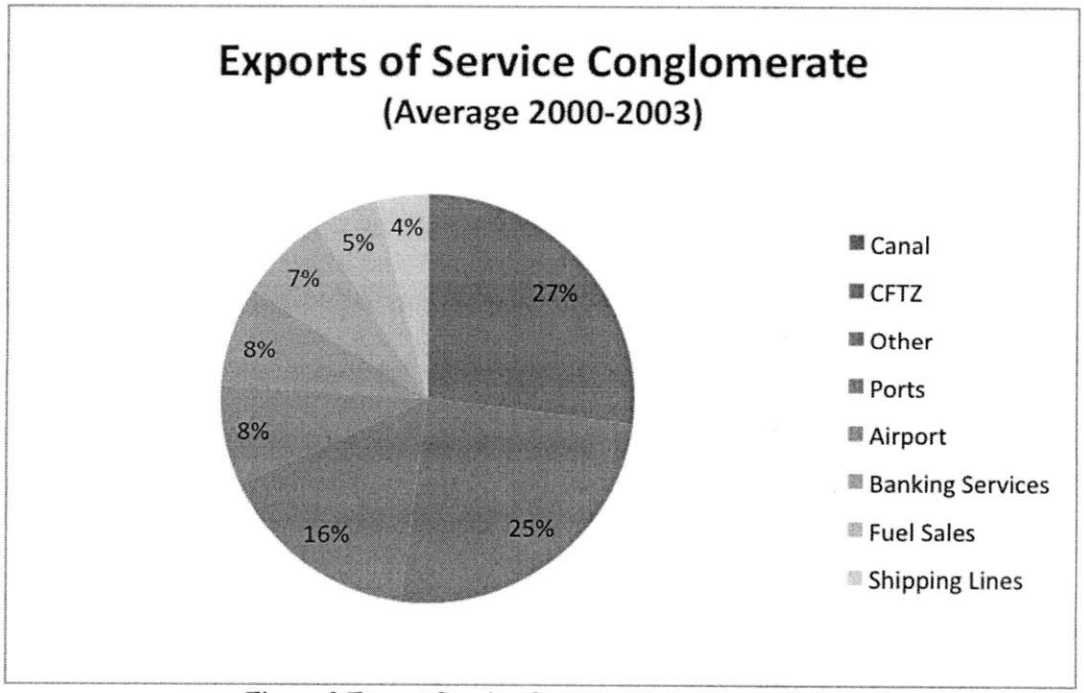

Figure 9 Export Service Conglomerate (ACP, 2006)

7.1 History

The Panama logistics hub history can be split in two main stages Panama and the US influence and the transition to the Panamanian government, which are explained in this section. (Figure 10)

Stage	Year	Event
Infrastructure Development	1850	Inter-oceanic Railroad/Port of Cristobal/Port of balboa
	1914	Panama Canal Opens (US Management)
	1918	France Air-Field in Colon
	1932	Albrook USA air-field and base
	1941	Howard USA air-field and base
	1947	Tocumen International Airport open
	1947	Colon Free Trade Zone opens
FDI Attraction	1995	Privatization of Ports (MIT,PPC,CCT)
	1998	Panama Maritime Authority created
	1999	Panama Canal Authority Created (Panama Management)
	2000	Panama Railroad modernized
	2009	Creation Panama Pacifco

Figure 10 History of Panama Logistics Cluster (DEC, 2009)

7.1.1 Panama and the U.S. influence

Panama's geographic position has been the primary asset for the economy in the last 200 years. In the Colonial era, Panama was a focal point for Spanish trade between Europe and east South America. In the 1850', with the construction of the railroad, Panama served as primary route from west to east trade during the California "Gold Rush" and more recently in the 1900's Panama with the Canal served as military and trade support for the U.S.

Panama's history as a logistics hub begins in 1855 when the Panama Railroad was finished. The purpose of this railroad was to aid the American need to transport gold from California to the east coast during the Gold Rush. The port of Portobelo in the Caribbean and the port in Panama in the pacific aided the gold transportation. Later on, the railroad served as main support during the construction of the Panama Canal.

The Panama Canal was finished in 1904 and was managed by the U.S. and used mainly for military and trade support for the U.S. The end of World War II prompted an era of Panamanian discomfort with the presence of U.S. military in the Panama Canal Zone. The Panama Canal Zone (PCZ) was created to ensure water supply for the Canal. The PCZ is a 553 square mile territory inside of Panama, extending 5 miles of each side of the Panama Canal, excluding Panama and Colon City (ACP, 2000). The Panama Canal Zone was home of multiple US settlements and military bases, including tree air force bases and five different forts Figure 11.

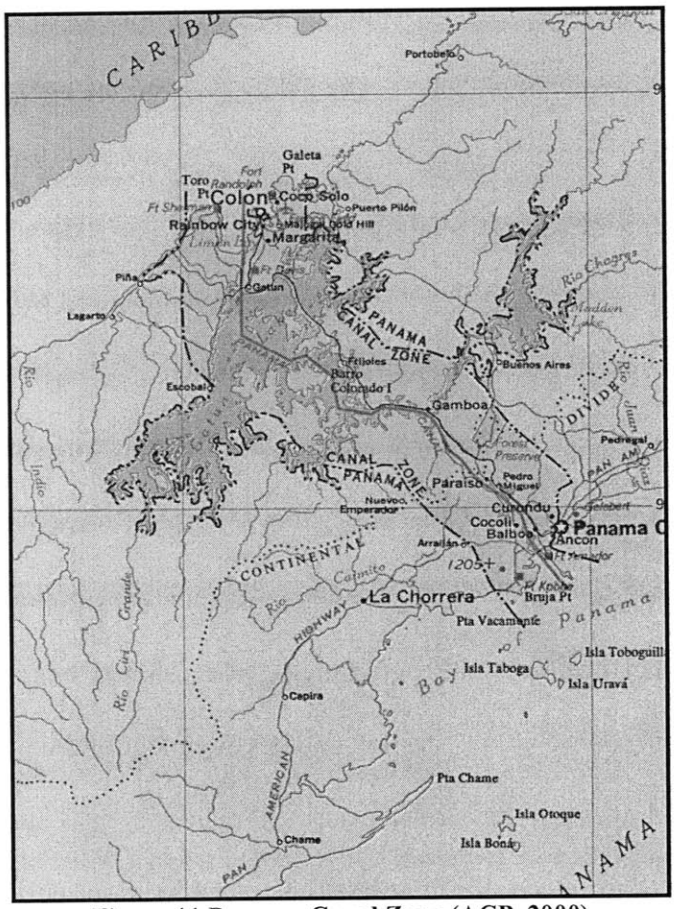

Figure 11 Panama Canal Zone (ACP, 2000)

In 1948 the Colon Free Trade Zone (CFTZ) was established as an autonomous institution. This would become the most important Free Trade Zone in the western hemisphere by offering

many trade advantages along with special tax incentives such as tax credits, depending on the number of Panamanian employees, and special income tax rates on foreign trade operations. Additionally, companies in the free zone do not pay corporate income tax, federal or municipal tax (CFTZ, 2009). Dividends paid on profits from foreign trade operations and from direct sales are not subject to the dividend tax. Merchandise arriving at, stored in, or leaving the CFZ destined for a foreign country is exempt from taxes, charges or any type of tariff.

7.1.2 Transition to the Panamanian administration

In the 1960's the tensions between Panama and the US became increased as riots and protests created political pressure to renegotiate a treaty with the US for the control of the Panama Canal. The Torrijos-Carter treaty signed in 1974 between Omar Torrijos and Jimmy Carter granted the Panamanians control of the Panama Canal Zone effective in year 2000, as long as Panama maintains the neutrality of the Canal. The Panama Canal Authority (ACP) has managed the Canal since December 31, in 1999.

In 1979 the Panamanian government took control over the port of Cristobal and Balboa from the US under the National Port Authority (APN). Llacer, 2006 explains how APN was created in 1974 as arm of the Ministry of Commerce and the further privatization of the ports. In 1971 the United Nations Development Programme (UNDP) signed an agreement with the Panamanian government for the administration and development of the ports. In 1988 the UNDP made the modernization of the port system a priority. Created in 1998 after the National Port Authority, the Panama Maritime Authority (AMP) is an autonomous entity of the Panamanian Government responsible for approving, registering and authorizing regular and special flagging, either locally or by means of an authorized marine merchant consulate. It promotes domestic and foreign investment, and supports the development of multimodal logistics centers.

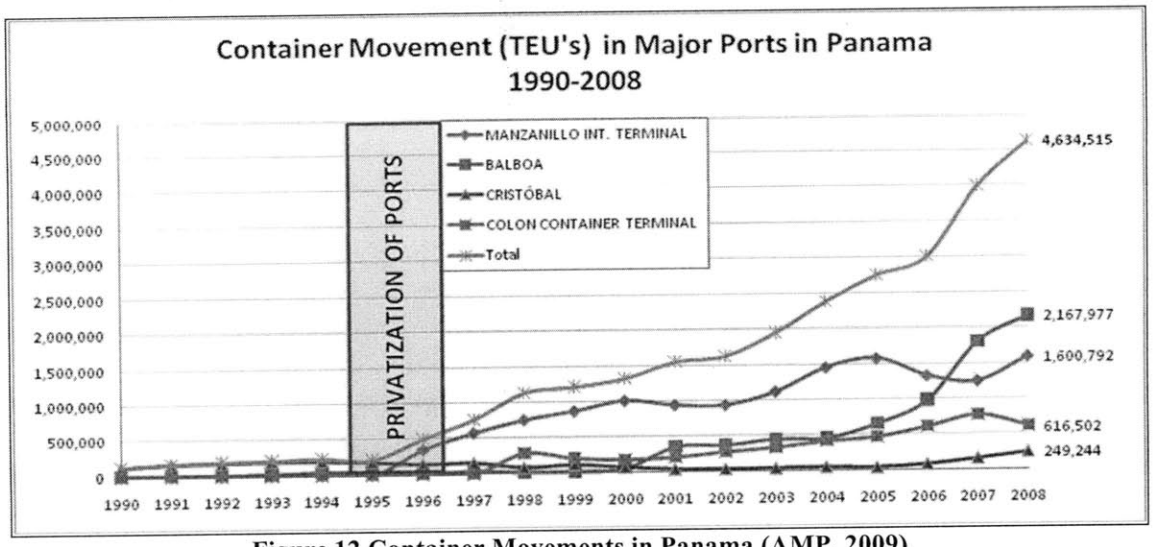

Figure 12 Container Movements in Panama (AMP, 2009)

The government started debating port privatization in the early 1990's. Debates culminated in 1994 and the first port was privatized in 1995. Manzanillo International Terminal was approved by the Law 31 in December of 1993. Then Evergreen Marine group got the Coco Solo Norte location to build the Colon Container Terminal under Law 12 of the 5th of January 1996. Later in 1997 under Law 5th of 26th January, Hutchison Port Holdings through Panama Ports Company received Balboa in the pacific and the Cristobal terminal in the Atlantic(Llacer, 2006). Container throughput in Panama has grown rapidly since 1995 (AMP, 2008).**Error! Reference source not found.** shows the dramatic growth on the port of Balboa and Manzanillo. It is important to recognize the reasons for the growth in each case. Balboa is the only container terminal in the Pacific of Panama so it has no competition. In the other hand, Manzanillo competes with two other ports but manages to grow faster due to its efficiency and constant operational improvement.

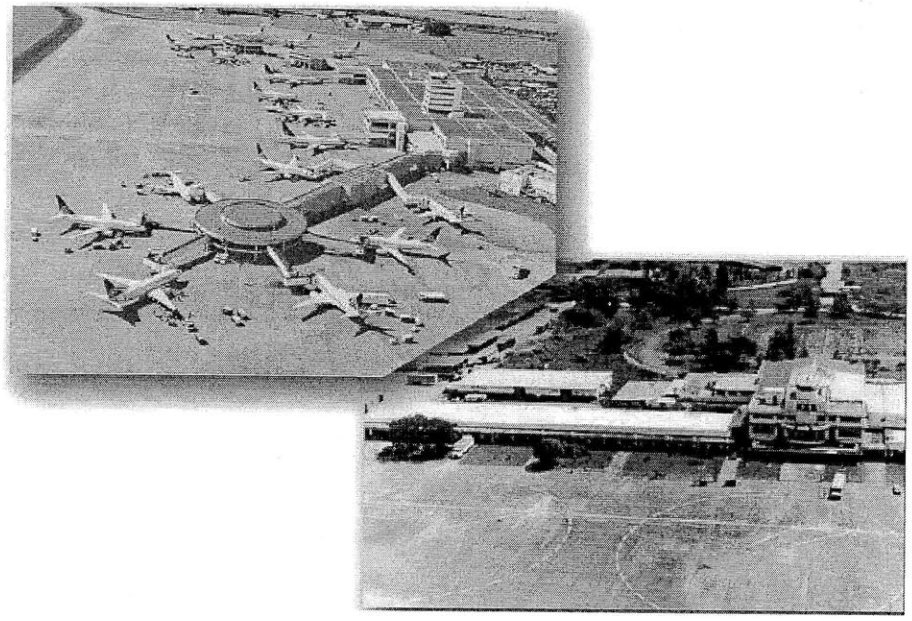

Figure 13 Tocumen Airport after expansion (Source ACP 2006)

Tourism has also been used as development tool in the last 15 years in Panama. One of Panama's most successful companies is Copa Airlines. It has been awarded multiple regional awards for service and performance (COPA, 2009). This success attracted a joint partnership with Continental Airlines in 1999 and since then has developed Panama as Hub of the Americas in the Tocumen Airport. Since early 2000 the airport infrastructure has been improved tremendously and as a result Panama is the entry point for most commercial flights to Central and South America (Figure 13).

7.2 Logistics cluster

Panama's Logistics cluster core has infrastructure operator, including the Canal operations, logistical services and transport industry, being infrastructure operators the most developed group (Figure 14). This cluster has been developed around the operations of the Panama Canal, which is the most important infrastructure operation in the country. The ACP, as mentioned

before, is the branch of the Panamanian Government responsible of running the Canal like a profitable business. It has its own patrimony and the right to administer it.

The ACP has been perceived as a professional an independent entity of the government that promotes the logistics development in Panama. It has improved Canal operations and reduced transit time to less than 24 hours making more efficient than ever before. The ACP has revenues of over $2 billion dollars with costs of only $600 million (ACP, 2000) and issues debt independently and has higher credit rating than the Panamanian treasury.

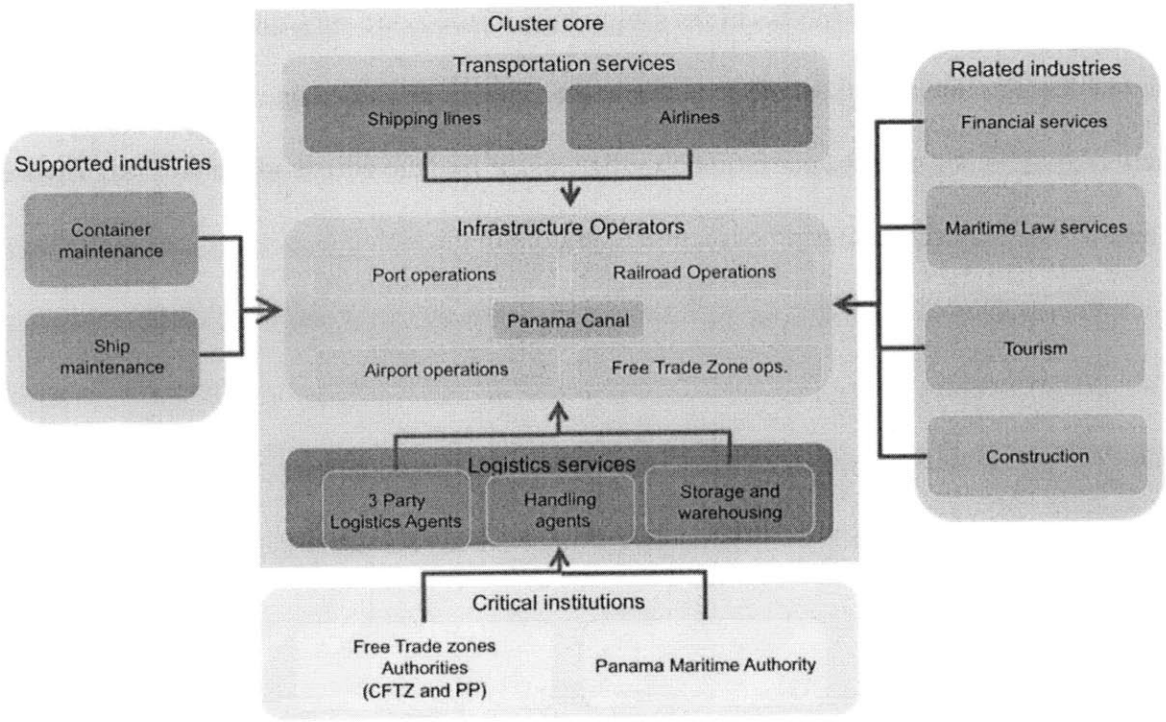

Figure 14 Panama Logistics Cluster

Figure 9 shows the service industry exports in Panama. The Canal and the Colon Free Trade Zone alone account for 52% of all service GDP (ACP, 2006). The service industry heavily relies on the Canal and services stemming from shipping and trading of cargo.

Another important player in the infrastructure operators of the Panama logistics cluster is the Colon Free Trade Zone (CFTZ) located between the ports of Cristobal and Manzanillo. The CFTZ is a semi-autonomous entity of the government in charge of the administration of the Free Trade Zone. The CFTZ accounts for more than 20,000 direct jobs. In 2005, nearly $5 billion worth of goods passed through the CFTZ, with $500 million added to the Panamanian trade balance (U.S. Department of Commerce, 2005). The CFTZ receives more than 250,000 visitors a year. Its main suppliers come from Hong Kong, Taiwan, US, Japan, Korea, France and other countries in Europe. The major buyers of the Colon Free Trade Zone are Colombia, Venezuela, Panama, Guatemala, Ecuador, Costa Rica and The US. The Free Trade zone gave way for the construction of the other infrastructure found in the cluster, like the ports and the Airport. The Figure below shows all the major infrastructure operators in the Colon.

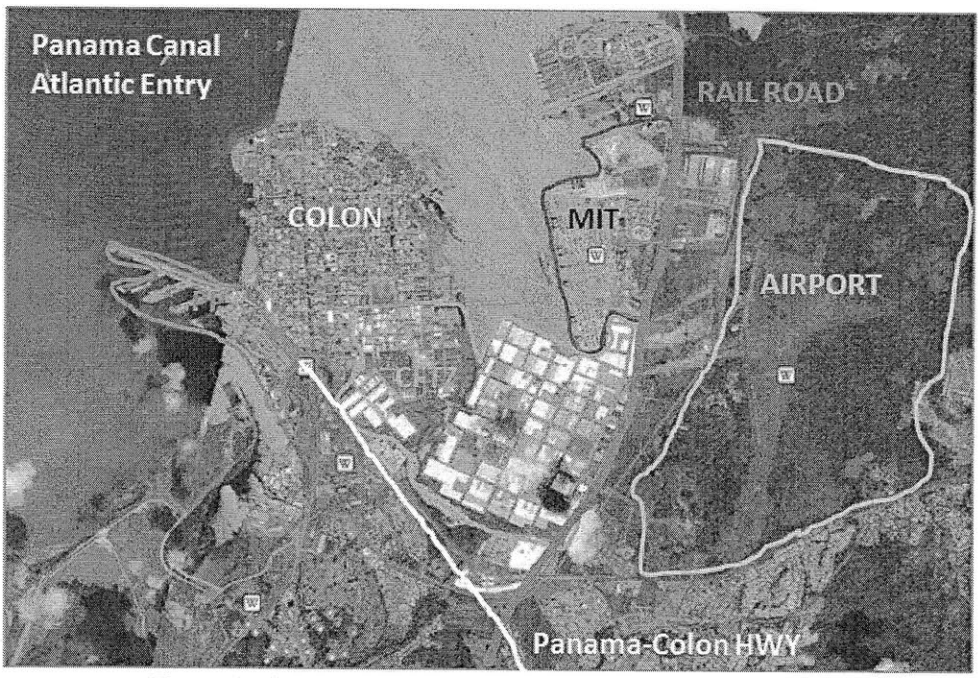

Figure 15 Colon City logistics infrastructure (Google, 2009)

In Colon you find three major ports, the free trade zone, and the airport all with access to the railroad and the highway that connects Panama and Colon. The largest port operator in the

Atlantic side of the canal in Panama is Manzanillo International Terminal. Manzanillo International Terminal (MIT) is a joint venture between Panamanian investors and SSA Marine. MIT moves more than 1.6 M TEU's last year and is recognized by UNCTAD as the most important transshipment port in Latin America. SSA Marine is one of the largest terminal operators in the world. It operates ports in all the Pacific and Atlantic coast of the US, Pacific coast of Mexico, Chile and Taiwan. Since 1995 the port has expanded continuously and has plans for expansion in 2015.

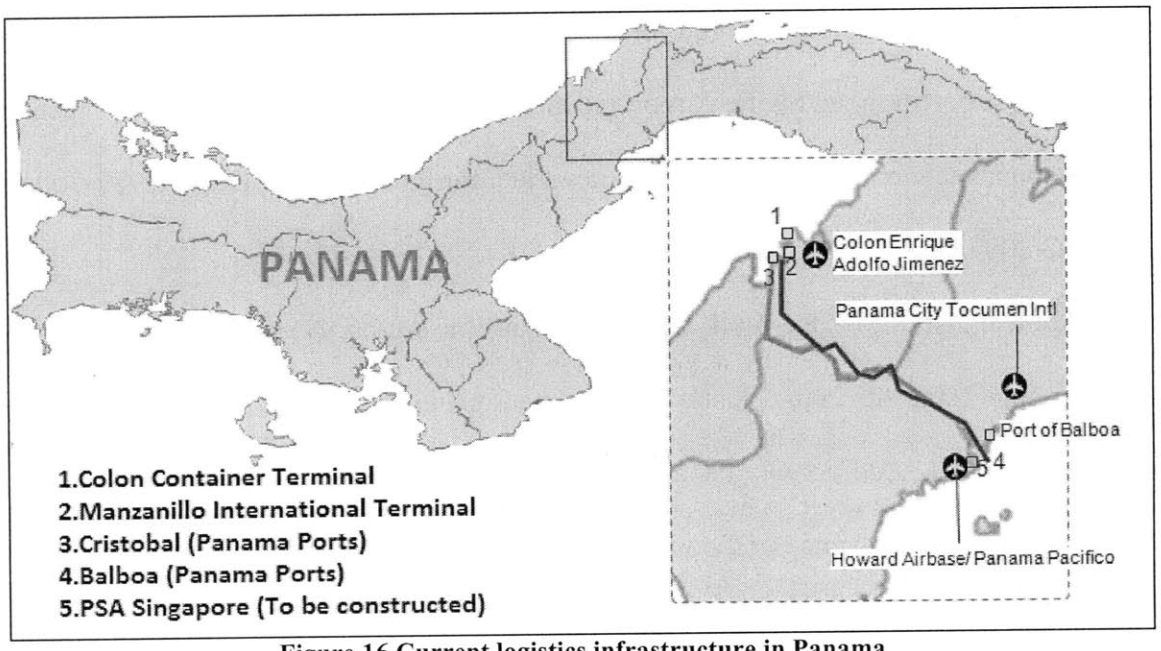

Figure 16 Current logistics infrastructure in Panama

Balboa and Cristobal ports shown Figure 16 are operated by Panama Ports Company (PPC), which is owned by Hutchison Port Holdings. Hutchison Port Holdings owns four of the seven biggest ports in the world: Hong Kong, Busan, Shenzhen, and Rotterdam. Colon Container Terminal (CCT) is a subsidiary company of Evergreen Group. Evergreen also operates ports in Peru, Venezuela, and Santo Domingo. Additional concessions have been given to PSA Singapore to construct a large container terminal in the Pacific.

Regarding railroad and air infrastructures, the inter-oceanic railroad is managed and operated by Panama Railroad Company, a joint venture partnership of Kansas City Southern Industries (KCSI) and MI-JACK. MI-JACK is a manufacturer and operator of intermodal facilities.

Air cargo agents with head quarter operations in Panama include: DHL Aero Cargo, Panavia Cargo Airlines, Air Panama and Copa Cargo(AZ Freight, 2009). Other regional airlines also have cargo services to Panama mainly using the Tocumen international airport cargo terminal. Tocumen movement of cargo is only surpassed by 17% of the world airports in a sample of 952 airports ranked by the Airport Council International (ACI, 2006). DHL recently announced the investment of $50 million in a new fleet for Panama to replace old 727-700 planes for new 757-200 planes(LaEstrella, 2010).

In critical institutions the AMP (Panama's maritime Authority) as discussed previously plays a very important role in the cluster by coordinating and attracting investment in port operations in Panama. Additionally Panama Pacifico plays an important role in the development of the logistics cluster. Panama Pacifico is a 40 year long plan to develop a logistics park using the Howard Air force Base infrastructure. This logistics park uses the infrastructure left by the U.S. air force and will contain warehouses, offices, distribution centers, information technology centers and homes for companies to bring their operations to Panama. The figure below shows the advantageous position of Panama Pacifico relative to the main logistics infrastructure (London & Regional Properties, 2007). The project is structured with government support to provide Panama Pacifico with a competitive advantage in terms of taxes and ease of business under Law 41 of June 20, 2004.

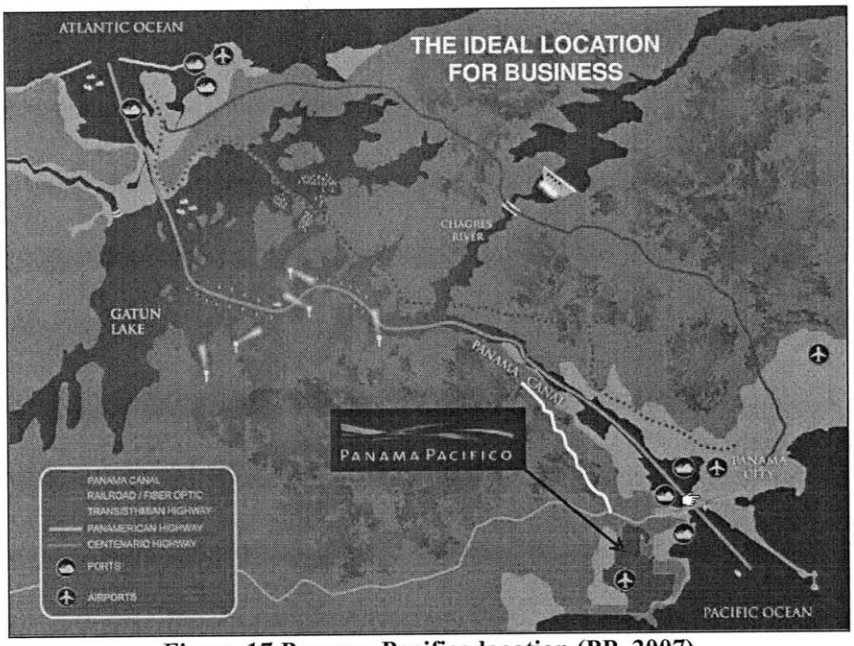

Figure 17 Panama Pacifico location (PP, 2007)

Panama provides basic logistics services like third party logistics, warehousing and handling agents. Additional logistics related industries in Panama include banking, insurance, maritime law and flagship registry. Panama has the largest registry of ships with more than 5,300 ships under the Panamanian flag(CIA, 2009). The transportation services found in panama include the major shipping lines of the world, with noticeable importance for Maersk, Evergreen, and COSTCO. Largest logistics service providers in Panama include Panalpina, DHL, and Schenker.

7.3 Panama benchmarking (Dubai and Singapore)

Since Panama wants to become a world-class logistics hub we compared its current state and its development plans those of Singapore and Dubai. To do so, we are using a benchmarking considering the structure of the seven critical factors proposed in the chapter 6.

The World Bank compiles information on each country and measures countries in six different dimensions specifically related to logistics and compiles the Logistics Performance Index.

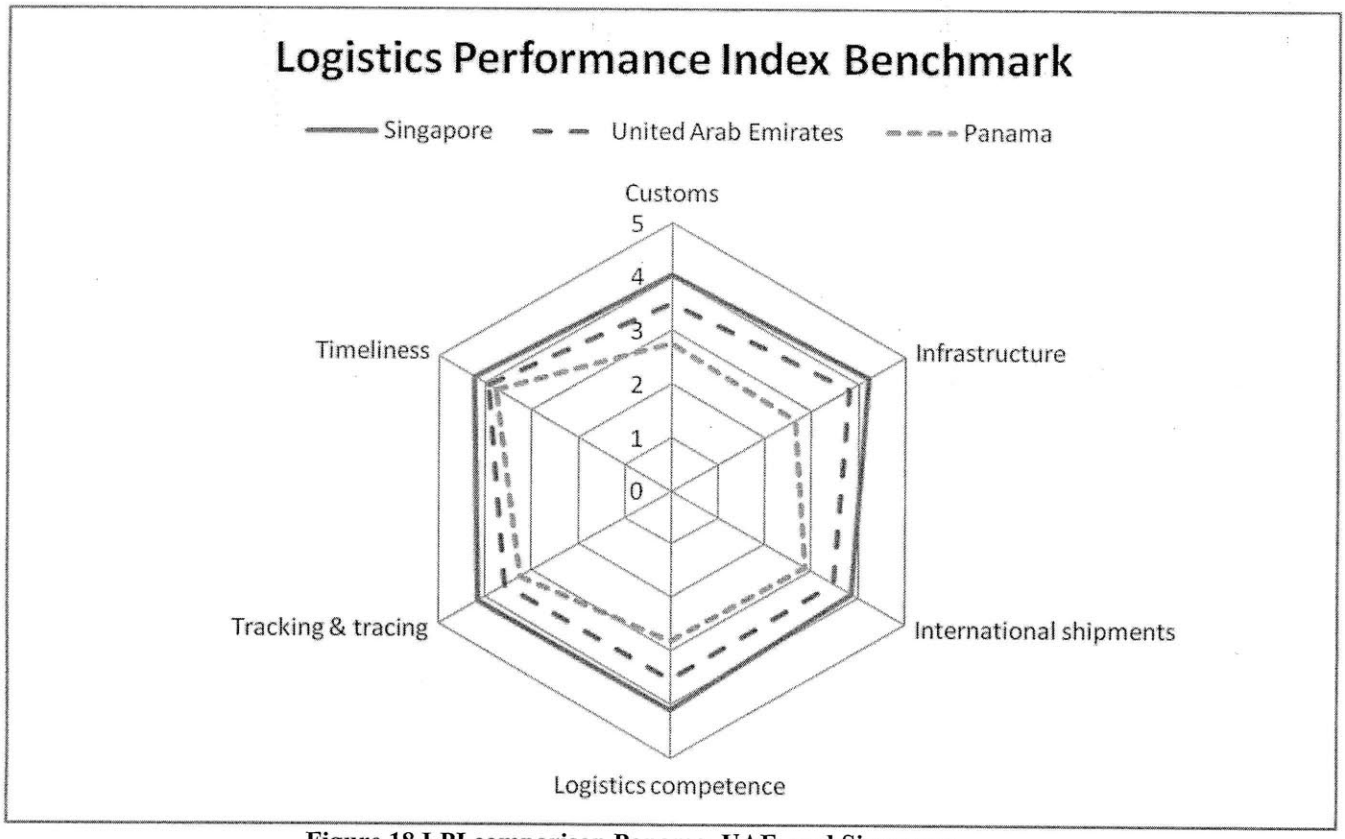

Figure 18 LPI comparison Panama, UAE, and Singapore

In the Figure 18 Singapore and United Arab Emirates are compared to Panama. The LPI is based on a worldwide survey of operators of freight forwarded and express carriers. Survey respondents provide feedback on the ease to perform logistics business in the countries they operate According to the LPI we can see that Panama's greatest challenges lies in the lack of infrastructure, logistics competence, and customs. We will discuss in greater depth the implications of each dimension of the LPI using the seven identified factors defined in Chapter 4.3 as requirements for a logistics hub.

7.3.1 Strategic location

Panama, Singapore and Dubai logistics hub development started with their strategic location in trade routes. Regarding connectivity, Panama ranks number 1 in the world, while Singapore

number 4. However, Dubai is not in the top 20 ports in terms of connectivity. Pablo Kaluza *et al*, 2010 modeled all shipping networks using the Sea-Web database information on arrival and departure of all ships with the automatic indentification system (AIS). The AIS data allowed them to measure port connectivity and Panama is the most central port in the world. The diagram (a) below shows all shipping lines in the world and color codes them according to the number of journeys. The diagram (b) shows the position of the 20 most central ports in the world. Although Dubai is not highlighted in this study as one of the top 20, it is part of the yellow line which represents high traffic shipping line with access to the middle east market and right between asia and europe main shipping lines.

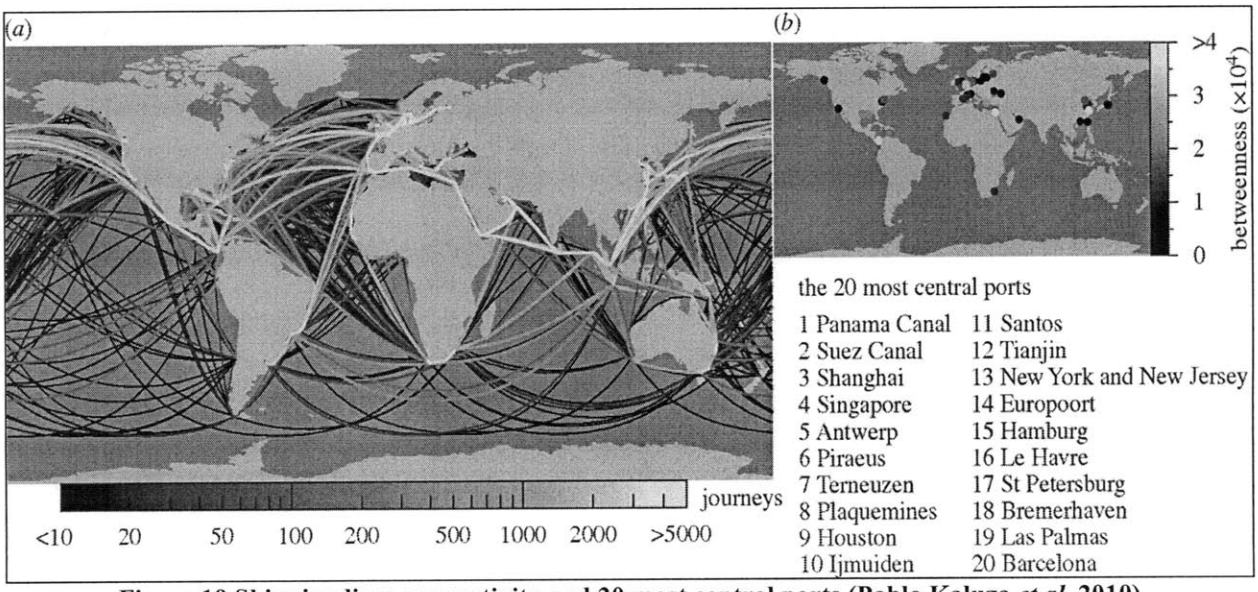

Figure 19 Shipping lines connectivity and 20 most central ports (Pablo Kaluza *et al*, 2010)

Regardless of the connectivity of Panama it is important to understand the markets that can be served from the country. Most of the traffic of the Canal goes from Asia to US east coast, which represents lots of opportunities to grow. In contrast, the Latin-American market is much smaller and is served by other ports. We will discuss the effect on this market in later chapter.

7.3.2 Government commitment and stability

Governments in Singapore and Dubai have long-term policies and no political parties to struggle. Panama is a democratic republic with elections every 5 years. Panama's stability has been recognized and as the Global Competitiveness Report shows the government stability is the least concern for doing business in Panama (figure 22).

The development plans in countries like Panama are bias by the president in charge and most times are truncated by the following government. Panama currently has a 10 year plan for the development of the country, but, it is yet undefined if the next government will support these initiatives. For this reason the government has created, as described before, a set of rules and regulations like Law 41, which provides business with legislative support and guarantee not change in laws for the first ten years of operations. The neutral nature of the Panama Canal, is another institutional advantage for the country. The Canal is a key institution with power to demand action and stability on policies form the government.

7.3.3 Human capital

The figure below shows the total literacy rate from 1980 to 2007 for the three analyzed countries. Singapore and UAE started below Panama (Yellow) but their performance in improving literacy rate has been remarkable.

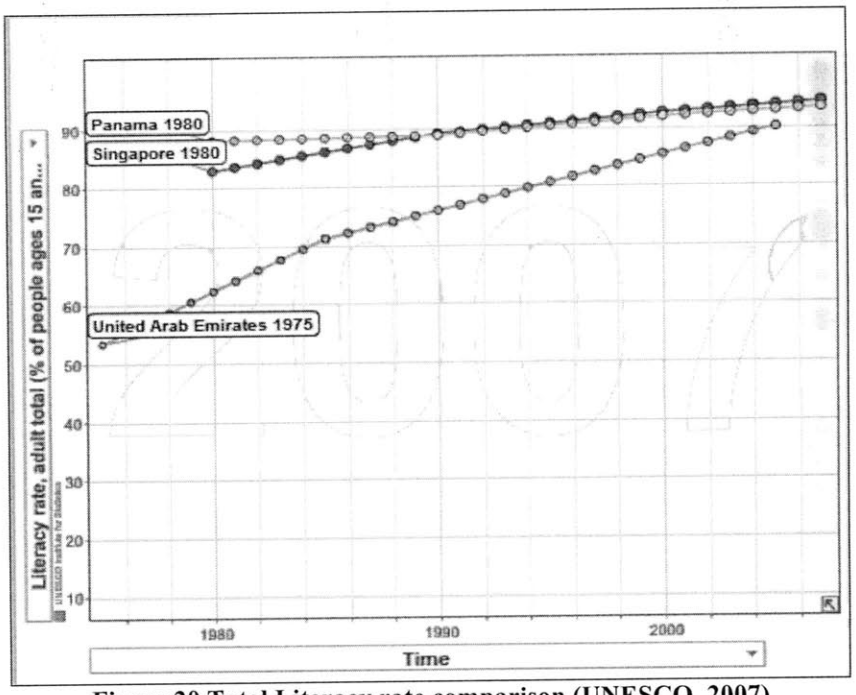

Figure 20 Total Literacy rate comparison (UNESCO, 2007)

The World Economic Forum ranks Panama at 80th of 133 for higher education and training meanwhile Singapore is located in 5th position. Panama actually spends more in percentage of its GDP in education than Singapore and United Arab Emirates (UAE). According to the CIA Factbook Panama spends 3.8% of its GDP and has 91.9% literacy. Singapore on the other hand spends only 3.7% of its GDP in education and has 92.5% literacy (CIA, 2009). UEA has only a 90.9% and spends 1.3% of GDP in education.

Panama's attempt to improve the quality of its education is the city of Knowledge, a project started in 1995 and supported later by the Law 6 of 1998. The project uses the former Fort Clayton installations and is now an international complex for education, innovation, and research. In 2008 there were more than 70 industries operating in the city of knowledge, 34 international organizations, and 29 academic programs(Ciudad del Saber, 2010). Daily there are more than five thousand visitors coming into the complex, it generates more than two thousand

jobs. Then again this is not enough to close the gap between developed hubs and Panama's labor force.

Table 3 WEF Education indicators (WEF, 2009)

WEF Education Indicators	Panama	Singapore	UAE
	Rank	Rank	Rank
Quality of education	**102**	1	21
Higher education and training	**80**	5	29
Secondary enrollment	**95**	17	50
Tertiary enrollment	**48**	29	81
Quality of math and science education	**113**	1	20
Specialized research and training services	**76**	14	21

The WEF indicators show that there is big gap between Panama and the developed countries. The interviews performed in Panama all indicated that quality of labor force to be one concern and the government of Panama has also identified this weakness and plans to address it by investing over $2.2 billion dollars in Education and Culture. The government is trying to follow the same example as Singapore (Government of Panama, 2009).

7.3.4 Infrastructure

As identified before, successful logistics hubs run intricate intermodal nodes between ports, airports, highways, and railroads. One of the deficiencies identifies in the LPI survey for Panama is its infrastructure. In addition the World Economic Forum Global Competitiveness Report (GCR) shows similar ranking for Panama. In the infrastructure pillar Panama is ranked 65 out of the 133 countries in the survey and 61 in the LPI rankings.

Table 4 Infrastructure Indicators WEF and LPI

Infrastructure	WEF		LPI	
	Rank (1-133)	Score (1-7)	(1-155)	Score (1-5)
Panama	**65**	**3.9**	**61**	**2.63**
Dubai	6	6	17	3.81
Singapore	4	6.4	4	4.22

Singapore and Dubai both have the infrastructure to handle more than 10 million TEU's a year with efficiency and provide intermodal connectivity. Panama currently moves only 4.5 million TEU's per year using all 4 ports and has plans for expansion to have a total capacity of 15 million by 2015. This is the most aggressive capacity expansion in the region, but still far from the capacity found in Singapore and Dubai.

Intermodal services are scarce in Panama as a hub. Singapore and Dubai create very tight hubs with access to air, sea, road and rail in the same place. Panama is hub divided in two parts, one in Atlantic and one in the pacific. The integration of ports in the pacific with the ones in the Atlantic has improved since the new railroad operations in early 2000's. But, there is still a challenge for a more efficient highway joining Colon and Panama. The latest Free Trade Zone at Panama Pacifico is a step forward into the development of a more comprehensive logistics hub with access to ports, airport, and highway. The current government identifies this weakness and has pledge to increase the investment to over $3 billion in roads and connectivity between both sides of the isthmus (Panama, 2009).

7.3.5 Administrative processes

The figure below explores the critical dimensions that companies evaluate to operate in a new country (The World Bank Group, 2010). Singapore is ranked in the top 10 in 9 over 11 indicators. Panama's biggest weaknesses are employing workers, paying taxes and enforcing contracts. Employment regulations are very rigid and very protective of local workforce. According to the World Bank " Doing Business" report on Panama a first year operations of a company required 59 different payments and 482 hours of processing, while enforcing contracts requires 31 procedures and over 686 days. The cost for exporting one container is $729 dollar

and $879 to import, which is higher than both Dubai and Singapore. The current government is trying to address this issue developing efficient trade windows in zones like Panama Pacifico and the CFTZ.

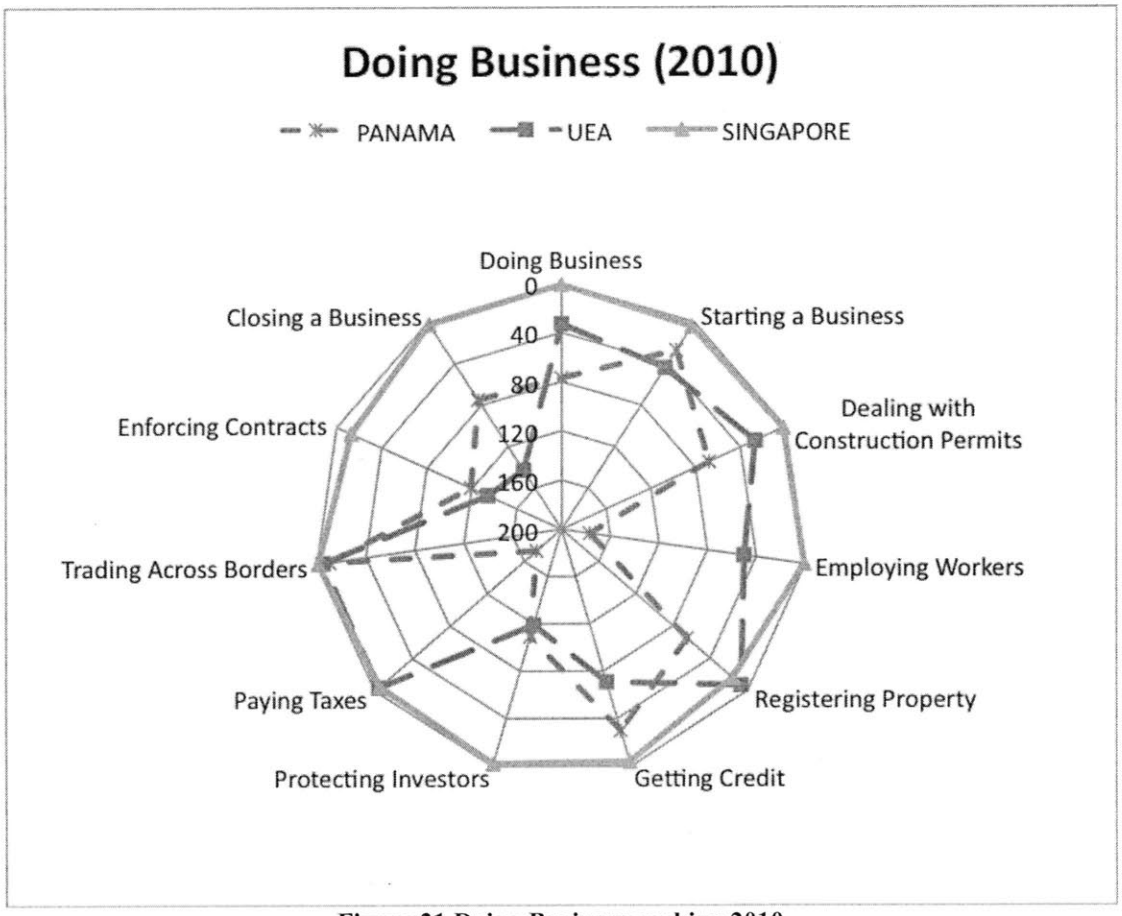

Figure 21 Doing Business ranking 2010

Regarding the most problematic factors for doing business, the WEF Competitiveness Report says that the biggets concerns for companies are corruption (19.5%) and inneficient government bureucrasy (16.3%). These results are supported by the Transparency international Corruption perception Index (CPI), which measures the countries perception with a score between 1 and 10 (10 being the best). Panama gets 3.4, while UEA gets 6.5 and Singapore, "the country without corruption" 9.2 (Transparency International, 2009).

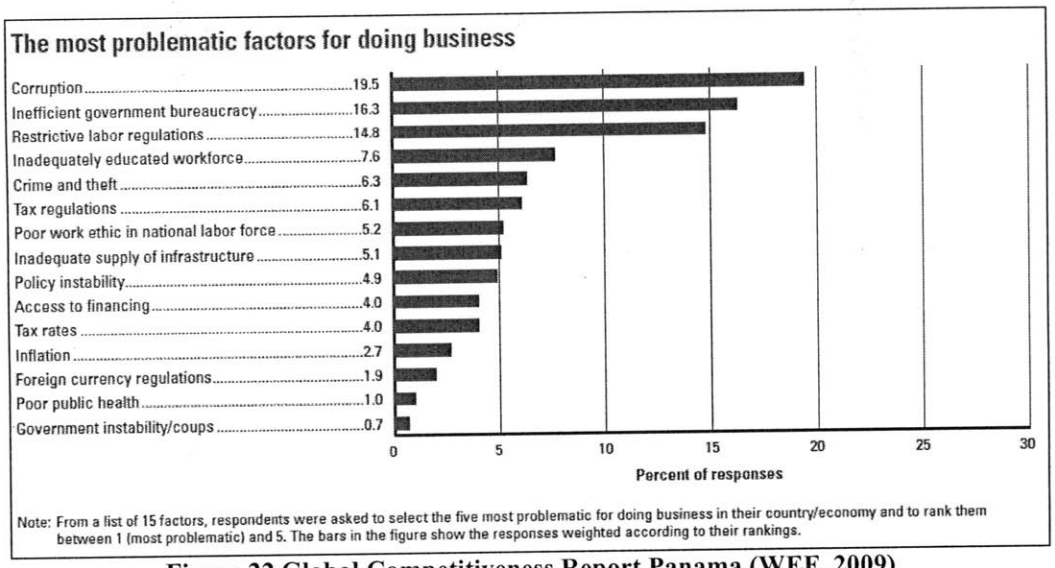

Figure 22 Global Competitiveness Report Panama (WEF, 2009)

In spite of these results, the ACP is a Panamanian institution recognized as efficient, with clear vision and power of execution. For example, the latest biddings for the Panama Canal expansion were an example of large projects done without corruption, because the government hired the World Bank to manage the bidding process. Another example is Panama Pacifico, because it was awarded in a public bidding to London & Regional Properties (LPR) over other 18 bidding groups (LPR, 2009).

7.3.6 Regulation for attracting FDI

Base on Singapore and Dubai's regulation for attracting business, Panama has established a beneficial regulation. The Law 41 of June 2004 creates the special benefits and fiscal support for Panama Pacifico to be a free trade zone. These benefits ensure world competitive taxation, customs and investing. Law 41 of 2007 was created to improve the already existing benefits of Law 41 of 2004 and target headquarters operations. This improved law provides labor codes that make firing and hiring easier and immigration benefits to move workers from other countries.

Furthermore, the law provides a guarantee of ten-year period of no fiscal changes to ensure companies stability for doing business without the worry of changing laws (LPR, 2009).

7.3.7 Anchor companies and FDI attraction

Panama needs a more aggressive and comprehensive promotion to attract FDI. Currently Panama's inflow of FDI is $2.4 billion compared to $22.7 billion in Singapore and $13.7 billion in UEA (Heritage Foundation, 2010). The Government of Panama (2009) describes the sequence of steps to for the development of Panama and even before investing in infrastructure the government wants to develop the plan and implement attraction of FDI. Currently there is not a defined plan to attract a specific industry like Singapore has done before.

The development of Dubai and Singapore are both highlighted by the clear vision of the government and their developments as logistics hubs over the period of 50 and 30 years respectively. Singapore today provides one of the best environments for business owners. In contrast, Panama's efforts to attract FDI are fragmented in different departments and are not clearly communicated highlighting the need for a similar plan for the whole country to succeed as a world-class logistics hub.

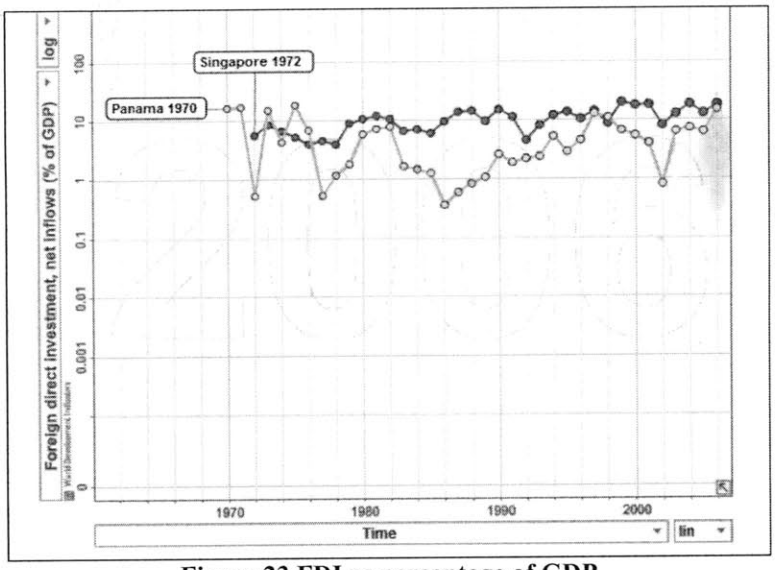

Figure 23 FDI as percentage of GDP

Figure 23 above shows in the last 30 years how much of the GDP was due to FDI. It shows the sustainable large inflow of FDI in Singapore, versus the variable lower flow in Panama. However, a growing percentage in the case of Panama can be observed in the last years. It also shows the influence of the government in the percentage of FDI. Panama currently has Free Trade Agreements with major countries in Asia and the US. Singapore and Dubai have modern Free Trade Zones and Colon Free Trade Zone is old and serves a regional market.

Currently Panama has more than 100 branches for multinational companies. The most noticeable ones have been attracted by the benefits of the Law 41. The Agency for the Special Economic Area of Panama Pacifico and the creation of the Law 41 has recently resulted in the attraction of new companies from all over the world. Table 4 presents a summary of the companies that currently take advantage of the benefits under Law 41. Also, the ACP, the Colon Free Trade Zone and port operators, have provided the right services to attract operations from major companies into the country. The industries required for the Canal to operate, have in time, increased the growth of adjacent industries that attract large companies into Panama.

Table 5 Anchor companies in Panama (Business Panama, 2010)

Country	Enterprise	Activity
Denmark	Maersk	Maritime
Switzerland	Procter & Gamble	Goods
Venezuela	Inelectra	Construction and Engineering
China	Sinopec	Energy
South Korea	LG Consulting	Consulting
Switzerland	Roche	Pharmacy
USA	Caterpillar	Heavy Equipment
USA	AIA Services	Insurance
South Korea	Hyundai Heavy Industries	Maritime
USA	AES	Energy
France	Total	Energy
Spain	Volconsa	Construction
Switzerland	Endress + Hauser	Technology
USA	Western Union	Money Transfer
USA	Thunderbird	Entertainment
France	Peugeot	Automation
USA	Halliburton	Energy
USA	Pan American Life Global Serv.	Insurance
Mexico	Cemex	Construction
USA	Moffatt & Nichol	Construction and Engineering
Switzerland	ABB	Electric Engineering
USA	Safra Asset Management	Advisory
South Korea	Kumho Tire	Automation
Netherlands	Heineken	Goods

8. Impact on the Latin American port network

To characterize and analyze the ports in the Latin-American region it is important to understand the dynamics of the ports and their relationships. Our hypothesis is that the growth of a hub in any network will affect the flows within it. First we will overview all the important ports in Latin America to determine which ones are directly affected by their relationship with the growth of Panama as a hub. Secondly, we will discuss the difference between a gate port and a transshipment port and their relevance to this study. Then we will finalize with a brief discussion of the main ports affected.

8.1 Latin American network of ports: impacted ports

Shipping networks in the last 10 years has seen tremendous growth in the containerized cargo area(ACP, 2006). We will measure the impact of Panama in this sector since its effect will be seen in the short term. During the interview with Panama Canal representatives, it was discussed that the Panama Canal expansion will affect the shipping of dry bulk, but more immediately the containerized cargo, which represents the largest volume of the Canal traffic. The United Nations Conference on Trade and Development (UNCTAD) Annual Review of Maritime Transport of 2008, which is dedicated to the Latin American region and the Caribbean, identifies the 25 largest ports in Latin America in terms of total containers (UNCTAD, 2008). To have a more concise group of ports to analyze the impact of the Panama cluster development, we chose the 10 most important ports in terms of cargo using UNCTAD information.

Table 6 UNCTAD ranking of port activity 2007

Ranking of port activity by country in Latin America and Caribbean

(TEUs)

	2004	2005	2006	2007	Average annual growth 2004-2007
Brazil	4 977 180	5 302 242	7 122 054	8 713 984	25.03%
Panama	2 428 762	2 731 705	2 949 072	3 907 839	20.30%
Mexico	1 902 754	2 133 476	2 676 774	3 063 539	20.34%
Chile	1 544 935	1 715 999	2 041 145	2 680 939	24.51%
Jamaica	1 356 034	1 670 800	2 150 408	2 016 792	16.24%
Argentina	1 251 895	1 490 378	1 800 000	1 863 954	16.30%
Colombia	875 415	953 331	1 333 764	1 835 018	36.54%
Bahamas	1 059 581	1 121 285	1 390 000	1 636 000	18.13%
Peru	806 567	991 681	1 085 040	1 175 329	15.24%
Venezuela (Bolivarian Republic of)	920 884	1 069 008	1 218 798	1 125 221	7.40%
Costa Rica	734 088	778 651	828 781	976 621	11.01%
Ecuador	564 093	632 237	670 237	894 320	19.51%
Guatemala	750 343	785 868	809 348	830 936	3.58%
Trinidad and Tobago	449 468	322 466	632 266	714 972	19.69%
Honduras	555 703	553 013	593 800	636 435	4.84%
Uruguay	423 343	454 517	519 218	596 487	13.63%
Dominican Republic	537 316	355 404	366 255	309 344	-14.14%
Guadeloupe	108 658	154 263	154 506	168 839	18.46%
El Salvador	45 315	49 151	124 331	144 458	72.93%
Barbados	82 028	88 758	98 511	99 623	7.15%
Netherlands Antilles	82 087	89 229	90 759	97 271	6.17%
Nicaragua	16 983	18 951	47 854	58 614	81.71%
Belize	35 565	35 891	38 005	39 191	3.40%
Saint Lucia	24 965	60 747	30 656	32 339	9.85%

Source: UNCTAD secretariat based upon UNECLAC – Perfil Marítimo and individual port data.

In this chapter, each port relationship with the Canal is analyzed to find out the impact of the Panama Hub development. Table 7, presents the 10 countries that use the most the Canal.

Table 7 Latin American countries use of the Canal in long tons. (ACP, 2009)

Country	Long Tons (Millions)
Chile	25.4
Colombia	12.6
Ecuador	12.4
Peru	12.1
Mexico	11.5
Venezuela	7.1
Guatemala	3.3
Brazil	3
El Salvador	2.9
Jamaica	2.8

The interviews performed to the two of the main shipping lines operating in Panama, Maersk and Evergreen determined that the Panama Canal has little or no effect on the cargo lines that connect Argentina and Brazil to the world. Argentina biggest port, Buenos Aires, enjoys a privileged geographical position that allows it to connect with Europe and Asia without using the Panama Canal. That is why Argentina is not present in the top ten countries that use the Canal even though it ranked sixth in port activity.

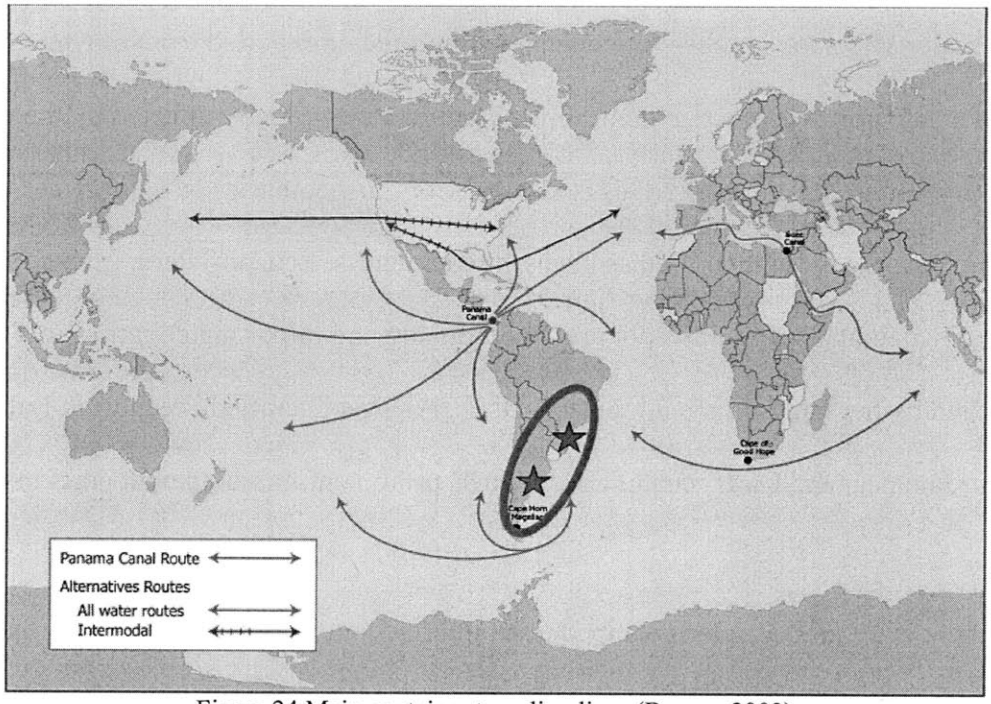

Figure 24 Main container traveling lines (Berger, 2003)

Brazil in the other hand moves some cargo using the Canal. Cargo from Asia to Santos in Brazil has a shorter route going straight than using the Canal. The distance from Hong Kong to Santos is 10,274 nm, and using the Canal it would be 13,666 nm almost one third longer. In the other hand, when cargo goes from and to US west coast to Santos in Brazil then the Canal can play a role since it shortens the distance by about 586 nm. The annual cargo report published by the Panama Canal shows that only 3 million long tons of the total 714 million long tons handled by Brazilian ports use the Canal (ACP, 2009).

8.2 Gate port vs. Transshipment ports

From the countries identified to be affected by the Canal we then need to identify what type of cargo is using the Canal and what type of port is being used to send this cargo. Ports are used as points of entry or exit of cargo. Chile for example is a country with large export and imports to the US and uses the Canal in Large scale but even if Panama became a large Logistics Hub this would not really affect the numbers of containers imported or exported from of Chile. Chile is an example of a gate port where cargo comes in and out and it is directly affected by the economy of the country not by outside ports. This is also true for most countries in Latin America and the Caribbean except for those identified as Transshipment ports. Ecuador, Peru, Mexico, Venezuela, Guatemala and El Salvador are all producing and importing countries that are not really affected by the transshipment industry. UNCTAD has identified Freeport in Bahamas, Kingston in Jamaica, and Cartagena in Colombia as prominent transshipment ports in addition to Panama.

Transshipment is defined as goods shipped to an intermediate destination, and then from there to yet another destination. There are multiple reasons for this type of operation. In a Hub-and-spoke

system a large vessel brings containers for a region and it unloads most of its cargo in a central location where it is transshipped into smaller vessels that deliver to the final destination. Another reason for transshipment is the consolidation of cargo from multiple origins to meet before reaching their final destination. Additionally, trans-shipment operations can be done in places where special custom laws apply which simplify the consolidation of cargoes. Transshipment can have multiple definitions but in this context it refers mainly to ports that perform a water-to-water transshipment.

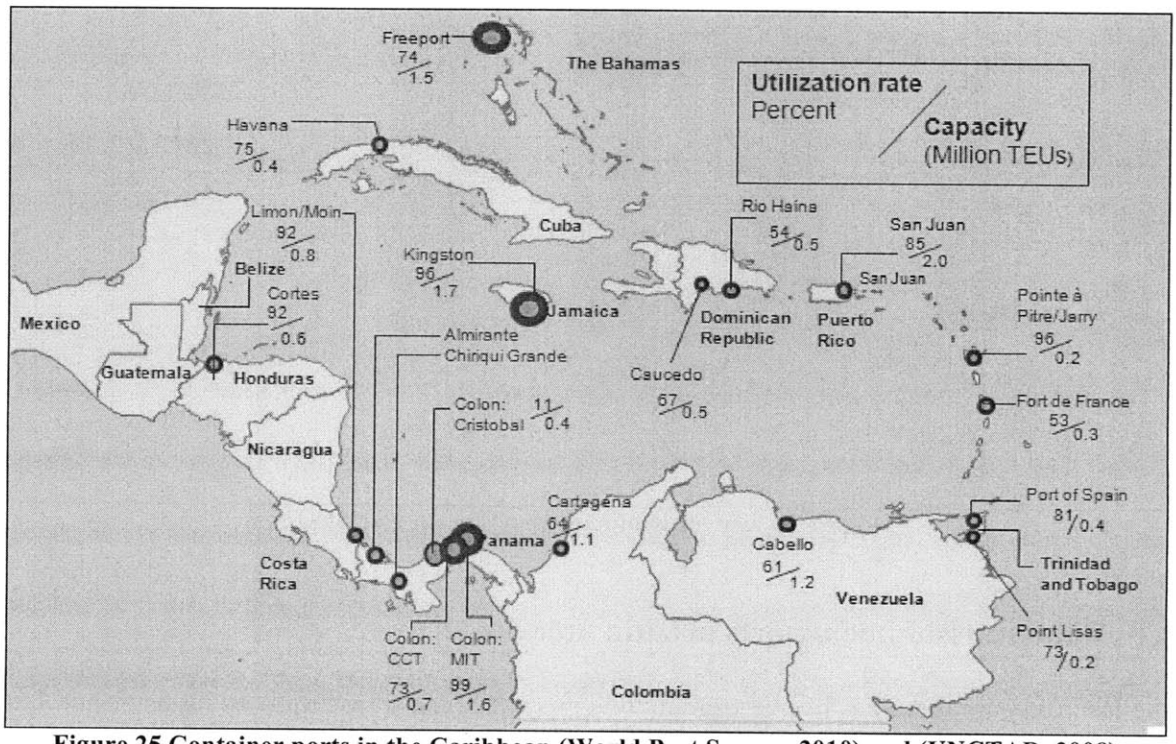

Figure 25 Container ports in the Caribbean (World Port Source, 2010) and (UNCTAD, 2008)

The map shows all transshipment ports in the Caribbean with their respective capacity. Clearly Bahamas, Jamaica, and Panama surpass in capacity other container ports in the region. Figure 26 Key transshipment ports in the Caribbean shows the percentage of cargo that is transshipment versus consumed in local market. The line identifies their total throughput in TEU's. Notice that Freeport is the only pure transshipment port. Jamaica local market consumes around 15% of the cargo just like Panama. All of these ports have expansion plans for the next five years. UNCTAD

Maritime Review of 2008 identified Kingston, Manzanillo, and Santos as the biggest container ports in the region. The review also pointed out Manzanillo, Kingston, Freeport, and Balboa as key transshipment hubs. Additionally, Colombia and Trinidad and Tobago are increasingly growing their share of the market.

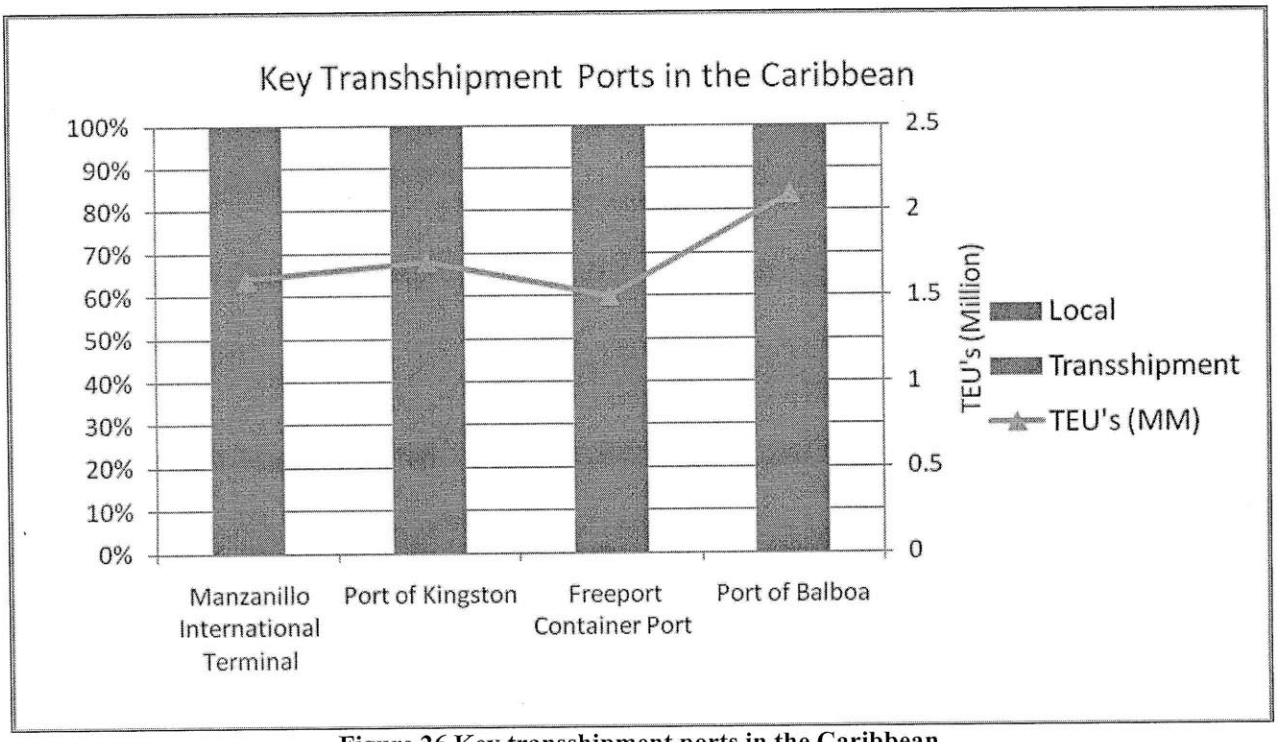

Figure 26 Key transshipment ports in the Caribbean

8.2.1 Main transshipment ports in Latin America

In the last 10 years there has been a tremendous growth of the transshipment industry and Latin America is no exception to this behavior. The graph below shows the growth of transshipment cargo in the four largest transshipment ports in Latin America according to UNCTAD. Freeport main market is servicing the cargo consolidation for the US market while the other ports are mainly for distribution in the entire Caribbean region, east Central America and north South America. Balboa main advantage is the lack of competition on the west coast of Panama. There are no big container ports close by that can take its cargo. Balboa's infrastructure was improved

in 2005 and it reached 1 million TEU's in 2007(Panama Ports, 2009). PSA from Singapore has acquired the permit to build a mega port right in front of Balboa with the expected capacity of 450,000 TEU's(PSA, 2008).

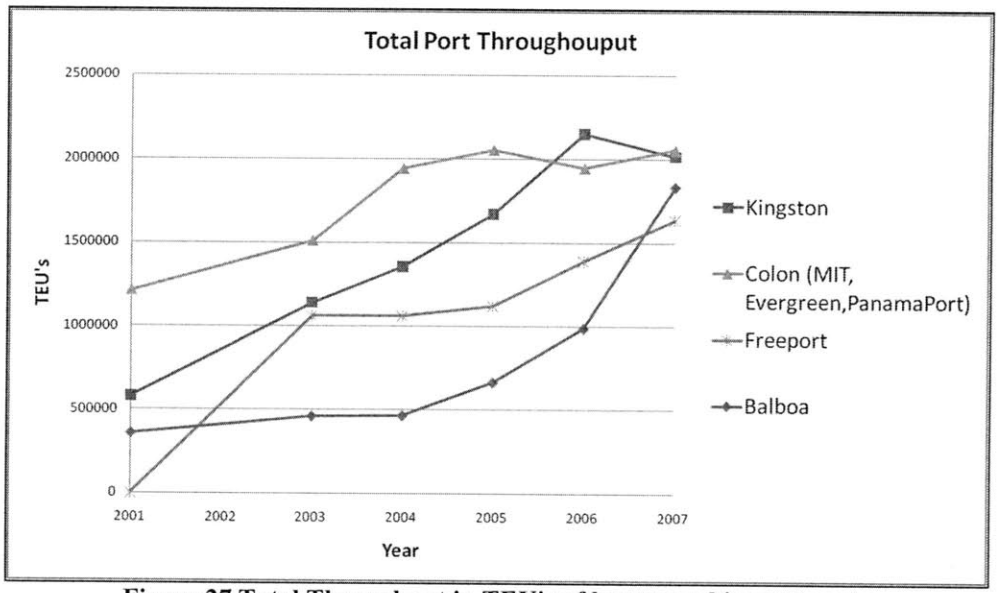

Figure 27 Total Throughput in TEU's of key transshipment ports

Panama enjoys a privileged position in the region to develop into a logistics hub, as we described in the previous chapter. When comparing LPI scores the only countries with higher overall LPI than Panama are Brazil, Argentina, Chile and Mexico. None of them have large transshipment operations and mostly have Gate ports. Colombia and the Bahamas are closer to Panama. Jamaica needs to improve a lot of the processes regarding customs and timeliness

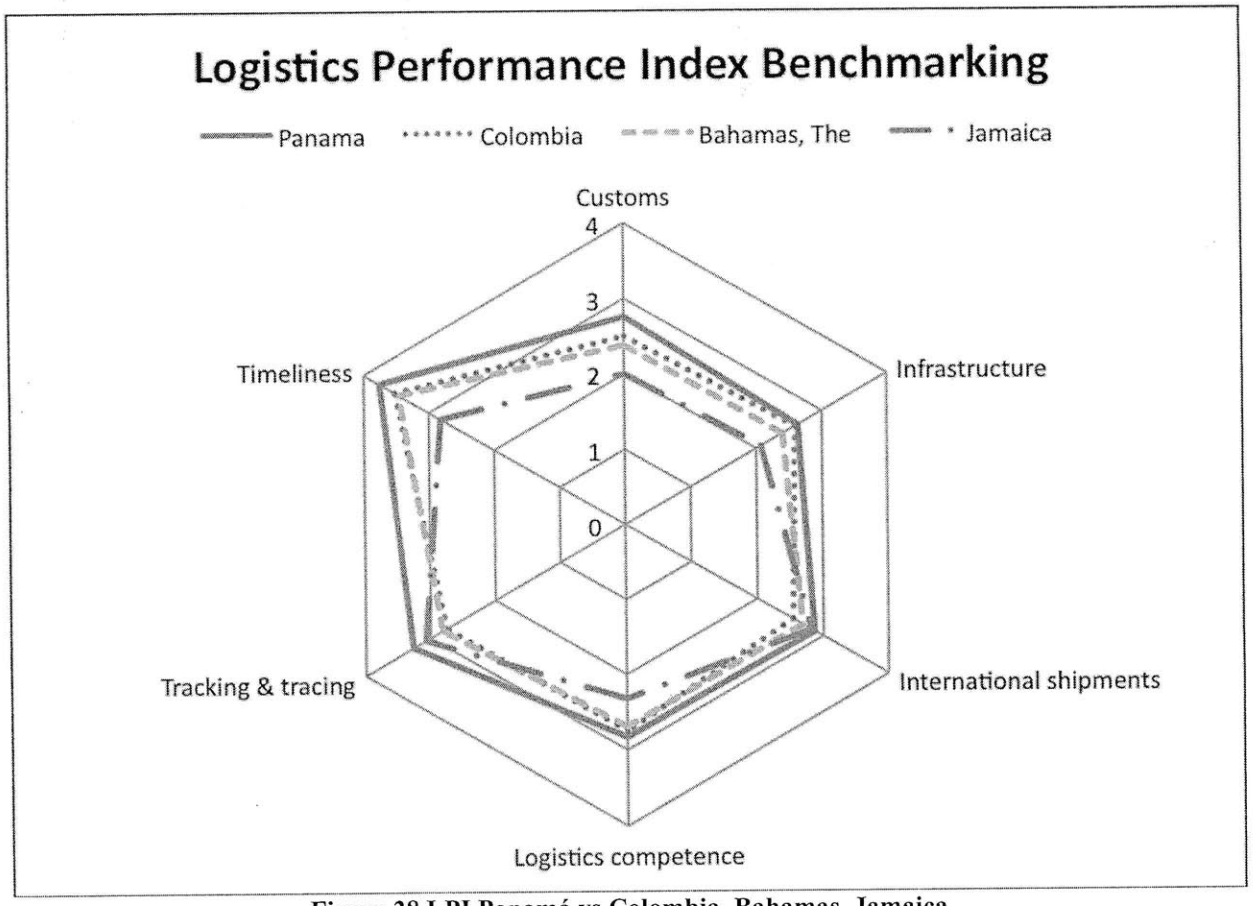

Figure 28 LPI Panamá vs Colombia, Bahamas, Jamaica

In summary, Panama has a lot of advantages to develop a logistics hub in the region given the connectivity, trade and government commitment to improve. The real short-term effect o the growth in Panama, will affect the market of Kingston and Freeport. The review of the non-Panamanian transshipment hubs in the Caribbean indicated as shown in Figure 25 there is plenty of capacity in the area and plans for expansion. Diversion of transshipment activities is not expected to be related with capacity at other ports, but the advantages of Panama ports because of their proximity to the main trade routes. The next level of competition will come from port that can provide additional services to draw more value from the current traffic in their market.

9 Conclusions and recommendations

Panama's ambition to become a logistics hub is a realistic aspiration that can be achieved with combination of government planning and private investment. The following is an overall assessment of the current Panama in contrast to the government plan and future actions by ports and the Canal. Panama's main challenge is to overcome its regulatory constraints and develop an efficient and corrupt-free environment for companies.

Table 8 Clusters key elements

SUMMARY	Singapore	Dubai	Panama	Panama Planned
Strategic location	Strategic position in the north south corridor in Asia	Strategic position between Europe and Asia	Strategic position in the Asia-US East Coast corridor	Expansion of the Canal will provide access to larger volumes and more capacity for connectivity
Political Stability	Committed and stable government. Unique party.	Committed and stable government, Monarchy	Committed government. Multiple political parties, potential opposition	Long term policies and laws to protect investors
Human capital	Emphasis on logistics and technical education, world class labor force	Incentives to bring labor from other countries and provide world class labor force	Inadequate labor force, lack of technical knowledge	Investments in logistical education and technical training
Infrastructure	World Class infrastructure and intermodality	World Class infrastructure and intermodality	Good Ports, lack of proper intermodality	Expanded canal and ports. Improvements in road connectivity
Administrative processes	World Class customs, and other relevant business processed	Investor friendly legislature	Denoted as corrupt, and not as efficient	One-stop-shop type of entity new business creation
Regulation for attracting FDI	Clear vision and incentives plan. Economic and labor incentives at the beginning, later value proposition.	Clear vision and development plan, Economic and labor incentives. Some value proposition.	Lack of a long term plan (10yrs>). Rely on economic and labor incentives. No value proposition defined.	Creation of entities like AAEEPP and Laws to support them. Plan relies on economic and labor incentives. No value proposition clearly defined.
Anchor Companies	Several logistics, manufacturing, transportation companies attracted.	Several logistics, manufacturing, transportation companies attracted.	Some logistics and transportation companies attracted.	In the future AAEEPP will play a major role to attract new Anchor companies

There is a need to create a clear long term policies to address the changing governments every five years guaranteeing stability for the attraction of FDI. The table below summarizes the analysis from previous chapters and illustrates the key elements of the different clusters discussed.

Additionally, we graded in a scale of 0 to 5 (being 5 the best score) Singapore, Dubai and Panama current state of cluster development and Panama's state after implementing the government plant 2009-2014. This grade was done considering the proposed Structure of seven critical factors. Figure 29 summarized Panama's current situation and the evaluation of the government plans for improvement and development.

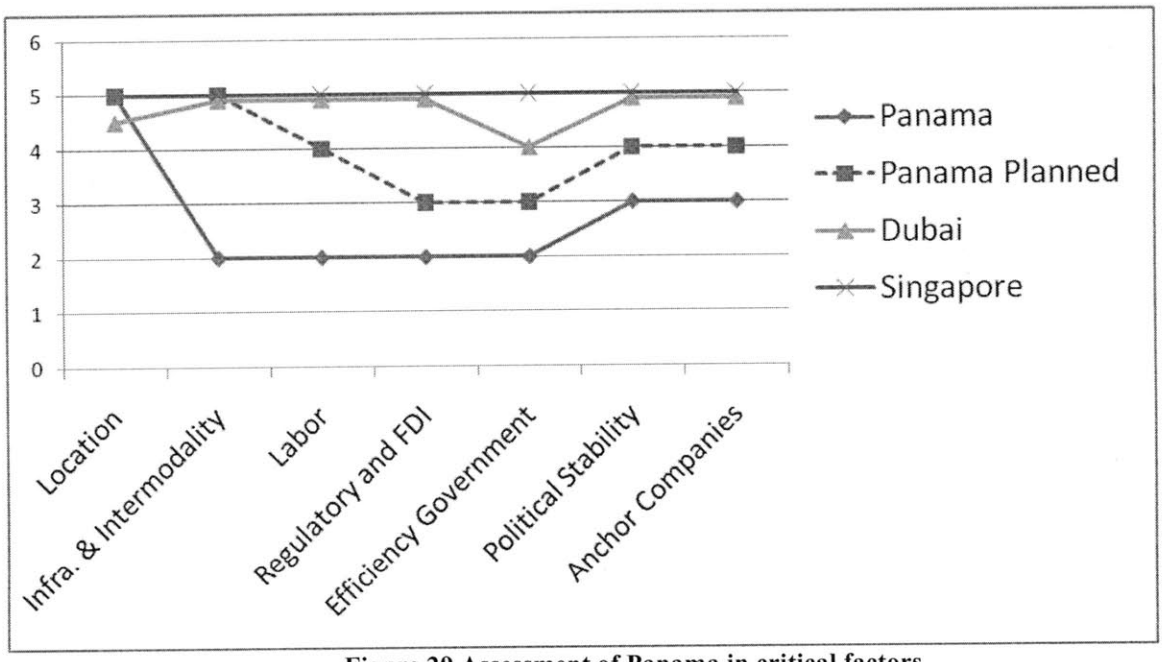

Figure 29 Assessment of Panama in critical factors

Location: Panama's location provides a lot of potential for further development of logistics services and value added activities. Panama has the best location in terms of connectivity to large cargo routes.

Infrastructure and Inter-modality: Current projects like the Panama Canal expansion, the connection of panama pacific to the Pan-American Highway and the improvements of the Panama-Coon highway will provide better infrastructure for logistics in Panama.

Labor: Current labor force is not skilled, inflexible and not cheap. The government plans for better educational institutions and emphasis on logistics training will require time and effort. In the mean time the government needs to provide options for companies to attract talent to the country.

Regulatory and FDI: Panama lacks a leading institution in charge of bringing FDI and communicates this throughout the different entities of the government. There is a dislocation of efforts which is yet to be resolved properly.

Efficiency of Government: Governmental efficiency can be address with laws like law 41 and the creating of entities like The Agency for the Special Economic Area of Panama are good steps towards efficiency but there is still the threat of corruption that needs to be addressed.

Political Stability: One of the biggest advantages of Panama is the stability of the government and the relations of Panama with trade partners. The only reason why Panama did not score a complete 5 in this area is because the change of government every five years allows changes in politics as different parties are in power.

Anchor Companies: Companies operating in Panama currently make use of all the benefits provided by the government but it is yet unclear how much of this benefit will promote the development of the country. Panama transition from transshipment and logistics services to becoming an innovating industry like Singapore and Dubai is yet to be defined.

The government can address all Panama's biggest challenges. As discussed previously the public and private investments in infrastructure will take care of the growth in demand for

better logistics infrastructure in Panama. In the other hand, it is a real challenge for the current government to ensure the continuity of the projects design to deal with the lack of skilled labor and the attraction of FDI in the short-term. Panama bureaucratic efficiency improves as projects like Panama Pacifico, create laws like law 41 that addresses the real needs of business owners and their concerns with Panama in the long-term.

9.1 Recommendations for impacted ports

Countries that are affected by the Panama Canal, like describe before, may adopt a competitive or a cooperative attitude. Competition in terms of better service offerings and reduced costs improves the overall region competitiveness. Panama, offers convenience for shipping lines that use the main routes via the Canal, but for non-canal related transshipment the competition in the Caribbean is based on location and cost. In some cases there will be a case of cooperation because, like in the case of Freeport, the port operator of Panama Hutchison Holdings is the same port operator for Balboa port and Cristobal port in Panama which means that they will offer shipping lines services with disregard of competition between countries.

- Freeport provides cheaper costs than Panamas and can maintain its position as transshipment hub for routes south-north America and Europe-South America and the Caribbean.
- Kingston in the other hand has too many competitors in the middle of the Caribbean and will have a harder time capturing local markets if the capacity around keeps growing at the current pace. Kingston needs to focus on a specific set of customer or services not available in the heart of the Caribbean and capture the smaller distribution network in the Caribbean.

Countries wanting to compete in the diversification of transshipment flows need to focus in the development of infrastructure to meet the demand, but more importantly to provide the right environment for businesses to grow after traffic is captures. The development of successful transshipment ports goes hand in hand with the ease for businesses to operate in the country and the reliability of the port operations.

BIBLIOGRAPHY

Dubai Economic Council. (2009). *Dubai Economic Council.* Retrieved 2010 йил 27-February from Dubai Competitivess Council: http://www.dec.org.ae/

AAPA. (2008). *World Port Rankings.* Retrieved 2010 йил 1 from http://aapa.files.cms-plus.com/Statistics/WORLD%5FPORT%5FRANKINGS%5F20081.pdf

ACI. (2006). *Wolrd Aiport Traffic Report International.* ACI.

ACP. (2000). *Autoridad del Canal de Panama.* Retrieved 2009 йил 13-December from Panama Canal History: http://www.pancanal.com/esp/history/history/index.html

ACP. (2009). *Autoridad del Canal de Panama Estadisticas.* Retrieved 2009 йил 19 from Estadisticas de Transito: http://www.pancanal.com/esp/maritime/statisti.html

ACP. (2006). *Panama Canal Master Plan.* Panama city: ACP.

AMP. (2008). *Autoridad Maritima de Panama.* Retrieved 2009 йил 10 from Estadisticas AMP: http://www.amp.gob.pa/

Ashai, Z., Dahshan, M. E., Kubba, J., Talati, H., & Youssefi, P. (2007). *The Transport and Logistics Cluster in the United Arab Emirates.* Cambridge, MA: Microeconomics of Competitiveness Group Project.

Ashton, B. (2006 йил 14-September). *Logistics – The Factory Without Walls.* Retrieved 2010 йил 17-October from Mute: http://webcache.googleusercontent.com/search?q=cache:l_DFapxtATUJ:www.metamute.org/en/Logistics-Factory-Without-Walls+Products+are+then+delivered+to+the+destination+points+without+being+stored+at+the+hub&cd=1&hl=en&ct=clnk&gl=us

Asia Competitiveness Institute. (2009). *Singapore Competitiveness Report.* Singapore: Lee Kuan Yew School of Public Policy, National University of Singapore.

AZ Freight. (2009). *AZ Freight.* Retrieved 2010 йил 1-4 from Panama: http://www.azfreight.com/azworld/aw22703.cfm#v

Brito, T. B. (2010). *Feasibility Analysis of a Global Logistics Hub in Panama.* Centrol Latinoamericano de Innovacion en Logistica.

Business Panama. (2010). Retrieved 2010 йил 23-1 from at a Glance: http://www.businesspanama.com/about_panama/glance.php

CFTZ. (2009). *Incentives*. Retrieved 2010 йил 4-February from Colon Free Zone: http://www.colonfreezone.com/info/incentives.asp

Changi Airport Group . (2009). *Changi Airport* . Retrieved 2010 йил 15-February from Changi Airport : http://www.changiairport.com/changi/en/air_cargo/?__locale=en

Chee, V. (2002 йил 4-January). *Port of Singapore Authority (PSA)*. Retrieved 2010 йил 5-February from Singapore Infomedia: http://infopedia.nl.sg/articles/SIP_577_2005-01-27.html

CIA. (2009). *CIA Factbook* . Retrieved 2010 йил 25-3 from CIA: https://www.cia.gov/library/publications/the-world-factbook/geos/pm.html

Ciudad del Saber. (2010 йил 3). *Ciudad del Saber.* Retrieved 2010 йил 23-4 from http://www.ciudaddelsaber.org/areas-trabajo/desarrollo-humano

Commit FZE. (2008). *About UAE*. Retrieved 2010 йил 4-February from Commit: http://www.commitbiz.com/about_uae.htm

Compare Infobase Limited. (2010). *Focus Singapore*. Retrieved 2010 йил 17-March from Focus Singapore: http://http://www.focussingapore.com/information-singapore/

COPA. (2009). *Copa*. Retrieved 2010 йил 12-3 from Historia: http://www.copaair.com/sites/cc/es/acerca-de-copa-airlines/pages/Nuestra-Historia-2.aspx

Cullinane, K. C. (2004). Container Terminal development in mainland China and its Impact on Competitiviness of the Port of Hong Kong. *Transport Review , 24* (1), 33-56.

Directorate of Economics & Statistics. (2010). *Economic survey of Maharashtra 2009-10 (ESM)* . Mumbai: Planning Department, Government of Maharashtra.

Emirates Group. (2007). *Emirates Airlines*. Retrieved 2010 йил 10-February from The Emirates Story: http://www.emirates.com/

Fleming, D. K. (1999). Comment some reflections on port competition in the United States and western Europe. *Maritime Policy & Management , 24* (4), 383-394.

Fujita, Y., & Hisa, S. (2004). *"Shifting Trade Patterns" - HowWillTheyImpactInfrastructureNeeds in East Asia and Pacific Region? -*. Japan Bank for International Cooperation (JBIC). Washington: ADB-JBIC-World Bank Joint Flagship Study.

Gapminder. (2007). *Gapminder*. Retrieved 2010 йил 22-3 from Gapminder: www.gapminder.org

Government of Panama. (2009). *Strategic Government Plan 2010-2014.* Panama City: Government of Panama.

Graham, M. (1998). Stability and competition in intermodal container shipping: finding a balance . *Maritime Policy & Management* , 129-147.

Hayes, D. M. (2006). Singapore Targets Logistics and Transport growth. *Logistics and Transport Focus* , 57-60.

Heritage Foundation. (2010). *Heritage Foundation.* Retrieved 2010 йил 2 from 2010 Index of Economic Freedom: http://www.heritage.org/index/country/Panama

Hubner, W. (2005). *The Role of Changing transport Costs and Technology in industrial Relocation.* Directorate for science, technology and industry "Maritime Transport Comittee". Organization for economic Co-opertaion and Development.

Institute for Competitiveness. (2010). *State Competitveness Report.* India: Institute for Competitiveness.

Ketels, C., Lall, A., & Siong, N. B. (2009). *Singapore Competitiveness Report.* SIngapore. Kevin Cullinane, Y. T.-F. (2005). Port competition between Shangai and Ningbo. *Maritime Policy & Management* , 331-346.

LaEstrella. (2010 йил 26-March). *DHL Renews panama Airplane Fleet.* Retrieved 2010 йил 4-4 from La Estrella: http://www.laestrella.com.pa/mensual/2010/03/24/contenido/19584222.asp Lim, J. (2009 йил 5-10). *IE Singapore.* Retrieved 2010 йил 3-April from InfopediaTalk: http://infopedia.nl.sg/articles/SIP_1581_2009-10-06.html

Llacer, F. J. (2006). Port privatization in Panama. *Marine Policy* , 483-495.

London & Regional Properties. (2007). *Panama Pacifico Master Vision.* Retrieved 2009 йил 4-9 from Panama Pacifico: http://www.panamapacifico.com/Explore-Master_Vision.aspx LPR. (2009). *Panama Pacifico Development.* Retrieved 2010 йил 13-3 from Slideshare: http://www.slideshare.net/panamapacifico/panama-pacifico-development

Maharashtra industrial development corporation (MIDC). (2009). *Maharashtra and its strengths.* Retrieved 2010 йил 12-March from MIDC Portal: http://www.midcindia.org

Matly, M., & Dillon, L. (2007). *Dubai strategy: past, present, future.* Cambridge, MA: Harvard Business School.

Narayanan, B., & Vashisht, P. (2008). *Determinants of Competitiveness of the Indian Auto Industry.* New Delhi: Indian council for research on international economic relations.

National Informatics Centre. (2010 йил 25-January). *Education, Health.* Retrieved 2010 йил 8-March from The National Portal of India: http://india.gov.in/

OECD. (2009). *OECD*. Retrieved 2010 йил 18-April from Custom procedures: http://www.oecd.org/document/13/0,3343,en_39048427_39049358_41368845_1_1_1_1,00.html

Pablo Kaluza, A. K. (2010). *The complex network of global cargo ship movement.* Journal of The Royal Society.

Panama Ports. (2009). *Panama Ports*. Retrieved 2009 йил 11 from Balboa: http://www.ppc.com.pa/balboa.php

Parundekar, S. S. (2010 йил 2 and 5-April). Executive Director Poona Divisional Productivity Council. (M. team, Interviewer)

Porter, M. (2008). Clusters and competition. In M. Porter, *On Competition* (pp. 213-303). Boston: Harvard Business Review.

PSA. (2008). *PSA International.* Retrieved 2010 йил 4-2 from Panama: http://www.internationalpsa.com/factsheet/pdf/panama.pdf

PSA Singapore Terminals. (2010). *PSA Singapore Terminals*. Retrieved 2010 йил 15-April from PSA Singapore Terminals: http://www.singaporepsa.com/

Ravindran, N. (2007 йил May). *Singapore's aerospace industry gains recognition; Singapore's aerospace industry looks set to grow further as new deals are sign*. (G. Group, Producer) Retrieved 2010 йил 10-March from Entrepreneur: http://www.entrepreneur.com/tradejournals/article/164421450.html

Remaking Singapore, Special version for MOC 2010 (2010 йил 4-March).

Robinson, R. (1998). Asian hub/feeder nets: the dynamics of restructuring. *Maritime Policy and Managemenet* (25), 21-40.

Singapore Airlines. (2008). *Background / History* . Retrieved 2010 йил 7-February from SIAS: http://www.sias.org.sg

Song, D.-W. (2003). Port co-opetition in concept and practice. *Maritime Policy & Management* , 29-44.

Song, D.-W. (2002). Regional container port competition and co-opertaion: The case of Hong Kong and South China. *Journal of Transport Geography , 10* (2), 99-110.

Srinivas, S. (2010). India's most competitive states. *Businessworld* , pp. 40-57.

The Economist. (2009 йил 3-December). *A plan to unlock prosperity.* Retrieved 2009 йил 5-December from http://www.economist.com/displaystory.cfm?story_id=15014282

The World Bank Group. (2010). *Doing Business*. Retrieved 2010 йил 15-2 from Doing Business : http://www.doingbusiness.org/economyrankings/

Transparency International. (2009). *CPI*. Retrieved 2010 йил 3 from Corruption perception Indez: http://www.transparency.org/policy_research/surveys_indices/cpi/2009

U.S. Department of Commerce. (2005). *Doing Business in Panama: A Country Commercial Guide for U.S. Companies.* U.S. Department of Commerce, Commercial Services.

UNCTAD. (2008). *Annual Review of maritime Transport.* UN.

Ungo, D. (2009 йил 12). Oficina de Invetigacion de Mercado ACP. (D. munoz, Interviewer)

Vishal Mishra Web. (2010 йил 8-April). *Vishal Mishra Web*. Retrieved 2010 йил 10-April from Vishal Mishra Web: http://vishalmishra.com/statewise_gdp.html

WEF. (2009). *WEF Competitiveness Report.* WEF.

World Bank. (2009). *Doing Business.* Washington D.C.

World economic Forum. (2009). *Global Competitivennes Report.* Geneve: WEF.

World Port Source. (2010). *World Port Source - Caribbean*. Retrieved 2010 йил 2 from World Port Source: http://www.worldportsource.com/ports/region.12.php

World Trade Organization. (2006). *Trade policy review - United Arab Emirates.* Lausanne: WTO Secretariat.

WTO. (2009). *WTO Trade Statistics.* Retrieved 2010 йил 2-February from http://www.wto.org/english/res_e/statis_e/its2009_e/its2009_e.pdf.