

Master Thesis

The Panamanian Logistics Cluster - A Trajectory for Sustained Growth?

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Abstract

This study seeks to explore the relation between the clustering of logistics industry and economic growth, exemplified by the case of Panama. Increasingly, governments resort to cluster policies to foster growth, innovation and competitiveness of their regions and industries. However, the study of logistics cluster policies and their effects on growth have been largely side-lined by academia. Among the only scholars to comprehensively investigate the manner is Sheffi, who concluded policy recommendations for the facilitation of logistics cluster development. This work employs these recommendations and tests their validity in the case of Panama. Holding an asset of immense value, the Panama Canal, gives the country the opportunity to capitalize on the vast flows of trade passing through. However, success depends on the government's ability to generate policies that create a favourable environment for logistics to flourish. After the review of relevant literature on cluster research, a theory-based evaluation approach has been employed. Doing so, policy inputs, activities, outputs and outcomes are considered. To master the task of defining policy outcomes, a series of semi-structured key informant interviews has been conducted with individuals of relevant organizations from the business, public and education sector in Panama-City, Panama. This study seeks to answer the question: How does Panama's policy aimed at fostering its logistics intensive cluster promote the country's economic growth? It was found that Panama's ability to capitalize on its locality, attract foreign direct investment and encourage domestic investment were the main contributors to the country's impressive economic growth in recent years.

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“While we maintain the unity of the human species, we at the same time repel the depressing assumption of superior and inferior races of men. There are nations more susceptible of cultivation, more highly civilized, more ennobled by mental cultivation than others—but none in themselves nobler than others.”

Alexander von Humboldt – Cosmos, 1858

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List of Acronyms

3PL	Third-Party Logistics
ACP	Autoridad del Canal de Panamá (Panama Canal Authority)
BOP	Balance of Payments
CEO	Chief Executive Officer
EDB	Economic Development Board
FTZ	Free Trade Zone
GDP	Gross Domestic Product
HDI	Human Development Index
IMF	International Monetary Fund
INADEH	Instituto Nacional de Formación Profesional y Capacitación para el Desarrollo Humano (National Institute of Professional Formation and Training for Human Development)
IT	Information Technology
ITSE	Instituto Técnico Superior del Este (Higher Technical Institute of the East)
LPI	Logistics Performance Index
MAR	Marshall-Arrow-Romer (externalities)
MNE	Multinational Enterprise
NCB	National Computer Board
NTU	Nanyang Technological University
NUS	National University of Singapore
OECD	Organisation for Economic Co-operation and Development
PSA	Port of Singapore Authority
R&D	Research and Development
SEZ	Special Economic Zone
US	United States (of America)

I. Introduction

When thinking about the Central American nation of Panama bordering Colombia and Costa Rica, public attention in the Western World has recently and primarily revolved around the Panama Papers scandal. The offshore company issue has moved the country into a negative light, however the second thing coming to mind is most likely the Panama Canal and its recent expansion. It is both a Panamanian national symbol and reason for the country's independence from former Gran Colombia. After an initial but disastrous and costly endeavour by the French to build an interoceanic canal during the late 19th century, the United States revived the project in the early 20th century. To begin construction, the US led Panama to independence to outmanoeuvre Grand Colombian involvement and ownership demands. Nonetheless, the canal initially remained under the authority of the US and its military which erected extensive military facilities and a command centre for the Latin American region, meanwhile guarding the strategically important canal. In 1977, the Torrijos- Carter Treaties ensured the transition of ownership to the Panamanian people after 1999.

Nowadays, the Panama Canal is the country's economic backbone and it generated 1,933 billion \$ in revenues, providing 1 billion \$ to the state budget in 2016. Whereas the US treated the Canal as a strategic facility, the Panama Canal Authority (ACP – *Autoridad del Canal de Panamá*) have been able to effectively manage the Canal as a means to generate vital state income (Oppenheimer, 2009, p. 56). Since the millennium, the country enjoyed some of the highest GDP growth rates world-wide, by far leading in Latin America with rates between 4% and 12.1% in the last decade. Yet, a great share of the population remains suffering from poverty. Unsurprisingly, the Canal, the logistics sector and related industries are at the centre of Panamanian policymaker's attention to further stimulate the already impressive economic growth at the isthmus. This is reflected by the Panamanian governments' strategic plans which seek to further exploit the potentials from the country's strategic geographic position and logistics related activities around the Canal.

The positive economic performance sparked euphoria among foreign investors and Panama self-confidently proclaims to establish itself as the 'Hub of the Americas' (Palabras del Presidente de la República de Panamá, 2017; Netherlands Embassy in Panama, 2015). Some media outlets and economic analysers go even further and see in Panama a potential 'Singapore of Latin America' (The Economist, 2011; Meléndez, 2012). Considering the

countries' similarities, the reference does not seem far-fetched. Both lie at the crossroads of international trade, house large scale financial and logistics sectors and capitalize on their main resource – a favourable geographic locality. In his book, Sheffi (2012) comprehensively elaborates on the characteristics and potential of logistics sector and trade driven growth, among others investigating the cases of Singapore and Panama. His deliberate focus lies on the development and benefits of logistics intensive clusters for regional development. The concept of clusters was first thematised by Porter in his pathbreaking work *The Competitive Advantage of Nations*. He points out that not nations compete in the global marketplace, but their firms and companies do. Subsequently, it is certain industries or sectors who compete with those of other nations and their competitiveness is affected by state action, determining success or failure (Porter, 2011). Locality and regional environments emerged as principal determinants of economic success.

Deducted from Porters works, Ketels & Memdovic (2008) describe clusters as “groups of companies and institutions co-located in a specific geographic region and linked by the interdependencies in providing a related group of products and/or services” (p. 378). On the other hand, scholars regularly point out “that after nearly two decades of study and debate, it is probably impossible to agree on a single, universal definition” (Cortright, 2006, p. 4). Capello (2011) and Ascani et al. (2012) provide some further insight into the tools at hand when designing regional development strategies, reinforcing location theory and cross-fertilization effects of clusters. As modern means of transport have had space shrinking effects, nations and regions face more competition. The authors highlight the relation between agglomeration economies and the concept of clusters as pivotal for a region's or city's competitiveness. Todaro & Smith (2012) state that agglomeration economies and clusters may trigger increased economic growth in development countries. By investing in a ‘big push’ states should engage in a “public-policy-led effort to get the long process of economic development under way or to accelerate it” (p. 164). These assumptions increasingly influence regional development policy making and major development institutions began to promote cluster strategies and smart specialization since the 2000s (Shakya, 2009; United Nations, 2007). Yet, concerns remain about the effectiveness of public policies for cluster development as success of clusters does not emerge through specific targeted policies solely, but largely depend on a more complex favourable milieu and environment (Tavares & Teixeira, 2006, p. 308).

Purpose of Study & Research Questions

It has been shown that there are diverging opinions on the role of government and public policies in cluster development. However, for the case of logistics intensive clusters, Sheffi (2012) concludes that a logistics cluster “not only benefits from accommodating government policies in trade, taxation, and zoning but requires significant public investment in logistics infrastructure as well as regulatory support” (p. 175). Based on this observation, the main aim of this study is to shed light on government policies aiming at the facilitation and development of a logistics intensive cluster as means to promote economic growth in Panama. The author seeks to contribute to the general body of research on clusters as academia so far focussed on clusters producing concrete material outputs, while the service economy remained widely neglected. Moreover, industrial cluster research so far mostly looked at developed countries or the major developing countries. In non-prominent developing countries, research was focused mostly on agriculture and small and medium enterprises, not large-scale logistics or industrial operations. Lastly, an additional intention is to provide a snapshot of the current development of the Panamanian logistics intensive cluster. Common strategies to logistics cluster facilitation will be pointed out and recommendations for future policy developments shall be given. As a result, the research question of concern for this work is:

“How does Panama’s policy aimed at fostering its logistics intensive cluster promote the country’s economic growth?”

To place the research question in the greater field of economic growth studies and answer the principal research question, following sub-questions will be addressed:

1. *What are clusters and how can they pose a trajectory for economic growth?*
2. *What is Panama’s current cluster policy and its resulting policy outcomes?*
3. *What does it take to become the ‘Singapore of Latin America’?*

Case Selection

Engaging in a small-n in depth case study with a focus on logistics clusters allows for a broad menu of cases to choose from. Dealing with logistics clusters, each of which is a rather unique or rare case dependent on distinct location characteristics the choice of an in-depth single-

case study is appropriate according to Yin (1994, p. 38-41). Opting for Panama resulted from the observation that most logistics clusters studied so far can be found in OECD countries and China. Despite Panama's longstanding and prominent role as an international passage for goods and people since the first settlements were established by the Spanish in the age of colonization, international attention focused on other areas of the world. The passage dates to the mid-16th century when a donkey track connected two major settlements which acted as gold harbours during the age of colonization. Much later, a train connection revolutionized the transport of people and from the Atlantic to the Pacific and vice versa. Eventually, it took two attempts to construct a canal which opened in 1914. Moreover, the recent opening of a new set of locks in June 2016 unfolded unknown capacities to shippers and widens the former bottleneck in world trade. If studies concerned the locality, they employed quantitative approaches, yet governmental capacity to intervene and foster the cluster have not been regarded much by research yet.

Research Design

Economic growth and development of third world countries moved into the focus of social science and economic researchers at the end of the era of colonization, triggering the advent of theories and paradigms on economic growth and development. Modernization theory and neoclassical development theory have been the dominant schools of thought throughout the second half of the 20th century, however economic growth in developing countries proved to be a highly-individualized process. Due to these characteristics, a qualitative case study design appears most appropriate to approach the issue. Modern growth and development scholars increasingly focus on the regional level and the importance of localities which resulted in the rise of the regional development paradigm. Subsequently, this paper seeks to conduct an in-depth case study to gain knowledge about the particularities and individual circumstances of the case in focus.

Among scholars engaging in cluster research emerged the compromise that clusters can hardly be artificially created through government intervention but evolve in an organic manner. Instead, the role governments play in cluster development is characterized by facilitation and burden lifting exercises. Research is expected to reveal that logistical cluster

creation and amplification can be induced by government intervention while depending heavily on their locality and positioning in the global networks. It can be assumed that modernization theory and its heavy focus on state intervention indeed stands some ground. Notwithstanding, the local economic development paradigm with its focus on locality and clusters has an increasing leverage in explaining a country's economic development.

In this research question, economic growth will serve as the dependent variable, whereas government policies are presented as independent variables. In academic research, a set of central drivers of economic growth have been identified. Bassani et al. (2001) concluded that these central drivers are accumulation of physical and human capital; research and development; sound macroeconomic policy setting; financial development and international trade. However, the first sub-question, which is answered through a literature review, will reveal that the general body of literature on clusters and cluster based economic development inherently focuses on the role of regional competitiveness as supportive driver of growth. There is a direct relation between regional competitiveness and the 'Singapore model of economic development', which will be regarded as a successful cluster policy example. Consequently, the 'Singapore model' and competitiveness aid to identify independent variables of concern and set criteria for the subsequent policy evaluation.

The second sub-question will be answered through conducting a policy analysis, focussed on a policy performance evaluation of the ongoing efforts. By employing a process evaluation, a central interest of this paper lies in tracing the interrelation of governmental policy and outcomes on the ground. To do so, official policy documents, namely the strategic governmental plans of the Martinelli and Varela administration and legislation will be investigated. In Latin America, the state plays a traditionally strong role in furthering the promotion of economic growth. Hence, the nation-state level is treated as the unit of analysis to counter a lack of data on the regional level. The government's general economic and social reports will be utilized to investigate policy progress. A chronological series of events regarding the Panamanian logistics cluster and state interventions will be contrasted with growth indicators. These are numerical growth indicators as well as economic performance and growth reports by international organizations and the respective government.

Researchers in the field of clusters recommend conducting interviews as they "can make up for the challenges inherent in a quantitative analysis of secondary data" (Yoo, 2003,

p. 32). On the one hand, the interviews shall provide insight into the manifestation of government policy or policy outcomes on the ground. On the other hand, they shall help to investigate and draw conclusions on the current cluster environment. The approach has been widely used in previous research and will therefore be applied as verification of observed trends in Panama and to provide insight into practitioner experience and observations. A series of key-informant interviews was conducted from 2nd May to 11th May in Panama-City, Panama. Interviewees have been chosen based on three key areas of consideration – governmental actors; educative institutions; and businesses and associations.

Lastly, the aim is to trace whether there has been a process of policy learning and if the notion ‘Singapore of Latin America’ is legitimate. The notion originates from the country’s interest to establish itself as major regional commercial, logistics and aviation hub, inspired by the ‘Singapore model’. Results from the policy analysis will be considered to give policy recommendations for the further course of the country’s economic development and growth.

Relevance of Study

This study is academically relevant, as clusters have been primarily looked upon by regarding material inputs and outputs, focusing on goods and value creation in quantitative terms. The proposed topic in contrast relates to a type of service cluster which did not receive much prominence yet. There is a long history of failed cluster policies (Martin & Sunley, 2002; Zahler et al., 2014). Therefore, a need arises to provide academia with examples of successful cluster policies and what the determinants of their success are. The case of Panama has not been extensively studied empirically and the existent yet scarce literature on logistics clusters mainly concerns Singapore, Hong Kong and Rotterdam (Sheffi, 2012; Enright, 2003). Although constituting one of the world’s most prominent waterways, Panama has so far been side-lined by academia. Hence, the study of this case constitutes a major contribution to the study of cluster policies and their growth effects in the given locality.

This study’s societal relevance arises from the importance of economic growth for any developing country. Being faced by poverty and poor socio-economic conditions, economic growth, the creation of jobs and better working conditions aid societies in attaining the United Nation Sustainable Development Goals. In this respect, successful clusters have shown to be

particularly effective to provide for increased competitiveness, as well as economic and social upgrading. Although growth needs to be accompanied by other factors, a multitude of studies have shown that economic growth represents a main instrument to achieve poverty reduction. Moreover, ongoing globalization and dispersion of global value chains will lead to the decentralization of production processes and distribution networks. Yet, many developing countries miss comprehensive trajectories to reap their benefit from the globalizing economy. Growth strategies beyond mere macro-economic adjustments, considering sub-national environments such as clusters offer new and innovative approaches for economic growth and development. As some regions will emerge as new production centres, there will be a need to erect adequate and effective regional logistics facilities which might lead to the development of a logistics cluster. Consequently, new distribution networks and new trade routes create a demand on which smart regional policymakers should react to create employment and prosperity. This reaction should rest on profound knowledge on previous experiences and particular regional circumstances.

Thesis Outline

Having introduced the general background of this study and the author's intentions, subsequent chapter two is dedicated to a literature review on cluster research and cluster based development and growth policy. Furthermore, the reader will be introduced to the distinct type of logistics intensive clusters and their characteristics by employing the 'Singapore model' as exemplification of a successful cluster policy. These findings will result in the establishment of a theoretical framework for the analysis following the subsequent chapter. Works of major academic contributors will be presented to reflect the evolution of thought in this relatively young field of study. Chapter three will set the scene for analysis the further course of this study by establishing the methodology. Thereafter, chapter four will engage in a policy analysis employing an in-depth case study approach. Panama's growth policy will be sketched and the contents relevant to the development of its logistics cluster identified. Moreover, Panama's current cluster environment will be analysed and the findings underpinned with information from interviews. Lastly, chapter five will provide an overview of the findings and attempt to identify policy recommendations for the further course of action.

II. Literature Review

The study of industrial clusters found its advent in the early 2000's when Michael Porter brought to topic into the spotlight through his book *The Competitive Advantage of Nations*. Subsequently, the issue became somewhat of a trend topic in business and economics, soon attracting the attention of development scholars who became interested in their role in economic growth and development. This chapter is dedicated to a literature review on the foundations of cluster research and their role in economic growth and policy. As the focus of this work lies on logistics clusters, their particularities will be addressed throughout this chapter.

Subsequently, the reader will initially be introduced into the general definition of clusters and logistics clusters before sketching the historical precedents of contemporary cluster theory. Next, the relation between clusters and growth and empirical evidence thereof shall be considered. The chapter will be closed by an elaboration on the role of clusters in development and growth policy, setting the theoretical framework for the further course of this work.

What Are clusters?

Before engaging in an exploration of the core of the body of literature on clusters it is appropriate to define the concept itself. Authors in the field still fail to agree on a common definition, yet Michael Porter as the principal scholar in the subject paved the way for the cluster concept with his work *The Competitive Advantage of Nations*. He perceives clusters as

“geographic concentrations of interconnected companies and institutions in a particular field. Clusters encompass an array of linked industries and other entities important for competition. They include, for example, suppliers of specialized inputs such as components, machinery, and services, and providers of specialized infrastructure” (Porter, 1998, p. 78).

Rosenfeld (1997) sees clusters as describing “concentrations of firms that are able to produce synergy because of their geographic proximity and interdependence, even though their scale of employment may not be pronounced or prominent” (p. 4). Feser (1998) argues

that clusters are not simply related and supportive industries and institutions “but rather related and supporting institutions that are more competitive by virtue of their relationships” (p. 26). In contrast, Swann and Prevenzer (1996) merely see clusters as “groups of firms within one industry based in one geographical area” (p. 139) or a “large group of firms in related industries at a particular location” (Swann et al., 1998, p. 1). Reinforcing the importance of mutual ties, Cortright (2006) says that “an industry cluster is a group of firms, and related economic actors and institutions, that are located near one another and that draw productive advantage from their mutual proximity and connections” (p. 1). Lastly and coming closest to Porters view, Martin & Sunley (2002) quote Cooke & Huggins who acknowledge clusters as “geographically proximate firms in vertical and horizontal relationships involving a localised enterprise support infrastructure with shared developmental vision for business growth, based on competition and cooperation in a specific market field” (p. 13).

The varying interpretation and definition of clusters in academia is striking. However, one can trace a certain common core to the concept. All scholars acknowledge that clusters are a composition of firms in a certain locality producing related or similar goods. Therefore, they are somewhat similar in structure and employ similar processes and draw from a locally specialized labour force. Moreover, most authors acknowledge the importance of non-firm members providing services for the cluster and supportive institutions such as universities, business and trade associations or vocational training centres. The co-location of these actors and their interaction can result in cost saving effects, knowledge spillovers and innovation (Wolman & Hincapie, 2010, p. 4).

Nonetheless, in focus of this study lies a particular type of cluster whose study is just emerging – “A cluster of firms with logistics-intensive operations” (Sheffi, 2013, p. 7). Given the infancy stage of study in this area, Sheffi offers the most comprehensive elaboration on what such cluster is comprised of. They may take very different forms, being considered hubs or logistics parks that include three typed of companies:

“(i) logistics services providers, such as transportation carriers, warehousemen, forwarders, third party logistics companies (3PLs), customs brokers, and specialized consulting and IT providers, (ii) companies with logistics-intensive operations, where value added operations may be small relative to the logistics-related activities, such as distributors, light manufacturing and kitting companies, and (iii) the logistics

operations of industrial firms, such as the distribution operations of retailers, and after-market parts suppliers” (ibid.).

Additionally, they may be differentiated as managed logistics parks and unmanaged agglomeration of logistics facilities. In the former case, they typically take the form of public-private partnerships with strong involvement of public authorities that ideally involve educative institutions. The latter miss the managed component, yet often appear near the former.

There is no doubt on the existence of clusters but questions remain on how clusters may be described and measured. Subsequently, the author will picture how the issue has been approached by academia before moving towards an exploration of the benefits clusters may hold for growth.

Describing and Measuring Clusters

The ability to identify clusters, describe their structures and assess their potential and actual effects on growth are of vital importance to provide practitioners and policymakers with options for intervention. The common core to the cluster concept defined above suggests that clusters can indeed take very different appearances on a case to case basis. Porter (2003), the founding father of the discipline, acknowledged this problem and sees that the “major constraint to the analysis of clusters has been the lack of a systematic approach to defining the industries that should be included in each cluster and the absence of consistent empirical data on cluster composition across a large sample of regional economies” (p. 562). The reviewed studies dedicated to the description and measurement of clusters so far have applied both, quantitative and qualitative measures.

One way to describe clusters is to create typologies or categorizations. Porter himself was among the first seeking to describe clusters based on their components, looking at depth and sophistication. He considers a variety of cluster components which may include “end-product or service companies; suppliers of specialized inputs, components, machinery, and services; financial institutions; and firms in related industries [...] downstream industries (i.e. channels or customers); producers of complementary products; and specialized infrastructure providers” (Porter, 2000, p. 254). Furthermore, he stresses that governmental and educative

institutions should have a role. Wolman & Hincapie (2010) take a similar approach, proposing cluster classifications by the *breadth of membership* and distinguishing between narrow, medium and comprehensive membership based on the presence of Porter's abovementioned components (p. 7). Enright (2003) argues that "clusters should be characterized along relevant dimensions if they are to be distinguished and understood" (p. 101), proposing ten dimensions - geographic scope; density; breadth; depth; activity base; geographic span of sales; strength of competitive position; stage of development; innovative capacity; and ownership structure - to inform about individual cluster's "potentials and problems in ways that can inform in ways that can inform policy and strategy" (p. 102).

Whereas scholars traditionally focussed on industrial clusters, one must note the recent emergence of the study of service clusters, in particular logistics clusters. The increasing number of publications in the field is likely to be spurred by governments "devoting significant resources to the creation and growth of various logistic clusters" (Rivera et al., 2016, p. 242). Their study has mostly revolved around the identification and description of structure, cluster members and their interactions. It is argued that they require a categorization of their own, as they may take substantially different forms. Yu et al. (2005) and Boile et al. (2009) conducted in-depth case studies on individual logistics clusters around the world and sought to establish classifications on the basis thereof. However, their results are rather descriptive in nature, leading Sheffi (2013) to summarize three dimensions which need to be considered when seeking to classify a logistics cluster. The first dimension he considers is the cluster's modal orientation - the types of transportation offered. These may include air cargo, shipping, bulk, rail transportation and trucking. Depending on the modal orientation, a cluster will attract diverse types of companies, ideally serving as a node in the global supply chain where "intermodal facilities exchange containerized freight between trains and trucks, etc. (p. 13). The second dimension is a scope-based classification, referring to the external scope of geographical operation. As logistics clusters are nodes in trade and distribution networks, they require differing infrastructure demands and strategies. Whereas always having a connection to the global distribution system, they may serve international, regional or local logistics demands. Lastly, it is recommended to distinguish functional classifications. Here, the focus lies on the breadth and type of operations conducted. Sheffi (2013) distinguishes between customs and taxation-advantaged places, such as Free Trade Zones (FTZ) and Export Processing Zones; single commodity logistics parks specializing in a certain type of commodity;

and special service distribution parks, focusing on specialized storage and distribution, i.e. bulk commodities or cold-chains (p. 14).

The above only pictures part of the discussion on categorization, yet the approach is of limited usefulness for analysis as it is a rather descriptive effort applied scarcely. In fact, most commonly researchers work with intensive individual qualitative case studies, assessing only one or a few clusters at a time (Benneworth, 2002; Allen & Potiowsky, 2008). Their common feature is the reliance “on a combination of surveys and interviews targeted at ‘key informants’ to develop an understanding of the characteristics of the industry cluster” (Allen & Potiowsky, 2008, p. 303). This approach has also been applied in the study of logistics clusters, exemplified by Kasarda (2008) who engaged in studying urban development role of an airport, establishing the term ‘aerotropolis’. He and other scholars investigated how aviation related businesses were attracted to a location and gave a stimulus for regional development (Lee & Yang, 2003; Kasarda & Lindsay, 2011). Ports and their surrounding areas have been regarded in an analogous manner (Monios & Wilmsmeier, 2012; Merk, 2013). Often it is referred to hubs instead of clusters, whereas a hub by nature represents a cluster. They develop at mode changing localities, where cargo and freight changes between air, ship and terrestrial transportation. The authors build their core arguments on in-depth interviews with senior executives, entrepreneurs, industry representatives, business association representatives as well as governmental and educative institutions. Yoo (2003) notes that “gathering key informant information, is probably the most common approach to identifying regional clusters” (p. 21). Yet, “the literature on clusters pays scant attention to valid expert data collection techniques” (ibid.). Many qualitative case studies make use of ‘Porter’s Diamond’ and ‘cluster maps’. Porter developed his ‘Diamond of Advantage’, a model dedicated to enhancing the understanding of the competitive advantage of a given cluster, possessing certain factors that contribute to it. It is employed to explain how governments can act and intervene in a cluster to affect its global competitive standing.

The diamond consists of four factors which are supposed to create a competitive advantage for firms (Porter, 2000). Porter sketches the four corners which represent factor conditions, demand conditions, industry strategy/rivalry, and related and supporting industries as seen in Figure 1. In later extensions of the model, the variables of government and chance were added. Factor conditions include tangible assets (i.e. physical infrastructure)

and intangible assets (i.e. information, legal systems, research institutes) upon which all firms rely to uphold competition. Productivity increases are realized through improvement of efficiency and quality of these factor conditions. The factor firm strategy and rivalry “refers to the rules, incentives, and norms governing the type and intensity of local rivalry” (p. 20). It is assumed that local competition and resulting innovation do not only improve local competitiveness but the region’s competitiveness over other regions. Demand conditions imply that a cluster in development should shift from low to high local demand. The “presence or emergence of sophisticated and demanding home customers presses firms to improve and provides insights into existing and future needs that are hard to gain in foreign markets” (p. 21). Moreover, the presence of capable and competitive related and supporting industries nurtures and supports a cluster. Lastly, the variables of government and chance indirectly influence the model. Chance refers to disruptive events outside the control of the cluster members which may represent innovations, world market shocks such as rising oil prices or stock crises, wars, etc. Lastly, the government variable represents government actions and policy influencing the cluster. It is assumed that government can indeed act in areas where a competitive advantage is present and may be reinforced by government measures, yet lacks

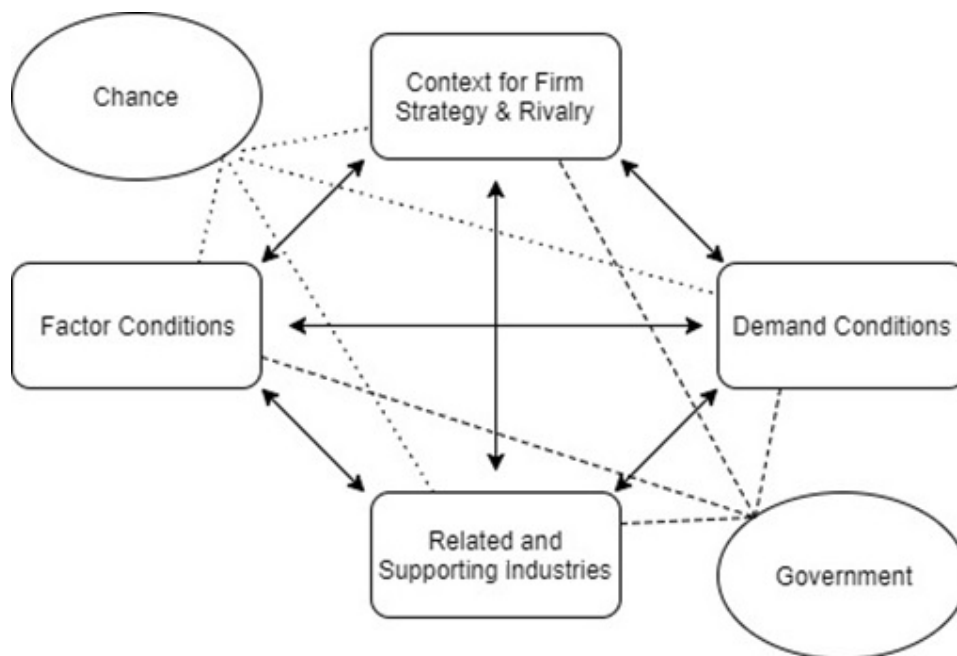


Figure 1 – Porter’s Diamond Framework (Source: Rugman & Verbeke, 1993)

the capacity to create competitive advantages from the scratch. The diamond of advantage clearly has some strong points as it can provide a comprehensive qualitative assessment of a cluster and serve as a base for policy decisions to improve the cluster environment. However,

it “does not seem to be an effective technique for finding industry clusters; rather, it is used to verify and explain the results of the observed leading sectors in study regions” (Yoo, 2003, p. 26).

Another typical complement for key-informant interviews are cluster maps. Many qualitative studies identify a cluster’s components and show the relations among them graphically through lines and arrow diagrams. Moreover, the diagram may be placed in the relevant part of the value chain to show the interaction of the cluster with the outside world. Austrian (2000) reviews several studies of this kind and notes that they “bring forward institutional detail and qualitative richness that are absent from the quantitative portion of cluster analysis” (p. 109), and concludes that “the case studies analyse the clusters’ special characteristics in terms of structure, growth opportunities, and common issues on which cluster participants could collaborate” (ibid.). However, Wolman & Hincapie (2010) see some problems in this approach. As for Porter’s Diamond, cluster maps are rather a summary than an analytical tool. Likewise, they focus on already established or successful clusters and although showing actor relationships, do “provide little or no information on the extent, importance or nature of the relationship” (p. 17).

Besides surveys and key-informant interviews, Bergmann & Feser (1999) suggest the use of quantitative approaches, such as location quotients, input-output analyses and network analysis. Location quotients investigate regional economic compositions, giving an indication on the share of a region’s industry employment relative to the share of national employment in the industry. However, they only provide industry level but no regional measures, therewith ignoring inter-industry dependencies. Their use is more complicated by the fact that “it can be used in only bottom-up analyses as one of several measures of sector performance” (Yoo, 2003, p. 21). More common is the use of input-output analysis to trace seller-buyer linkages (Feser & Bergmann, 2000; Berwert et al., 2004; Titze et al., 2011). Network analysis represents a mixed method approach in which input-output tables are paired with qualitative analysis in the form of interviews or data. For logistics, Riviera et al. (2014) developed a model based on locational quotients and a newly defined Logistic Establishment Participation index to identify logistics clusters in the US. Accounting for the failures of quantitative approaches, network analysis is much concerned with examining linkages between firms or sectors. It represents a

very comprehensive yet complicated approach to be seen in the pilot study of Capron et al. (1998) on clusters in the Belgian Innovation System.

Since introducing clusters into the mainstream of academia, Porter sought to establish a method to identify and measure clusters. In the early 2000s, he launched the cluster mapping project in cooperation with Harvard University (Porter, 2001). The research project is dedicated to comprehensively identify, map and explore the inter-industry linkages of existing and emerging clusters in the US economy. It is ongoing and the methodology adapted with increasing study and understanding of the phenomenon (Porter, 2003; Delgado et al., 2015). Nowadays, the project relies on a clustering algorithm to identify industries and related clusters, likewise applying input-output tables, similarity matrices and location quotients. The approach borrows some features from Hill and Brennan's (2000) techniques, who combined a variety of variables to conduct a what they call 'hierarchical cluster analysis'.

Quantitative methods that are frequently applied have a common lack as the cluster conceptualization does not exclusively rely on numerical figures but has a sociological component. As pictured earlier by Gordon & McCann (2000) and acknowledged by Porter (2000), cluster components and their cross relations are a key concern for the achievement of competitive advantages and subsequent growth potentials. Despite the progress in network analysis, identification of knowledge spillovers and communication networks proves to be complicated, due to their often-informal occurrence. Equally, qualitative approaches have their limitations as they do lack the capacity to identify clusters.

The Benefits of Clustering

Most clusters do emerge naturally, however cement their presence as co-location of firms comes with certain benefits. These benefits have not been newly discovered by recent research but rest upon processes which have been studied as early as the 18th century. Academic literature suggest that the cluster conception is composed of three main components – location theory, agglomeration economies and the theory of embeddedness. Subsequently, each component and their resulting benefit will be sketched briefly to illustrate the benefits of clustering in general, before turning towards the distinct benefits of logistics clusters.

Location Theory

Firstly, Location theory concerns the geographic proximity of production and markets, involving the minimization of transportation costs. Among the first to investigate the subject and arguably spark the discipline of spatial economics was Thünen (1826). He theorized about the proximity of agricultural production to the marketplace to reduce transportation cost in his work *The Isolated State*. Subsequently, Launhardt (1885) and Weber (1909) advanced location theory by complementing production functions and account for transportation costs of resources and finished goods. In his book, *The Theory of the Location of Industries*, Weber developed an algorithm to identify the optimal location for manufacturing sites. Although Launhardt developed a similar, yet much more modern conception in analytical measures, Weber received much of the credit. Modern academia therefore speaks of the Launhardt-Weber model.

Agglomeration Economies

Secondly, agglomeration economies were first described and investigated by Marshall (1890) in his book *Principles of Economics*. Still being a commonly cited scholar in regional development literature, he was the first to argue that firms can benefit from increasing returns to scale and external economies when they agglomerate in close spatial proximity. He focuses on four mechanisms through which agglomerations generate increasing returns – a local pool of skilled labour, local supplier linkages, market demand and knowledge spillovers. The theory remains acknowledged and has been used for further theorizing that led to the Marshall-Arrow-Romer (MAR) theory of spillovers (Glaeser et al., 1992) which stresses that local concentration benefits growth. These benefits occur due to knowledge spillovers as seen in Marshallian economics as concentration leads to a competition of innovation or research and development, and their quick integration. Note, that the mechanisms have been renamed to achieve coherence with overall cluster literature. Subsequently, it will be referred to labour market pooling, input sharing/supplier specializations, market aggregation and knowledge spillovers/MAR-externalities. It must be emphasised that benefits from clustering are exclusively external to firms, caused by proximity and manifested in cost savings from lower input costs and higher productivity.

Labour Market Pooling

Regional agglomerations provide for a large supply of labour with a variety of different and sector specific skills, whereas external benefits to firms arise. First, the availability of a large pool of potential employees suggest that wage competition takes place, resulting in cost savings for firms operating in a respective location. Second, the presence of a large pool of labour enables firms to easily replace an inferior worker with a more productive one, implying productivity gains. In this respect, Duranton & Puga (2004, p. 2086 ff.) note that this circumstance enhances the likeliness and expected quality of matches in a firm's search for employees. Third, agglomeration economies provide for the presence of sectoral specialized labour as the predominance of a certain industry attracts their local concentration. This results from the mere increased local demand for specific specialized skills.

Input sharing/supplier specialization

The presence of many firms producing the same or similar goods or services requires the presence of specialized suppliers to provide the commonly needed inputs to their production. External benefits arise, if these specialized suppliers co-locate in the region to provide physical inputs to production processes or producer services needed for firm operations. These may include accounting, legal services or industry specific inputs.

Suppliers will decide to co-locate if they find a sufficiently big market for their good or services, making up for eventually higher cost of operating in the same region. Firms and specialized suppliers will benefit from reduced transportation time and costs, due to geographic proximity. Moreover, the supplier gains from the physical proximity and accessibility to the client as it facilitates good inter-firm relations and product or service tailoring such as consulting or specialized engineering.

Market aggregation

Distribution and sale costs of goods and services to consumers may be significantly reduced in large agglomerations. If encountering sufficient demand in a given locality, it justifies a producer's choice to locate in the area, therewith increasing regional economic growth. Growth manifests through import substitution and increased local spending by employees, resulting in a multiplier effect in the regional economy. To reduce transaction costs, specialized suppliers co-locate to offer individual attention and tailored products or services.

This holds particularly true for providers of expensive and individualized niche goods and services, requiring special consumer attention.

Knowledge Spillovers/MAR-externalities

Knowledge spillovers or MAR-externalities are perceived to occur when many people working in a shared area, industry, skill set etc. gain a shared understanding of common problems. As a result, the local concentration of experts and practitioners increases the likeliness of innovation, lowering costs or generating increased productivity. This specialized local knowledge and spillovers thereof provide for local firms' competitive advantage and subsequent economic growth. Innovation as a result of spillovers is perceived to be fostered by informal and regular face-to-face interaction of local specialists that facilitates learning. In this respect, the emphasis of social network analysis on culture and embeddedness – “the social relationships among economic actors which are geographically localized” (Wolman & Hincapie, 2010, p. 14) – are of crucial importance.

Theory of embeddedness

The last component for modern cluster conceptions is the theory of embeddedness which reinforces the importance of MAR-externalities. Reviewing the earlier elaboration, one might suspect that clusters are simply agglomeration economies with a new and more contemporary label, invoking doubts on “the added value of the cluster approach to existing theories of agglomeration” (Cumbers & MacKinnon, 2004, 960). Indeed, a localized agglomeration economy may represent a cluster, nonetheless, the modern cluster conception stresses the importance of embeddedness and social networks. Granovetter's (1985) theory of embeddedness has its foundations in the sociological study of institutions, claiming that knowledge spillovers (MAR-externalities) are realized due to informal contacts, relations and trust among firms and other actors within a spatial economy. In this setting, a common work ethos forms a “social glue [that] binds together [...]. The social structure thus takes a central importance” (Porter, 2000, p. 264). However, Martin & Sunley (2002) criticise the former as “the social dimensions of cluster formation and cluster dynamics remain something of a black box in Porter's work” (p. 16). Indeed, it proves difficult to conceptualize and empirically test and analyse these soft features of Porter's cluster theory.

Given these observations, benefits from clustering differ from case to case depending on the specific circumstances and structure of the cluster itself. Glasmeier (2000) concluded in this respect that geographical clustering benefits seem to be specific to certain places with certain industries at certain times, being realizable only under particular conditions. Innovation and concomitant increased competitiveness are perceived as a principle driver of economic growth, MAR-externalities therefore are a black-box in the process of benefit generation. Indeed, “the mere presence of firms, suppliers, and institutions in a location creates the potential for economic value, but it does not necessarily ensure the realization of this potential” (Porter, 2000, p. 264). It requires common action and motivation by all cluster members, as “many of the competitive advantage of clusters depends on the free flow of information, the discovery of value-adding exchanges or transactions, the willingness to align” (ibid.) On the other hand, too deep and strong ties among cluster members may lead to the opposite, to static path dependence of a small group of likeminded actors. Gordon & McCann (2000) picture this risk by referring to Granovetter, who found that open networks that are “characterized by pluralistic open-ended network building strategies in which actors cultivate more extensive sets of links” (p. 521), and are more prone to generate innovation than their ‘closed club’ counterparts.

The Distinct Benefits of Logistics Clustering

Having shown the general benefits associated with clustering, attention now is being shifted to the distinct benefits of logistics clusters. Research on the topic is scarce and Sheffi (2012) and Riviera et al. (2016) are the most prominent scholars engaging in the topic. They conclude that the distinct benefits of logistics clusters are collaboration, value-added activities, upward mobility and job creation at different levels. Subsequently, it will be briefly touched upon each category.

Collaboration

Collaboration is perceived by Sheffi (2012) as the principal benefit from logistics clustering. Riviera et al. (2016) state that

“within a supply chain context, collaboration can be defined as a relationship between partners developed over a period of time to achieve lower cost, higher product or

service quality, greater product innovation, reduced risk, or enhanced market value” (p. 252).

According to Sheffi (2012), collaboration is likely to occur in logistics clusters due to the similarity and standardization of assets held and processes employed by logistics and transportation firms within the cluster. Collaboration may take the form of resource sharing in warehousing, equipment and labour (p. 112 ff.).

Value-Added Activities

The process of servicization led to the rise of firm practice to offer tailored combinations of goods or services to a core product, adding value in the process. Sheffi (2012) and Rivera et al. (2016) argue that logistics clusters are prone to attract and perform value-added activities, capitalizing on their strategic locations. Being a node in global supply chains, products passing through it offer companies the opportunity to “add value to these products by tagging, packaging, preparing for retail display, and performing postponed operations before the products are moved into retail channels” (Rivera et al., 2016, p. 253). Moreover, logistics clusters offer opportunities for reverse logistics, all activities performed after the point of sale such as repair and refurbishment.

Career Mobility

Sheffi (2012) and Rivera et al. (2016) moreover point at the culture of floor experience in logistics and potential for horizontal and vertical career mobility. They argue that “the logistics industry recruits people with relatively low levels of education and gives them the opportunity to progress in the labor market” (p. 254) and tend to promote people to higher positions from within the companies. It is argued that temporary workers hired for spikes in demand have the chance to prove themselves and may be offered full time contracts.

Job Creation at different levels

Lastly, both authors argue that “logistic clustering is a source of job creation” (p. 255). The argument is based on the potential for emergence of value-added activities, logistics related and supporting activities, promoting job growth on multiple levels. While transportation and logistics offer low entry barrier physical labour jobs, value-added activities may promote jobs in product finishing and light industries. Being an industry heavily using sophisticated communication and information technologies, logistics clusters offer job opportunities

beyond manual labour, including information technology (IT) specialists, accountants, operation and managerial executives etc. Rivera et al. (2016) conclude that “job growth is driven by the wide range on logistics job functions required within logistic clusters; and the need for firms to locate support and complementary job functions near logistics clusters” (p. 255).

Clusters & Growth – The Empirics

Despite the progress in laying the groundworks to identify and measure clusters, little attention has been paid to testing their actual growth effects. This is in part due to the cross-cutting and broad nature of clusters which makes it difficult to isolate their effects on growth from other sectors and to the lack of comprehensive regional data. Nonetheless, substantial research has been done on the effects of agglomeration on growth, while the investigation of MAR-externalities or the network component of clusters has been side-lined.

A substantial body of literature is focused on the investigation of city or regional growth effects through agglomeration. These are predominantly econometric studies and seek to “explain the growth in aggregate regional output, personal income, wages or employment by using variables that theory and empirical literature have identified as determinants of growth” (Wolman & Hincapie, 2010, p. 19). Researchers made use of explanatory variables such as human capital, labour market performance, physical capital etc., serving as control variables. In addition, an independent variable seeks to measure the extent of agglomeration, while the vast bulk of literature uses measures of spatial concentration of industries. Generally, the studies concerned claim that economic growth and agglomeration do reinforce each other – growth reinforces agglomeration and agglomeration reinforces growth (Martin & Ottaviano, 2001; Fujita & Thisse, 2003; Brüllhart & Sbergami, 2009). In this regard, Rosenthal & Strange (2004) looked at growth effects of productivity increases through specialization in agglomerations as study object. They found that increasing specialization does affect productivity and therewith growth positively, nonetheless conclude that extremely large increases in specialization are required to see meaningful productivity and wage gains. Despite the results of these studies, they are of limited usefulness as clusters tend to have inter-industry linkages which possibly obscures its true extent. Cortright & Mayer (2001) correctly note that in their very conceptual nature, clusters are prone to cut across

traditional industrial classifications. They see that “classifications are imperfect means of describing the activities of diverse and quickly changing enterprises” (p. 3).

Shifting attention to the specific type of logistics clusters, one must note that detailed studies on their growth effects are extremely scarce. As mentioned before, most studies deal with how to identify and describe logistics clusters, yet some evidence exists. Logistics clusters have foremost been studied in case study approaches. Rivera et al. (2016) sought to engage in theory building, employing a grounded theory approach paired with interviews. They found that logistics clustering fosters job creation through the “wide range of logistics functions and complementary jobs” (Rivera et al., 2016, p. 263), therewith increasing local disposable incomes and expenditure. Furthermore, they conclude that logistics clusters indeed may constitute a driver for economic growth, due to their distinct attractiveness for value-added activities. Other studies look at hubs, which in fact represent clusters. Other authors equally employ case study approaches and confirm the effect of increased employment positively affecting regional consumption, thus fostering regional growth. Kasarda’s (2008) study on airport cities revealed that logistics clustering close to airports leads to overall increased local commercial activity driving employment and growth. Grobler and Viljoen (2014) found that productivity gains of logistic clusters result in increased competitiveness which in turn drives economic growth.

Although there is a consensus on the positive effect of agglomeration on growth, it is hard to interpret and induce agglomeration studies into the study of clusters and their effect on growth as they ignore MAR-externalities which are difficult to capture and measure. While finding acknowledgement in some studies, knowledge spillovers and the networking component of clusters prove hard to test empirically. An investigation of literature dedicated to an exploration of the relation between knowledge spillovers on growth results in a mixed picture. In their study on knowledge spillovers in 40 Dutch regions using a regional growth model, van Stel & Nuieuwenhuijsen (2002) conclude that the importance of knowledge spillovers is indisputable, yet the size of their effect remains obscure. They remain in doubt about “what types of spillover are more important for achieving growth: spillovers emerging within sectors or spillovers emerging between sectors” (p. 25). Equally, Audretsch & Feldmann (2004) sought to incorporate spatial relationships into a knowledge production function. They,

as well as Rodriguez-Pose & Cerscenzi (2008) realized that regionally bound knowledge spillovers matter, yet more sophisticated measurement techniques need to be developed.

Cluster Based Development and Growth Policy

Cluster based economic development and growth policies have become a trend in regional economic development literature. The Cluster Mapping Project introduced by Porter and the Global Cluster Initiative Survey illustrate the attention the cluster framework receives as a means for regional growth and development (Sölvell et al., 2003; Ketels et al., 2006; Lindquist et al., 2013). Moreover, governments and international organizations advocate the cluster framework, adopted guidelines and policy recommendations on how to implement cluster based economic development policy (Mills et al., 2008; OECD, 2009). The underling rationale for cluster based economic development was provided by Porter - the most prominent and resilient advocate of the cluster framework:

“Since clusters involve powerful externalities across firms in a location, and associated public goods, there is a strong rationale for public policy. In the presence of positive externalities, market failure will lead to underinvestment in specialized skills, scientific knowledge, and specialized infrastructure that benefits the entire cluster while also increasing competition through lowering the barriers to entry of new firms. Public policy that provides rules, mechanisms, and incentives for capturing external economies will improve productivity and, with it, job, wage, and innovation growth” (Porter, 2009, p. 5)

However, not all members of the science community support Porter’s optimism to increasingly replace industry and firm level policies by regional or meso policies to foster external economies and innovation. The previous section has revealed that there is indeed some uncertainty about the productivity and innovation growth effects of clusters. Moreover, as there is no dominant and effective method to measure cluster dynamics, how should informed and targeted action by the public sphere be facilitated? Motoyama (2008) expresses his doubts by stating:

“The last limitation of the theory is its feasibility and whether and how government can effectively fill in the missing components of the cluster. For example, if a specific

element in a cluster is missing, such as the suppliers, a logical policy consequence would be for the government to provide grants to attract or nurture them. However, in reality, there is hardly such a case unless the government plans to form a cluster from scratch. The private sector is not blind and has usually looked for business opportunities. Even if there is a gap, how and how well government can promote the missing components is questionable. The more difficult part is to promote the interconnectedness of a cluster. If firms in a cluster do not have sufficient spillover or synergistic effects, what can government do? The current cluster theory may point out that government should do something about it but does not explain how" (2008, p. 360).

Motoyama finds himself in good company with Martin and Sunley (2002) who note that it is dubious if "setting and attempting to implement such policies within a cluster framework actually improves their effectiveness and outcome" (p. 32). Another sceptic is Bartik (2009) who criticizes cluster policy approaches as inappropriate because policymakers rely on incomplete knowledge on the size of agglomerations, making it difficult to determine what to subsidize. Duranton's (2011) studies revealed that cluster benefits are real, yet small. He advocates policymakers to focus on the cost curve to reduce costs associated with place – land use planning, urban transportation and the provision of local public goods. These activities should be prioritized as the supposed clustering benefits sketched earlier are difficult to impossible to be empirically recorded.

Despite the opposition, the cluster framework for economic development did gain prominence among policymakers and practitioners. Cluster theory provides a different lens to look at the issue of regional economic growth and development, fitting the global trend towards decentralization. Throughout the last two decades, many scholars have investigated how cluster based economic development policy should look like, give recommendations on good practice and on what kind of policy instruments should be applied. Ketels and Memedovic (2008) argue that cluster policy cannot compensate for unsound economic policy, but should be part of an overall strategy to increase competitiveness. It should be neutral, in other words no pick winners, nor seek to create a cluster from scratch. Moreover, the government should not act as a leader in cluster initiatives, but as a facilitator and participant

as the most successful initiatives are public-private partnerships. Lastly, “government should not provide subsidies, protection or relaxation of competition law” (p. 383).

In this sense, cluster policy supposedly aims to be distinct from traditional centralized industrial policy. In contrast to directly intervening into the economy and engage in long term financial commitments through subsidies and protectionist measures, cluster policy should aim at creating a favourable environment to “leverage local assets, capabilities, history and geographic location, [...] open to all clusters in a region” (ibid.). One must note however, that although scholars preach neutrality, Martin and Sunley (2002) show that even Porter contradicts himself. Whereas he points to neutrality on the one hand, he “argues in a neo-Keynesian manner that it is outward-oriented (export-based) clusters” (p. 34) which ought to be supported.

Despite these inconsistencies, the review of literature revealed that most proponents of cluster policy follow a similar line of thought in giving guidelines and recommendations (Rosenfeld, 1997; Formica, 2003; Cortright, 2006; Mills et al., 2008; Feser, 2008; Ketels & Memedovic, 2008). Many governmental institutions affirm clustering effects, i.e. the European Commission (2013) states in its guidelines on state aid that “external economies of scale or other benefits from a regional development viewpoint may arise as a result of proximity (clustering effect). Clustering of undertakings in the same industry allows individual plants to specialise more, which leads to increased efficiency” (p. 11). Wolman and Hincapie (2015) summarized a set of policies that proved relevant to both, academic authors and practitioners:

“(1) Learn how businesses interact and clusters work. (2) Support clusters based on their economic dominance, strategic importance, or leadership and potential. (3) Improve technical support services. (4) Support cluster expansion through recruiting companies that fill gaps in cluster development. (5) Develop and organize supply chain associations. (6) Support entrepreneurs through assistance for start-ups and spin-offs. (7) Encourage labor market pooling through providing labor market information, specialized training. (8) Encourage knowledge spillovers and networking through public sector research and development support. (9) Facilitate market development through joint market assessment, marketing, and brand building. (10) Represent cluster interests before external organizations

such as regional development partnerships, national trade associations, and local, state, and federal governments” (p. 141).

While there is much information on policies for cluster based development in the general industrial cluster literature, there is strikingly limited literature on policy for logistics cluster based development. In fact, among the only scholars giving policy recommendations are Sheffi (2012) and Rivera et al. (2016). Moreover, the publication *Logistic Sector Developments: Planning Model for Enterprises and Logistic Clusters* by the United Nations Economic and Social Committee for Asia and the Pacific (United Nations, 2007) provides a set of guidelines equal to what the other authors recommend. In contrast to the neutrality approach sketched earlier, there is a conviction of a strong role of the state in logistics cluster development. Sheffi (2012) argues that “logistics requires a significant base of physical assets, many of which require both initial and on-going government funding and are subject to government regulations” (p. 176). Resulting from the case studies conducted in his book, Sheffi identifies a set of policies of best practice, settings out five areas where public policy involvement is necessary to support and nurture logistics clusters.

1. *Government investment in transportation infrastructure (roads, ports, airports, canals, railroads)*
2. *Land provision and zoning for the creation of logistic assets (i.e. logistic parks, intermodal terminals, warehouses)*
3. *Government incentives to encourage asset development and private investment (FDI attraction)*
4. *Provision of soft public goods (educative & vocational training institutions)*
5. *Regulations affecting the overall business environment (regulations in trade, taxation, immigration, environment, etc.)*

Successful Logistics Clusters – The Case of Singapore

For the recommendations sketched above, Singapore served the scholars as benchmarking case, surpassing the success of all other cases regarded. Note that the country’s growth strategy, commonly termed the ‘Singapore Model’ did not aim at establishing clusters as the conception didn’t exist at that time. Nonetheless, government actions led to the

successful erection of a logistics cluster, which in turn attracted other industries, clusters and value-added activities.

For the development of logistics intensive activities, investments in port and transportation infrastructures are crucial. After independence Singapore was left with Keppel Harbour built by the British, yet it quickly outdated and poorly served the country's expanding economy. In response, the government heavily engaged in investments to provide infrastructures. Jurong Port and Changi Airport were the first assets built in the 1960s (Huff, 1997, p. 300) and were connected by a highway. Until the 1980s, the port reached a bottleneck, causing the government to respond by expanding existing ports and constructing more terminals. The port now spreads to five sites of the island state and remains under the management of the autonomous Port of Singapore Authority (PSA). Nowadays, the Port of Singapore is one of the busiest ports worldwide (Chin & Tongzon, 1998, p. 98; Marineinsight, 2016). Additionally, Muñoz et al. (2010) stressed that aside of physical infrastructure the early implementation of IT infrastructure was a crucial factor of success in Singapore. It enabled the country to "stay ahead in the quality of services offered" (p. 26) and contemplates the needs of physical infrastructure with efficient management and administration.

From the 1970's onwards, the government realized the necessity to complement the economic environment with soft public goods- vocational training and educative institutions. To fill the gap, the government focussed on the development of IT training through the National Computer Board (NCB), likewise promoting the application of information technology in all areas of the Singaporean economy at a very early stage to link up with the West. Subsequently, immense efforts were dedicated in setting up universities and other educative institutions to further promote value-added activities and provide the workforce needed. The efforts resulted in the foundation of the National University of Singapore (NUS) and Nanyang Technological University (NTU) offering specialized programs for IT, logistics and maritime related careers. In addition, the institutions were provided with considerate funding for research and development to "work on applied research aligned with the needs of the productive sector (Muñoz, 2010, p. 29) Again, Muñoz et al. deem the highly qualified human capital a factor of success for the country (p. 28).

The government took a strong role in developing the country's physical logistics assets, land provision and zoning, provision of incentives and regulations affecting the general

business environment. For this purpose, the Economic Development Board (EDB) was set up in 1961 to act as central institution dealing with these matters. The new institution was tasked with promoting and attracting foreign direct investment to the location, acting as a one stop-shop for general and procedural information needed by investors (Huff, 1995, p. 748). To efficiently manage the country's scarce surface, the EDB was tasked with the management of the Jurong Industrial Estate. The park offered ready to move in factories and warehousing facilities for export-oriented industries. As terrain became a scarce resource on the main island, SEZs were opened on surrounding islands to provide additional space for economic expansion. In addition, tax incentives were employed to attract foreign companies and MNEs to reside in the industrial park and SEZs. Over time the government targeted certain industries to "drive the development of specific sectors and move forward in the value chain" (Muñoz, 2010, p. 27). Regarding the business environment, Singapore has regularly been ranked among the best countries in the world to conduct and open business by the World Bank Doing Business Report (World Bank, 2017). It occupied rank three in 2016 and rank two in 2017, being acknowledged as corruption free, "where processes are transparent and efficient to minimize transactional costs" (p. 28).

Concludingly, authors of concern stressed Singapore's practice of continuous improvement, capacity expansion and government accountability. When bottlenecks come in sight, the government acts proactively to eradicate them and expand capacities to satisfy increased demand. Attempting to move forward in the value chain and reap greater benefits from its location, Singapore relies on the participation of all relevant stakeholders, including "high level public-private advisers committee formed by company CEOs, Ministries and well-known public figures, University' Deans and other high-level leaders to analyse what the next step should be" (Muñoz, 2010, p. 30).

Conclusion

This literature review's purpose is to provide a comprehensive overview of the state of research on clusters and their potentials for regional economic development. Although cluster theory remains somewhat fuzzy, the topic ranks high on regional development agendas and proves to be a new and innovative way to look at and regional economic development

strategies. Having introduced the overall cluster conception and its theoretical origins led to the conclusion that they might have a role in modern economic thought. Successful clusters may enjoy increasing competitiveness, a characteristic which became a major desire in economic development. Answering the first sub question, it can be concluded that indeed positive effects on economic growth were confirmed, yet the performance lags behind expectations. Successful cluster policy depends on the extent to which external economies are achieved. MAR-externalities remain a black-box for growth, therewith complicating exact measurement. Cluster policy must be designed in a smart and comprehensive manner to have meaningful impacts.

The distinct type of logistics clusters and their additional benefits could be a trajectory for long term growth in developing countries which sit along global trade routes, yet lack market access and export opportunities. The exploration of literature on cluster based economic development and growth policy revealed that traditional industrial cluster development strategies do differ from logistics cluster development counterparts. They require strong initial and on-going government involvement, running against most scholars' conviction that cluster policy should not pick winners. Therefore, this thesis will focus on the five policy areas rendered by Sheffi, namely government investment in transportation infrastructure, land provision and zoning for the development of logistics assets, government incentives to encourage asset development and private investment, provision of soft public goods and lastly, regulations affecting the overall business environment. It is expected that the independent variable – Sheffi's policies – affect economic growth – the dependent variable. Economic growth is a complex phenomenon, however Bassani & Scarpetta (2001) stress the academic consensus that central drivers of growth are accumulation of physical and human capital; research and development; sound macroeconomic policy setting; financial development and regulations affecting international trade. Consequently, one must suspect that the policy fields deemed relevant by Sheffi have beneficial effects on the drivers of growth.

The first three policy fields aim at the accumulation of physical capital in one way or another. The fourth policy field relates to the accumulation of human capital, whereas the last policy field seeks to establish regulations for a favourable international trade and business environment. Moreover, it has been shown that a central concern of cluster policy is to

enhance regional competitiveness. The literature review revealed that ‘Porter’s Diamond of Competitive Advantage’ does not serve to identify clusters, yet it is a useful tool to display a cluster’s current standing in a qualitative and comprehensive way. Doing so, one can inform policymakers about the way government may act as a catalyst or challenger to encourage companies’ aspirations. Thereby, the government may influence and improve Panama’s competitive standing in the global economy, in turn permitting to give recommendations about future directions and necessary policy adjustments. The construction of a Porter’s Diamond model requires to investigate certain factors – factor conditions, context for firm strategy and rivalry, demand conditions and related and supporting industry, as well as the variables of government and chance, illustrated in Figure 1. Subsequently, indicators must be found to measure the individual policy fields’ impact on growth in the following chapter.

It can be hypothesized that Sheffi’s policy areas affect both, the country’s factor conditions competitive advantage and three drivers of growth identified above in conjunction fostering Panama’s economic growth, illustrated in Figure 2. Based on the logic of theory-based policy evaluation, the policy programme proposed by Sheffi represents the policy theory (van der Knaap, 2004, p. 21) and will be referred as such form hereon.

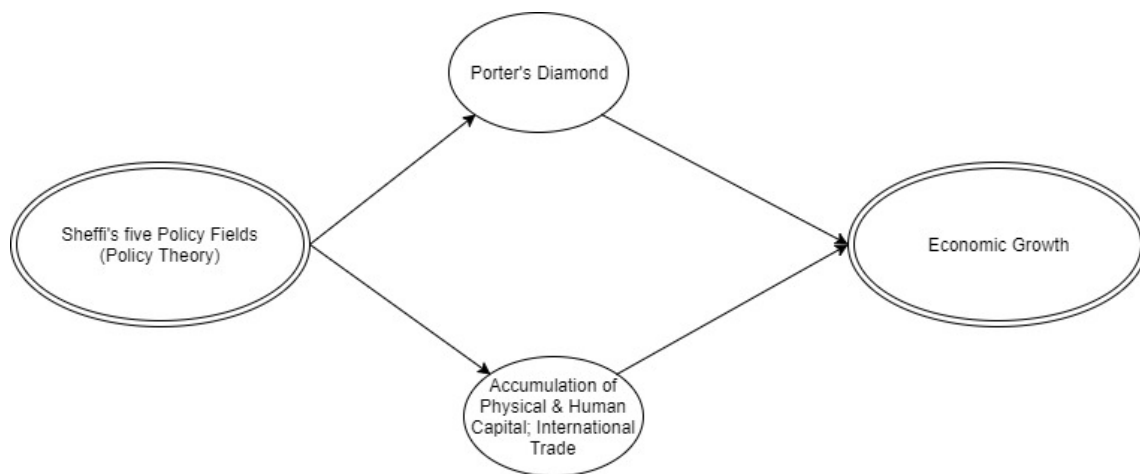


Figure 2 - Hypothesis

Singapore and Panama maintain lively diplomatic and commercial relations. In several occasions, Panamanian officials admired and embraced Singapore’s competence in logistics. The Panamanian Foreign Ministry and government officials repeatedly stress that Panama has much to learn from Singapore’s example of best practice, and is eager to do so. This observation is in line with the notion of policy transfer in rationalist literature on policy

learning. It is assumed that policy learning might occur as a process of transfer and learning by comparison. Policy ideas ‘travel’ and may lead to policy transfer which can be described as a “process by which knowledge about policies, administrative arrangements, institutions and ideas in one political system (past or present) is used in the development of policies, administrative arrangements, institutions and ideas in another political system” (Dolowitz & Marsh, 2000, p. 5). Increasing globalization and internationalization further drive this dynamic in which policy ideas can travel from one country to another, yet a process of policy transfer may take differing forms. One may distinguish between coercive and voluntary transfer, however *what* is transferred can differ as well. Policymakers may cherry pick components of a policy to be adjusted or copy an existing policy. In the former case, one speaks of policy emulation, in the latter policy is simply copied. However, Dolowitz and Marsh (2000) point to the possibility of unsuccessful policy transfer resulting from ill-information or the inability to copy or emulate a policy. Moreover, a policy may be transferred incompletely and miss the aspects which made it successful in the initial setting. Likewise, a transferred policy may simply not fit the context of the borrowing country.

If Panama indeed engages in Policy transfer as articulated by the country’s officials, there should be similar yet adjusted components traceable in the Panamanian economic growth policies since gaining control of the Panama Canal after 1999. Subsequently, the author will conduct a policy performance evaluation based on the logic of theory-based policy evaluation, tracing policy inputs, activities, outputs and outcomes to be further defined in the following chapter.

III. Methodology

To answer the overall research question laid out in the first chapter, a predominantly qualitative in-depth case study of the Panamanian growth strategy will be conducted, employing a deductive, theory-based policy performance evaluation. In line with scholars' perception of cluster as highly individual constructs, the in-depth single-case study design is appropriate if dealing with a unique case (Yin, 1994, p. 40). Likewise, as research on Panama in this matter is scarce, some revelatory nature can be attributed to this study. Whereas the purpose, research questions, case selection and relevance of this work have been laid out in the first chapter, more attention shall be given to the methodology, operationalization and sources in this chapter.

Attempting to answer the remaining sub-questions, several steps must be taken. Sub-question two will be answered by employing a theory-based evaluation approach, meaning the examination of the hypothesis from policy inputs to activities, outputs, outcomes and impact (Weiss, 1998; White, 2009, p. 3). To do so, policy inputs are identified in this chapter, whereas in the second section of the following chapter policy activities will be examined. In other words, the resources dedicated to the program and activities or measures undertaken. Here the independent variable, or policies, are of concern. Thereafter, outputs and outcomes will be regarded, meaning what the activities conducted produce and corresponding effects on growth. Outputs resemble the three drivers of growth, accumulation of physical and human capital, and international trade, requiring the further definition of indicators for adequate measurement. Thereafter, policy outcomes are of concern and measured with interview data. This step involves the creation and assessment of a Porter's Diamond modelled on the Panamanian logistics cluster, eventually permitting to examine effects of policies on growth or policy impact.

Equally, the approach will aid in answering sub-question three - *What does it take to become the 'Singapore of Latin America?'*. It has been indicated that in many ways, Singapore is considered a benchmarking case when it comes to logistics cluster development policy. The country achieved impressive developments, transforming from a poor trade outpost after independence to one of the most advanced economies worldwide. Although clusters weren't studied in these days, the country engaged in the fortification and expansion of its logistics sector particularly from 1970s onwards, resulting in the present-day logistics cluster.

Reviewing these developments revealed that the actions taken are largely congruent with the policy recommendations given by Sheffi (2012, p. 176). By the 2000s, Singapore emerged as major commercial hub in South-East Asia, proving that its policies employed in the decades before were successful and might prove an example to other locations seeking to follow the lead.

Operationalization

The independent variable pertains cluster development related policy. While the initial effort lies in sketching the policy content and measures, how can policy outcomes be measured in respect to how it affects the country’s growth – the dependent variable. First, logistics cluster relevant components, the independent variable, of the Panamanian growth policy will be identified and compared with Sheffi’s policy theory.

Policy Theory Component	Input	Evidence retrieved from
(1) Government investment in transportation infrastructure	Public funding	
(2) Land provision and zoning for the creation of logistics assets	Public funding	
(3) Government incentives to encourage asset development and private investment	Public funding	Strategic Government Plans; <i>Gazeta Oficial</i> ; <i>La Estrella de Panamá</i> ; <i>La Prensa Panamá</i> ; Hansa International Maritime Journal; International Monetary Fund Country Report Panama
(4) Provision of soft public goods	Public R&D and educational infrastructure	
(5) Regulations affecting the overall business environment	Regulation	

Table 1 - Policy theory, inputs & evidence. Adapted from *Logistic Clusters: Delivering Value and Driving Growth.* (p. 176) by Y. Sheffi, 2012, Cambridge: MIT Press.

Table 1 displays the individual policy theory elements, the respective policy inputs and where information was retrieved. All policy theory elements were indeed addressed by the Panamanian government. Furthermore, it can be anticipated that the policy inputs employed are public funding; the provision of public R&D and educational Infrastructure and regulations. Evidence on their actual execution was researched by intense investigation of the Strategic Government Plans, Panama’s two most respected newspapers (*La Estrella de Panamá & La Prensa Panamá*), as well as by consultation of Hansa International Maritime Journal and IMF country reports. The legislative texts as such were sourced from the official legislative journal of the Republic of Panama (*Gazeta Oficial*) and the homepage of the Panamanian Ministry of

Industry and Finance. A detailed elaboration on the policy activities will be provided in the following chapter.

It remains open how effectively test for the quality or success of Panama’s logistics cluster fostering policy. The problem being faced here is that economic data is only available for the national level. In addition to the lack of sectoral and regional data, cluster policy overall aims at fostering external economies and regional competitiveness. Miller (2007) acknowledges the problems of operationalizing small-n qualitative studies as “variables might not be observable”, hence one must take a variable “out of the realm of theory and plant it squarely in concrete reality” (Brown, 1988, p. 8). Consequently, indicators capable of expressing policy outputs must be found which relate to the drivers of growth to trace policy effects. On the one hand, World Development Indicators sourced from the World Data Bank will be employed to trace policy outputs. On the other hand, the interviews conducted provide another measure of a rather qualitative nature for the examination of policy outcomes and will be touched upon later. Table 2 displays the relation of policy theory components to the drivers of growth as output and a selection of indicators at hand.

Policy Theory Component	Output (Driver of Growth)	Output Indicator (World Data Bank)
(1) Government investment in transportation infrastructure	Investment (Accumulation of physical capital)	Logistics Performance Index: Quality of trade and transport related infrastructure
(2) Land provision and zoning for the creation of logistics assets	Investment (Accumulation of physical capital)	Foreign direct investment net inflows (% of GDP); Foreign direct investment inflows (BOP, current US\$); Gross capital formation (% of GDP)
(3) Government incentives to encourage asset development and private investment	Investment (Accumulation of physical capital)	
(4) Provision of soft public goods	Accumulation of human capital	Educational attainment (upper secondary; post-secondary; Bachelor; Master; Doctoral) (% gross); Enrolment; Government expenditure on education (% of GDP)
(5) Regulations affecting the overall business environment	International Trade	Doing Business Index

Table 2 - Policy theory, output & output indicators. Adapted from *Logistic Clusters: Delivering Value and Driving Growth*. (p. 176) by Y. Sheffi, 2012, Cambridge: MIT Press.

The first policy theory component – Government investment in transportation infrastructure – does not allow for measurement of absolute sums. Although it resembles the driver of accumulation of physical assets, no coherent data on government spending on infrastructure exist for Panama. More importantly, not only the sum invested matters, but the quality of infrastructure provided. This circumstance allows to employ a component of the Logistic Performance Index (LPI) by the World Bank. The LPI consists of qualitative and quantitative measures assessing the relative logistics competence of 160 countries. In total, six components build the LPI, namely, the efficiency of customs and border management clearance; The quality of trade and transport infrastructure; The ease of arranging competitively priced shipments; The competence and quality of logistics services—trucking, forwarding, and customs brokerage; The ability to track and trace consignments; The frequency with which shipments reach consignees within scheduled or expected delivery times. However, this study employs the component ‘quality of trade and transport related infrastructure’ exclusively to prevent bias.

The second and third policy theory component resemble the same driver as earlier but allow for more exact measurement. Both areas aim at creating and developing assets and private investment through foreign direct investments as in the case of Singapore. Hence, the indicators of foreign direct investment net inflows of both percentage of GDP and absolute balance of payment, as well as gross capital formation as percentage of GDP (formerly domestic investment) will be employed. The situation is complicated for the area of provision of soft public goods, resembling the driver accumulation of human capital. An investigation of indicators on educational attainment and government spending in education revealed that data not only on Panama but all Latin America is notoriously incoherent. Nonetheless, a variety of indicators with measures are at hand, encompassing various levels of educative attainment, enrolment and government expenditure on education.

Lastly, the field of regulations affecting the overall business environment related to the driver of international trade. Here, the Ease of Doing Business index and its subnational indices will be employed. Miller (2007) emphasises that indices are a solution to the problem of a vast number of measures available as “indices are composite measures which combine two or more indicators in the basis of predefined rules” (p. 94) which help “to avoid arbitrarily opting

for one measure [so that] an index comprised of different indicators on the same concept might be used as a basis to test validity” (ibid.). The Ease of Doing Business index consists of ten components concerning the ease to open and conduct business operations. It is a benchmark study of regulation employing ten sub-indices for starting a business, dealing with construction permits, employing workers, registering property, getting credit, protecting investors, taxes, trading across borders, enforcing contracts, getting an electricity connection and closing a business. It is based on survey executed by the Doing Business team, consulting more than 12,500 expert contributors on their perception on the local circumstances to open and run a business. The Doing Business Index informs in a comprehensive manner about the ease of conducting international business, deliberately regarding trade across borders, therewith constituting an excellent measure for the given purpose.

In addition, policy outputs shall be examined via the application of a Porter’s Diamond on the Panamanian logistics industry. Due to the lack of regional data and the concentration of logistics and economic activities in the capital and along the Panama Canal, national data will be of concern. The measures employed to construct the diamond are of two kinds – primary interview data and secondary expert literature. The latter encompass books on the history of the canal, the economic history of Panama and logistics and maritime journals. Doing so, each of the four factors and the variable of government have been researched in depth to conclude qualitative assessments.

To provide a measure for policy outcomes, key-informant interview data will be employed. The interviews were conducted with key-informants in Panama-City in May 2017, therewith reemploying a method commonly used by scholars in cluster research. Interviews as an additional source of high-quality primary data are a possibility to identify concrete policy outcomes, providing practitioner insight into how government policy shapes present day circumstances. They are used to ask for perceptions of success in policy implementation and perceptions of successful policy outcomes, looking at the drivers of growth of concern and the factors in the Porter’s Diamond.

Sources and Data Collection

To guarantee credibility, transferability and trustworthiness, in other words quality of a thesis and the research process, data needs to fulfil high quality standards (Golafshani, 2003, p. 8). To ensure that quality, qualitative data in the form of primary and secondary sources

were utilized. Primary sources were obtained through interviews and accessing governmental sources and policy documents. Secondary sources entailing expert literature and journal articles were obtained from libraries, academic journals and online databases. Moreover, numerical indicators and indices used to trace the (socio-)economic development and performance of Panama were obtained. These indicators originate from the World Bank's World Development Indicator database, representing the most comprehensive and consistent collection of data available and of relevance for this work.

To underpin the findings, a series of semi-structured interviews were conducted with a variety of professionals and officials in Panama-City in May 2017. The previous chapter illustrated that the method is commonly used in cluster research and therefore legitimizes the approach. Three sectors of concern have been identified namely, research institutions, governmental institutions, as well as businesses and associations. The interviews took a semi-structured form consisting of three sections, the first introducing the informant, the second consisting of one question each dedicated to the individual policies theory components and policy outlook. The last section was open for ad-hoc and background questions by the interviewer. An overview of the interview framework and questions can be found in Appendix 1. The interviews were recorded and programmed to last 45 minutes to one hour. The response rate of the contacted informants was very high, 9 out of 10 contacted individuals agreed to a meeting at their workplace. Due to scheduling and travel time 8 interviews were realised eventually. A list of interviewees, their current and foregone occupation and the collection of interviews consent forms can be found in Appendix 2. In total, eight interviews were conducted with three informants each for governmental institutions and business and associations. From the educative and research sector two informants were obtained.

Reliability and Validity

There is some limitation on the external validity of this case study. An in-depth case study focusing on only one country does not allow for a high degree of generalizability. However, as mentioned earlier, growth proved to be a highly individual process and no universal framework for economic growth is attainable nor desirable. It requires in-depth study of a given locality, its available resources, conditions, institutional setting etc. Consequently, generalizability is limited to cases with similar locality conditions rather than economic performance or development categorization. To counter doubts of validity due to

the small sample of informants, exclusively senior executive level individuals were targeted. The informants have been ensured confidentiality regarding their contributions to allow them to speak and express their opinions as freely as possible. Hence, the contributors' names will not be paired with the contents retrieved

IV. Policy Evaluation – Panama’s Logistics Cluster

The previous sections have dealt with the theoretical and methodological foundations of this work. Subsequently, the focus is being shifted towards the analytical heart piece of this work, comprising a policy performance analysis attempting to answer sub-question two – *What is Panama’s current cluster policy and its resulting policy outcomes?* The central building blocks of this section are an assessment of the policy as such, or policy activities, followed by the analysis, an assessment of the drivers of growth or policy outputs and subsequent outcomes. This also incorporates the creation of a Porters Diamond for the Panamanian logistics cluster. Eventually, the Porter’s Diamond is a graphical snapshot of the current outcomes of policy and overall state of the cluster. To show the importance of the logistics industry for the country and understand the drastic implications for its population, the overall policy context shall be given initial prominence.

Policy Context

The territory at the S-shaped isthmus connecting South America and Central America has been a place of trade and commerce for centuries. Spanish conquistador Vasco Núñez de Balboa was the first European to cross the jungle on the isthmus to the Pacific Ocean in 1513. On his quest, he was accompanied by Francisco Pizarro, who’s conquest of the Incan Empire would raise Panama’s status to a strategic location for the Spanish Crown. The transport of the riches of the Incan Empire to Europe was enabled by *Camino Real* and its later replacement *Camino de Cruces*, crossing from Panama-City on the Pacific to the isthmus’ Atlantic coast (Barletta, 2011, p. 194). In the 18th century the land connection lost its significance to a Spanish Empire in decay and turmoil. Liberated from the Spanish Crown by Simon Bolivar, Panama as a department of Grand Colombia became independent from Spain in 1821. The Californian goldrush reignited interest in the isthmus as a crossing for gold transports from the western to the eastern coast of United States. In 1850, the construction of an interoceanic railway began and was concluded in 1855 under a US business initiative.

The first attempt to construct an interoceanic canal by was made by the French under the leadership of Ferdinand de Lesseps who successfully built the Suez Canal. Construction began in 1881, however failed miserably and the project was abandoned in 1894 due to the

grave mistake to plan the crossing on sea-level. In early 20th century, the US uttered interest in purchasing the French interests in Panama. After initial agreement on the terms in 1903, the Colombian senate failed to ratify the treaty after the US senate did. In response, president Roosevelt learned about rebellious groups on the isthmus seeking independence from Colombia and supported their cause by blocking the access for Colombian forces with US warships. Thus, Panama became an independent US protectorate on November 3rd, was quickly recognized by the US as a new state and the new Panamanian government signed a treaty concerning the venture on November 6th, 1903 (McCullough, 2001). In 1904, the US formally took control of a zone of land, stretching from the Atlantic to the Pacific, heavily restricting access to Panamanians. The circumstance led to regular upheaval among Panamanians who saw their sovereignty infringed by the presence of the US. On January 9th, 1964, students sought to express their anger and rise the Panamanian flag inside the US controlled canal zone, leading to the assassination of several protestors by US forces. Nowadays a national holiday known as Martyr's Day, the incidence led to widespread civil unrest.

Although constitutionally democratic since 1903, a commercial oligarchic elite effectively ruled the country which became challenged by general Omar Torrijos. He assumed power by a coup in early 1969 and became the country's de facto dictator as head of the national guard (Pérez, 2010, p. 20 ff.). His reign was coined by the ratification of the Torrijos-Carter Treaties in 1977, which regulated the transition of the Panama Canal and the Canal Zone to the Republic of Panama after December 31st of 1999 (p. 57 ff.). Torrijos died in a mysterious plane crash supposedly ordered by his second man, Manuel Noriega who took power and remained in office until the US invaded Panama in 1989. Subsequently, he was removed from office, democracy was restored and the Panama Canal and the Canal Zone were handed back as agreed.

The course of events determined the choice of the timeframe of analysis from the transition of the canal onwards. Gaining sovereignty over the Panama Canal and the Canal Zone provided the impoverished nation with assets and income unknown before. This includes not only the Canal but vast US military facilities, caserns and airports which were erected for the US military's Southern Command. It is crucial to understand the role of the Panama Canal

and the Canal Zone in Panamanian history, as the facility as well as the events connected to it are a significant feature of Panamanian identity and national pride.

Since the return to democracy and the transition of the Panama Canal to the Republic of Panama, the country underwent an impressive growth and development process. The economic collapse at the end of the Noriega regime was followed by a US invasion and subsequent skyrocketing growth as indicated in Figure 3. The average growth rate of available data within the timeframe of this study from 2000 to 2015 lies at 6.7% with GDP per capita more than doubling.

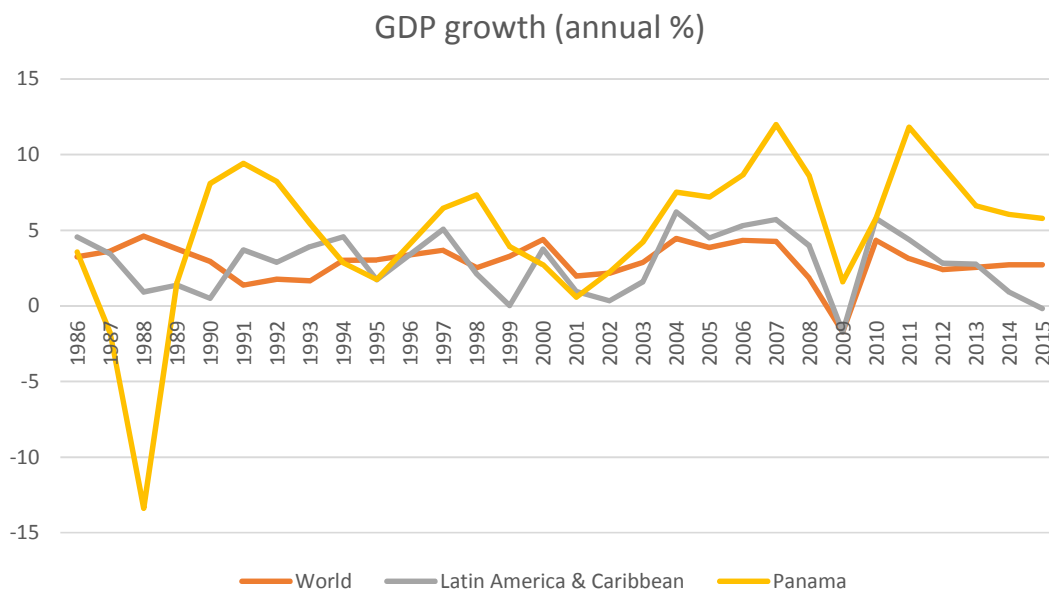


Figure 3 - GDP growth (annual %); Comparison of Panama, World and Latin America & Caribbean (Source: The World Bank, 2017)

Clearly, the Panama Canal is an important asset to the country and greatly influences its economic performance as 5% of world trade passes through it. In 2016, the canal generated revenues worth 1.933\$ billions of which 1\$ billion was paid to the government of the dollarized economy (ACP, 2016, p. 117). With an GDP of 52.13\$ billion at current market prices in 2015 is has more than doubled within a decade. Currently, Panama scores 0.788 in the Human Development Index (HDI) but despite the reduction of poverty in recent years, it holds a Gini-coefficient of 0.507, representing the fourth most unequal income distribution in Latin America and the greatest in Central America. In terms of economic activity, Panama’s economy is highly service dependent, accounting for 69.4% of GDP in 2015, whereas industry and agriculture account for 27.7% and 2.9% respectively. The logistics and transportation

sector alone represents a share of 13.9% of GDP in 2016, therewith being the fourth biggest sector of economic activity (Instituto Nacional de Estadística y Censo, 2017).

Article 16 of Law 34 of 2008 obliges each new administration to conclude a strategic plan of which two have been published so far by the Martinelli and Varela administration respectively. Unsurprisingly, both plans acknowledge the vital role of the logistics sector as driver of growth and seek to establish the country as 'Hub of the Americas' (Gobierno Nacional de Panama, 2010, p. 15; 2015, p. 30). The plans indicate the administration's intentions, however do not constitute policy as such.

Policy Assessment

Panama's economic growth and development throughout the last decade proved impressive, however the focus of this section lies in the policies employed by the state to nurture Panama's logistics cluster. Having regarded policy inputs earlier, the author will illustrate policy activities conducted in the five policy areas of Sheffi's policy theory deemed to foster logistics cluster development. The relevant legislation and government actions have been identified during the research process and will be presented for each policy area sketched by Sheffi. To display the course of policy over time, a timeline has been created including the relevant policy events, to be found in Appendix 3.

Government investment in transportation infrastructure

The Republic of Panama was fortunate to inherit the Panama Canal, military airport facilities and ports from the US. Nonetheless, the facilities were erected during the 20th century and the canal reached its capacity limits as ever bigger ships and more goods sought passage. Other critical infrastructure investments concern Tocumen International Airport and roadways.

The adaption of the canal to 21st century trade was emphasised by the Torrijos administration and the Panamanian people were called to decide via a referendum on an expansion of the canal in October 2006. The vote resulted in 76.86% of voters approving the measure. Consequently, Law 28 of 2006 ordered the ACP to conduct studies and contract constructors, while the 5.45 UD\$ billion project was to be self-financed by the institution

through operative revenues. Despite little delays, the new sets of locks on both sides of the canal began operating in June 2016. Moreover, the expansion of Tocumen International Airport was enabled by Resolution 168 of 2012 and authorized the public entity to access international and local financial markets for expansion and refurbishment of present facilities. The measures aimed at consolidating the airport and prepare for increased passenger and cargo flows and resulting, in a master plan under execution. A second passenger terminal is expected to open soon, while a new cargo terminal is under construction. Roadways were added to the road network to enhance the flow of vehicles between the ports sitting on the mouths of the canal on the Atlantic and Pacific. Lastly, few new port facilities have been added to the system, instead inherited facilities were given to port operators by the ACP for lease. Subsequently, they engaged in renovating them to fit contemporary cargo needs. The most recent added port is the PSA International terminal on the western shore of the canal and is operated by the Port of Singapore Authority. Concession for the terminal was granted by Law 26 of 2008 and it began operating in 2012. Indeed, the government seeks to develop another port in the Pacific side of the canal, however the project came to halt. Although a bidding process was initiated, the port operators contacted did not submit any bids due to legal constrains and pending cases on court. A renewed bidding process is expected to be initiated in 2017.

Land provision and Zoning for the creation of logistic assets

Logistics and related operations require vast space for activities such as warehousing and forwarding. The provision of these terrains by the government is predominantly conducted by the establishment of special economic zones (SEZ) to be found spread across Panama-City and the two mouths of the canal. On the Atlantic side, the Colon Free Trade Zone serves since 1948 as independent entity, remains the largest SEZ in the Americas and focuses on re-exportation. The development of SEZs was traditionally a central pillar in Panama's growth policy and has seen a renewed attention since the 2000's. In total, 19 free zones exist of which 12 are currently active and four are in a development state. The crucial government measures in the area have been Law 41 of 2004 and Law 32 of 2011, the former established the SEZ of Panama Pacifico, and the latter created a regime for smaller sized free zones.

Panama Pacifico, established by Law 41 of 2004, is situated on the Pacific mouth of the canal on the terrain of the former Howard Air base inherited by the US. The law has the

objective to create comprehensive legal, fiscal, customs, labour and migration regime to “incentivise and ensure the free flow of goods, services and capital” (Article 1) to attract investors and generate employment. Moreover, it established the Panama Pacifico Agency, a semi-autonomous public entity administering the SEZ and comprising all relevant administrative functions, therewith acting as a one-stop shop for investors. It is tasked with the development of the mixed-use zone to be conducted in cooperation with a private sector developer. The zone aims at attracting export-processing and logistics enterprises on one side of the airfield whereas management and operation facilities are situated to the other side with suburban housing, leisure and shopping facilities.

Law 32 of 2011 established a National Free Zone Commission, composed of concerned government ministers and representatives. The commission is tasked with establishing SEZs which can be operated as public, private or mixed organization. As for Panama Pacifico, special legal, fiscal, customs labour and migratory regulations are set out, however the commission can alter these depending on the individual zone’s purpose and form. The aim articulated is to attract value-adding manufacturing, assembling and finishing enterprises, high-tech companies, superior education and research institutions, as well as logistics and service companies. For all types of SEZs, relaxed labour regulations apply, allowing for flexible personnel adjustments.

Government incentives to encourage asset development and private investment

Sheffi recommends governments to provide incentives to companies to encourage asset development and private investment. Being a small economy, the government focused on realizing the aim through the attraction of foreign direct investments and the establishment of multinational enterprises in the country. For this purpose, Law 41 of 2007 provides incentives of three kinds – taxation, immigration and labour regulations.

Firstly, MNEs and their middle to high management personnel are given several tax exemptions. The territorial tax regime of Panama grants MNEs the exemption of income tax on any off-shore operations conducted outside Panama. In the case of the existence of a double tax agreement between Panama and the MNE’s country of origin, the Ministry of Economy and Finance might negotiate an individual tax agreement with the organization. In addition, middle and senior management personnel are excluded from income tax and social security payments if they are paid from headquarters abroad. Secondly, a special immigration

regime applies for MNE management, executive personnel and their dependents. Management and executives are granted a 5-year renewable visa, not requiring any additional work permit in Panama. Their dependents may request a work permit through a fast procedure. Moreover, special three-month visas are granted to temporary personnel.

In addition, the Martinelli administration's strategic plan stressed the need to establish an agency tasked with the promotion of investment opportunities (Plan Estratégico de Gobierno, 2010, p. 41). The agency shall enhance international knowledge of the Law 41 of 2007 framework and was established by Executive Degree 134 of 2010.

Provision of soft public goods

Education is a sensitive topic in Panamanian politics as the country's educative system performance is highly controversial. After participating in the international Pisa study, Panama ranked on position 62 of 65 participating countries (OECD, 2010). The country will take part in the Pisa study anew in 2018. The strategic plans of the Martinelli and Varela administration dedicate a chapter to educational reform, curriculum transformation and transition to modernization of the educational system from primary to tertiary education. Two public universities exist in Panama, next to a variety of private institutions. Moreover, the national education agency INADEH engages in vocational training. One could spend a work on its own to education in Panama, however space restrictions demand to focus on policy novelties regarding the logistics and related sectors.

The most notable policy decisions were the establishment of the International Maritime University of Panama through Law 40 of 2005 and the establishment of a branch of the Georgia Tech Institute of Technology in 2010. Panama's International Maritime University offers maritime and nautical studies whereas Georgia Tech Panama Logistics Innovation and Research Centre offers scholarship financed dual master programs. The institute additionally acts as a counselling body to the government. Moreover, the government announced the construction of a technical and vocation training institute, the *Instituto Técnico Superior del Este* (ITSE) in 2015. After an initial attempt failed, Resolution 55 of 2015 ordered the construction which is still ongoing.

Regulations affecting the overall business environment

A comprehensive assessment of the regulations affecting the overall business environment in Panama would exceed the scope of this study. The issue is complicated by the circumstance that the framework of Law 41 of 2007, as well as the vast number of individual SEZ regimes offer distinct conditions to companies. However, the World Bank Group offers a comprehensive ranking on the ease of doing business. In 2017, it ranked place 70 of 190 countries subjected to the survey.

Conclusion

This section has shown that the Panamanian government indeed did and does engage in all components of Sheffi's policy theory. Whereas the first four components were looked upon in considerate depth, the last two components are simply too extensive to be treated comprehensively in this work. Nonetheless, not only the fact that policies are executed matter, but what the activities produce matters. Subsequently, the results of policy activities conducted will be moved in the focus, looking at concrete policy outputs and outcome.

Assessment of Policy Outputs and Outcomes

The first part of this analysis has revealed the policies and instruments employed by the Panamanian government. Subsequently, the author seeks to display policy outputs and outcomes. To point at success, shortcomings and failures of policy, the sources of competitive advantage shall be given attention thereafter. The interviews conducted as central source of data were coded, distinguishing the informant's perception of the actions of government between positive, negative or mixed. In addition, relevant information was noted to look at common positions or conflicts among the informants' opinions regarding each policy field.

For the first policy area sketched - government investment in transportation infrastructure - one can conclude that the policy course is overall satisfactory. If investigating the policy output indicator, the Logistics Performance Index component on the quality of trade and transport related infrastructure, a positive trend emerges. Table 3 illustrates the development of the score over time. Whereas it worsened from 2007 to 2010, dropping 0.16 points, thereafter a successive improvement can be observed. In 2016 the quality of trade and

transport relevant infrastructure scored 3.28, overall improving 0.49 points since 2007. These scores indicate an overall positive development of the state of logistics relevant infrastructure and continued government investment.

Panama in the Logistics performance index: Quality of trade and transport-related infrastructure (1=low to 5=high)

Year	2007	2010	2012	2014	2016
Score	2.79	2.63	2.94	3.00	3.28

Table 3 - Panama in the Logistics Performance Index: Quality of trade and transport-related infrastructure (Source: The World Bank, 2017)

Table 4 shows that five informants perceive the actions positively, whereas two uttered dissatisfaction and one gave a mixed picture. Overall, the positive replies put forward the canal expansion as greatest achievement, permitting the use of unseen scales, more than doubling the total capacity and fostering the sector’s competitiveness. A similar picture emerged for the expansion of Tocumen International Airport, allowing for greater intermodality. The continuous expansion of capacities of the two autonomous entities eases bottlenecks and ensures the use of larger economies of scale, enhancing local businesses competitive advantage over regional competitor localities. However, some common critique emerged. Six out of eight informants put forward the urgent need for more port capacities on the Pacific, uttering dissatisfaction with the halt of the Corozal port project. The same number of informants stress a lack of road and highway capacities. Continuing road congestion puts limits on the performance of the cluster. Although the canal and airport expansion are deemed a success, the lack of road connectivity puts constraints on the system and intermodality. Five informants point at poor planning as the cause of the problem.

Informants' view	Government investment in transportation infrastructure	Land provision and zoning for the creation of logistics assets	Government incentives to encourage asset development and private investment	Provision of soft public goods	Regulations affecting the overall business environment
<i>positive</i>	5	2	8	0	6
<i>negative</i>	2	3	0	7	1
<i>mixed picture</i>	1	3	0	1	1

Table 4 - Informant Responses

For the area of government incentives to encourage asset development and private investment, the national government relies heavily on the attraction of MNEs via tax incentives. In addition, the special regimes in the many SEZs offer attractive conditions for foreign companies to set up operations with competitive advantages arising from the exemption of tax on exports and a liberalized labour regulation regime. Exploring the relevant policy output indicators, Figure 4 illustrates the net inflow of FDI in current US\$ from 2000-2015, indicating that after fluctuations to be attributed to the global banking crisis, FDI inflows increased rapidly since 2000. Alone in 2015, FDI amounting to 5.8 US\$ billion came to the country, whereas the total FDI received since the implementation of Law 41 of 2007 sums up to 28.6 US\$ billion. Figure 5 illustrates the share of foreign direct investment in Panama’s GDP from 2000 until 2015. It becomes apparent that FDI has been a critical component of GDP in recent years, accounting for 11.19% in 2015 and amounting to 9.17% on a 15-year average.

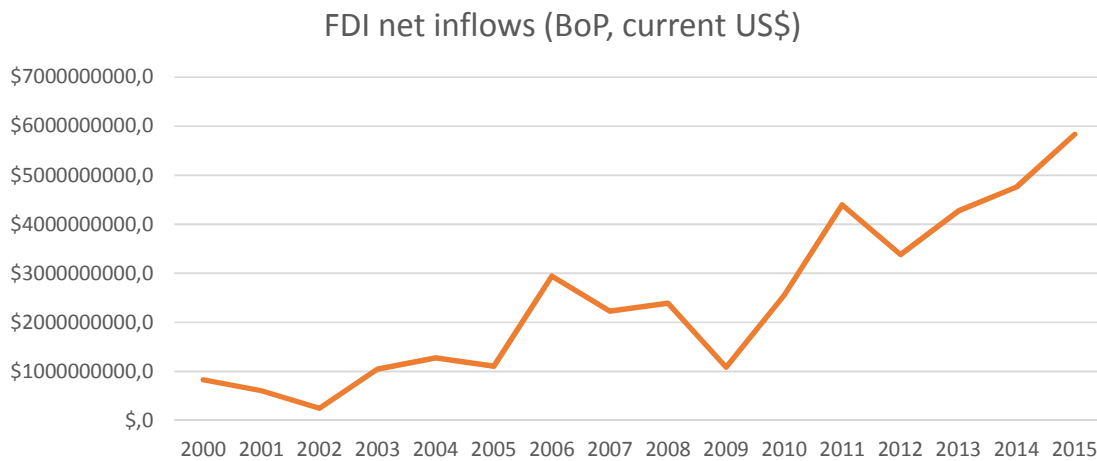


Figure 4 - FDI net inflows Panama (BoP, current US\$); (Source: The World Bank, 2017)

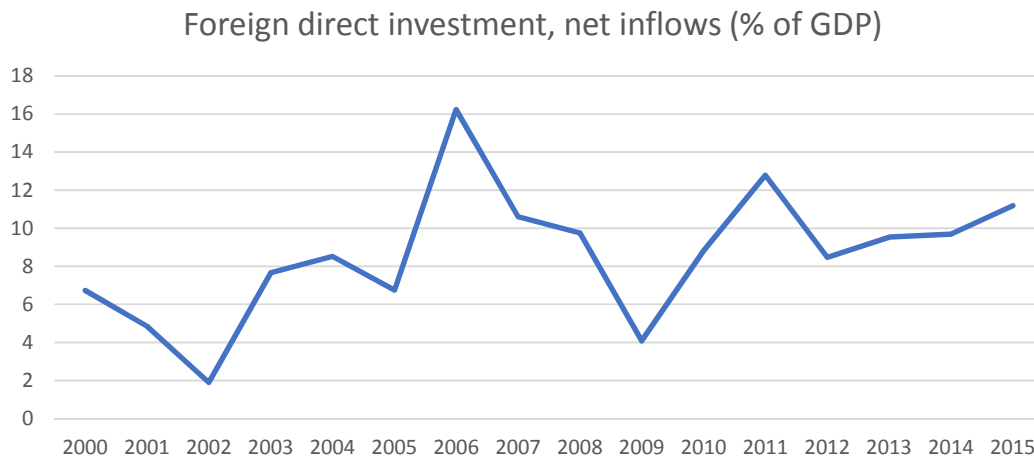


Figure 5 - FDI inflows Panama (% of GDP); (Source: The World Bank, 2017)

If regarding domestic investments, in other words gross capital formation as percentage of GDP, a similar image occurs. Figure 6 indicates an overall increase of domestic investments in the given time frame. After a slump at the beginning of the 2000s and the international financial crisis, investments quickly surpassed pre-crisis levels of 41.6% of GDP in 2011 and remain above this threshold since then. On average, gross capital formation in Panama amounts to 38.6 % of GDP in the given timeframe, by far outperforming the region holding an average of 21.7%.

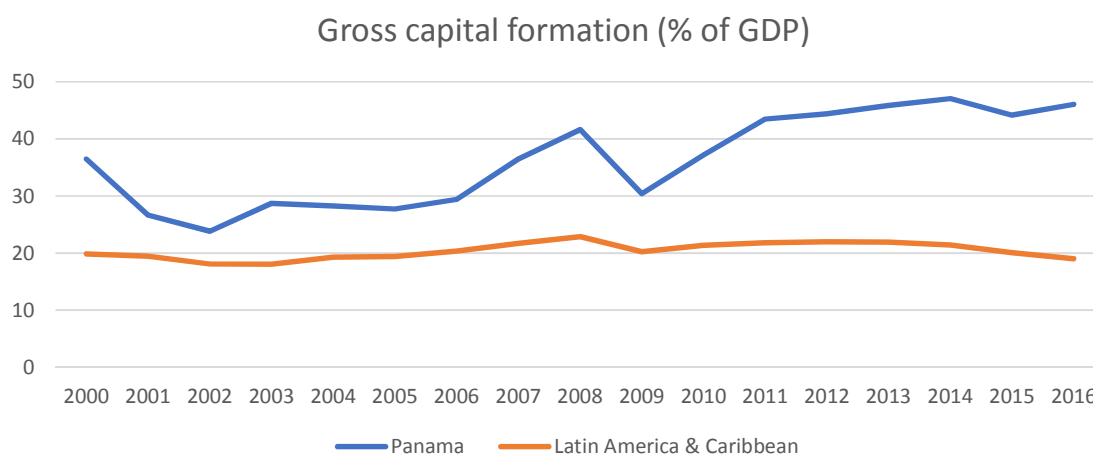


Figure 6 - Gross capital formation (% of GDP); (Source: The World Bank, 2017)

The informants have been asked if they think Law 41 of 2007 has been effective in attracting firms and bringing employment to the country and their responses were without exception positive. Informants concluded that government action to attract MNEs proved overall solid and successful, expressed in the strong approval of government measures. In January 2017, the Ministry of Commerce and Industry announces that 134 MNEs have settled in Panama, whereas 2016 was a record-breaking year (Rodríguez, 2017). The arrival of manifold companies confirms the literature stance that “foreign investment is more likely to be attracted into locations with pre-existing clusters than into other locations” (Enright, 2003 p. 115). However, “once the investments are attracted, the goal is to embed the foreign firms into the local environment” (ibid.) to enable the knowledge transfer and sharing of good practices wished for. In other cases, MNEs often used the incentives until they would run out and move to another location. It can be expected, that the persistent reliance of the Panamanian government on a territorial tax regime, subjecting only profits generated in Panama to taxation, is maintained deliberately to counter this threat.

A conflicting picture arises when concerning the following policy areas which affect each other in some ways. The investigation of policy documents has revealed that the provision of land for the creation of logistical assets is conducted through the establishment of free trade zones, with the two biggest – Panama Pacifico and Colon Free Trade Zone dominating the scene. The informants were asked, if in their opinion the government measures for the provision of terrain for logistics and related operations are done in a wise way. Only two informants responded positively, whereas three expressed dissatisfaction and three gave a mixed picture. The most common concern of five informants was the sheer number of SEZs and their poor connection to ports and the airport, leaving the individual zones in isolation. The execution of Law 32 of 2011 has been criticised, as zones are being established without clear purposes or comprehensive planning. As a result, each SEZ operates under a different and distinctive regime, not necessarily fulfilling the actual needs of the industries concerned.

Panama Pacifico has been pictured as a highly innovative and successful model for the future of the country, however it received both praise and criticism. On the one hand, three respondents stress the SEZ offers favourable conditions, being the only zone of mixed usage, comprising an airport and a one-stop shop for the smooth process of establishment for investors. On the other hand, four informants criticized the poor planning and connectivity to ports with currently only one street connecting the zone with the major Pan-American highway, one of the most traffic laden junctures of the national highway network. Despite the close proximity to ports, the poor connection to other critical junctures, in combination with road congestion has potential to curb the entire cluster's performance and attractiveness.

Two informants uttered concerns over the outdated business model of the Colon Free Trade Zone with an overly strong focus on simple re-exportation. Operations of Colon Free Trade Zone follow a traditional free zone business model and this doubtlessly was successful during the 20th century. Nonetheless, informants indicated that in their view the model must be reconsidered and modernized to attract activities of greater value-adding potential and use to the country. They recommend exploring novel approaches to convert it into a site of light-industry and reverse logistics to develop more value-adding activities for cargo passing through.

Three informants emphasised that the arrival of MNEs under the Law 41 of 2007 framework contributes to the sharing of good practice and knowledge transfer. Two informants see that once settled in Panama, MNEs bring further operations and departments to the location, particularly distribution centres. However, two informants found that in some cases the access to employment in an MNE is hardly an option for the wider Panamanian society, due to high entry requirements. Lastly, one informant emphasised that some MNEs quickly abandon their operations as they do not encounter the expected conditions. This primarily concerns the supply of skilled labour, to be touched upon hereafter.

One informant uttered some reservations regarding the potential to maintain the MNE presence in the long-term as they might prove disillusioned once operations were moved. This disillusion relates to the overall lack of quality regarding the forth policy area of concern – the provision of soft public goods. Government receives the worst score for its actions by the informants in this area.

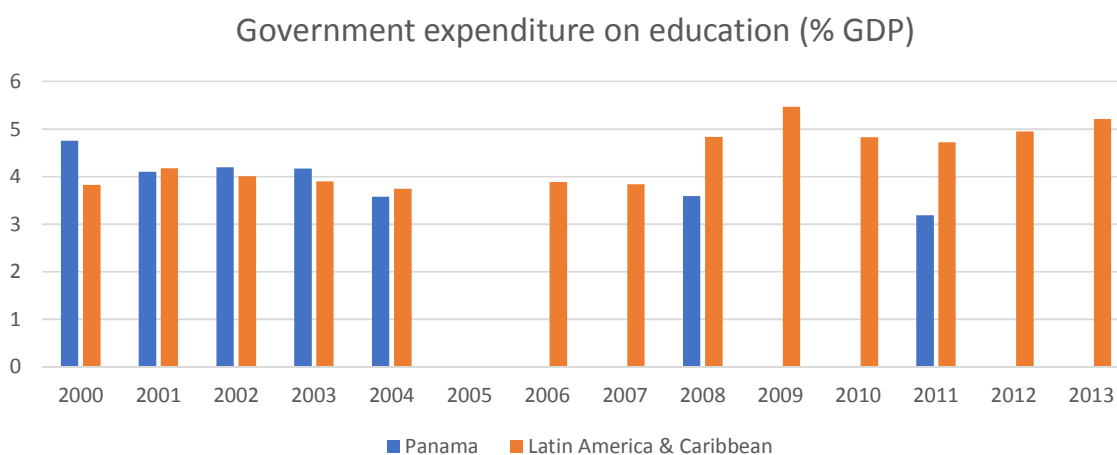


Figure 7 - Government expenditure on education (% of GDP); (Source: The World Bank, 2017)

Although public education and specialized education is being provided by the government, as well as several private institutions, it remains of mediocre quality. To examine the output of education policy, a variety of indicators have been chosen, namely, government expenditure on education as percentage of GDP, enrolment in secondary and tertiary education as gross percentage, as well as educational attainment in several levels as percentage of the gross. Figure 7 displays government spending on education as percentage of GDP, comparing Panama to the region of Latin America and the Caribbean. Although the data provided is incoherent and does not cover the complete time frame of concern, it becomes visible that Panama initially spent more than the aggregate of the region on

education but continuously reduced contributions. In 2000 the country dedicated 4.76% of its GDP to education, however spending was reduced to 3.19% until 2011. The aggregate region spending on education surpasses those of Panama by more than 1.5 percentage points in that year. A similar trend is observable is consulting gross enrolment in tertiary education as indicated in Figure 8.

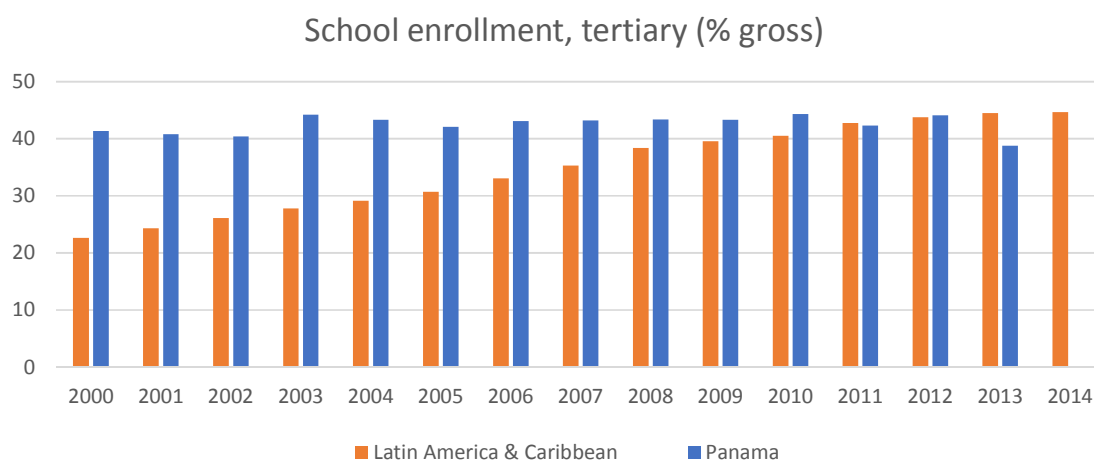


Figure 8 - School enrolment, tertiary (% gross); (Source: The World Bank, 2017)

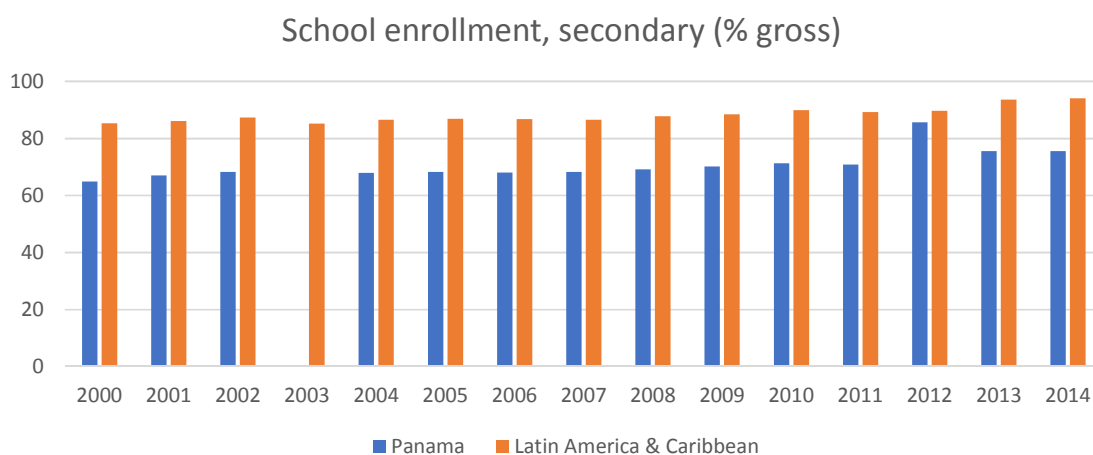


Figure 9 - School enrolment, secondary (% gross); (Source: The World Bank, 2017)

While Panama Initially outperformed the region aggregate with 41.34% in 2000, the region soon caught up and surpassed Panama in 2013 when Panama’s enrolments slumped to 38.74%. Nonetheless, the trend cannot be confirmed in secondary school enrolments as seen in Figure 9. On the contrary, secondary school enrolments slightly increased from 64.84% in 2000 to 75.55% in the last reported year.

Another indicator concerns the educational attainment on several educational levels. In this case, only data on Panama and no aggregate data was available. Only two scores for the given time frame were provided for the year 2000 and 2010 illustrated in Table 5. Data on the attainment of Bachelor's, Master and Doctoral degrees only exist for 2010. It becomes apparent that there is an overall positive trend observable if consulting these indicators. In all categories where comparisons can be made improvements occur.

To explore the outcomes of education policy, informants have been asked if the logistics and related sectors encounter a sufficient pool of skilled labour on the local labour market. Seven informants uttered dissatisfaction about the issue and one informant gave a mixed picture. The former criticise that programs offered by universities are obsolete and do not prepare graduates for the actual demands of the labour market. Some curriculum adjustments have taken place, yet the effort is described as rather limited and half-hearted.

Educational Attainment, population 25+, total (%) (cumulative)		
Year	2000	2010
At least primary	76.36	82.63
At least lower-secondary	47.49	61.49
At least completed upper secondary	33.68	43.00
At least post-secondary	11.17	22.74
At least Bachelor's or equivalent		16.09
At least completed short-cycle tertiary	10.45	21.36
At least Master's or equivalent		2.37
Doctoral or equivalent		0.26

Table 5 - Educative attainment, population +25, total (%) (cumulative); (Source: The World Bank, 2017)

Whereas the lack of candidates is not to be located on the managerial level, the informants complained about the lack of technical labour. In response to the situation, companies resort to the pragmatic application of a mixed internship-traineeship model. Interns are hired to subsequently cherry-pick the most satisfactory candidates for internal training, uncovering the failure of government to provide adequate public education. When asked about their opinion on the technical training facility ITSE, four informants expect the institution to calm the situation. However, they stressed that the construction of ITSE resulted only from a business initiate pressuring and demanding a technical education institution (Gobierno de la República de Panamá, 2017). The central criticism was that curriculums are outdated and do not serve the needs of economic actors.

For the remaining policy area – regulations affecting the overall business environment – an overall positive picture emerges. Whereas the Doing Business index as a performance indicator exists since 2004, comprehensive assessments on Panama exist for 2016 and 2017 only. Panama ranked place 67 and 70 respectively among 190 nations, declining three places. When focusing on the region of Latin America and the Caribbean, the country holds the seventh place. However, the World Bank Group also publishes sub-national economy rankings on the ease of doing business. The regional subnational ranking covers 22 cities the region of Central America and the Dominican Republic, whereas Panama ranks first. Panama is regionally recognized as a prime location to open and conduct business as shown by the World Bank’s Doing Business Reports, second only to Chile. This is meaningful as Dawson (2006) confirmed statistically positive direct and indirect growth effects through a favourable regulatory environment for businesses. Informants were asked if they think that the government offers a generally favourable regulatory environment for companies, in particular logistics and related industries. The responses were vastly positive as only one informant gave a negative and another a mixed picture respectively. Overall, the informants were satisfied with the current situation and pointed to advances of the Varela administration in facilitating business and burden lifting. However, they also pointed to the need to further advance, and optimize processes through digitalisation and the creation of a single, comprehensive database to ease custom and taxation processes.

However, the methodology of the Doing Business ranking must be criticized as it does not consider corruption which is prone to curb or limit business performance by bribery and clientelism. The recent Panama Papers scandal, as well as the revelations of the more recent Odebrecht corruption scandal affecting all Latin America and the capture of former president Martinelli on corruption charges by Interpol shows that corruption indeed still is an issue in the Panamanian economy and politics (Ahmed, 2017; Reuters, 2017; Oxford Analytica, 2017). Transparency International’s Corruption Perception Index shows that the Panama’s country score did not improve much. Since the first survey conducted in 2012 and the last survey in 2016, Panama’s score was retained at 38, whereas 100 resembles a circumstance free of corruption (Transparency International, 2017). The informants pointed to the need to digitalize processes, create a central databank for custom related administrative processes and reduce paperwork to curb corruption on this level.

Application of Porter's Diamond Framework on the Panamanian Logistics Industry

As mentioned earlier, constructing a Porter's Diamond requires to investigate certain factors – factor conditions, context for firm strategy and rivalry, demand conditions and related and supporting industries. The factors represent sources of or hindrances to competitive advantages, as cluster theory claims that clustering results in increased regional competitiveness. Employing the diamond model can help to systemize basic cluster characteristics, aiding in answering sub-question two. The policy description above provided relevant information in parts, yet each factor will be considered respectively to set the stage and construct the model.

Factor Conditions

Factor conditions comprise tangible and intangible assets relevant for competition upon which all participants in a cluster can draw, including climate, location and natural resources (Porter, 2000, p. 19; Lau, 2009, p. 183; Viederyte & Didziokas, 2014, p. 167). Panama holds some unique assets, of which the most crucial are the country's excellent location and the recently expanded Panama Canal. Being situated amid the American continents, the country and its canal are a major passage for international trade. It connects the Atlantic and the Pacific Ocean, the markets of Asia with the emerging economies of Latin America, the Northern American coasts and Europe. An additional input factor connected to the country's location is the consolidating Tocumen International Airport with high connectivity to all the Americas (Kasarda, 2011). One must note that both, the ACP running and managing the Canal, as well as Tocumen International Airport are public yet independent enterprises. They are free of control from government and manage their affairs independently in a business style manner (Oppenheimer, 2009, p. 57).

Despite these positive sides, there are some circumstances limiting these factor conditions relating to human capital and education. Although the government provides public education and the country has some specialized education institutes such as the International Maritime University of Panama and the Georgia Tech institute, the informants criticized poorly developed skills. Moreover, vocational and technical training has long been neglected by the state. Lastly, road congestion remains a problem limiting the sectors performance.

Context for Firm Strategy and Rivalry

“The context for firm strategy and rivalry refers to the rules, incentives, and norms governing type and intensity of local rivalry” (Porter, 2000, p. 20). Low productive economies tend to employ low wages to ensure their competitiveness, and local rivalry emerges rather through imitation than innovation. However, transforming to an advanced economy requires to move towards higher efficiency, shifting from low wages to low total cost.

In this regard, the context for firm strategy is largely driven by the favourable business environment as shown by the Doing Business ranking, as well as the incentive structure for MNEs provided by Law 41 of 2007. The territorial tax regime, granting companies exemption from income tax on operations conducted outside Panama acts as a strong incentive to locate regional headquarters in Panama. Given this context, the existence of SEZs, Colon Free Trade Zone and Panama Pacifico, is another crucial factor for companies to settle in Panama. The special regimes in taxation, immigration and labour regulation, as well as simplified business establishment processes provide them with a competitive advantage over companies operating afar from the location.

Demand Conditions

Logistics is a truly global industry, crosscutting the boundaries of local and international. Therefore, demand conditions must be regarded in both dimensions. For small, open and trade dependent economies such a Panama, “strong influence may be exerted by demand conditions in another country” (Rugman & Verbeke, 1993, p. 285). The canal has traditionally been a bottleneck in international maritime transport and the 100-year old canal locks were not envisioned to process the current amounts of trade flowing through it. After completion of the expansion, the bottleneck and congestion have been eased and the canal is now increasingly able to satisfy the high demand for passages. In fact, capacity has doubled from about 50 passages to 100 passages daily. This greatly affects the demand for services on the cargo and ships conducting trans-shipments in the country’s ports.

Despite the significance of international demand for logistics services, Porter argues that “the presence or emergence of local sophisticated and demanding home customers presses firms to improve” (Porter, 2000, p. 21). Moreover, he stresses that the quality of demand matters more than its size with clusters of linked industries playing “a central role in

giving rise to demand-side advantages” (ibid.). Local demand has been highly influenced by the country’s economic boom and increased local purchasing power. This is particularly visible in the rise of demand for retail. Moreover, the presence and continuing arrival of MNEs under the Law 41 of 2007 framework and in the country’s numerous SEZs creates a local demand for high quality services. If MNEs continue to move their logistics and distribution departments to the country, considerable pressure will be experienced by local logistics providers to satisfy the demand to innovate and upgrade.

Related and Supporting Industries

The factor describes the presence of related and supporting industries, including both, the presence of capable suppliers and presence of competitive related industries. These are “industries which partly coordinate and share activities in the value-chain and the those which produce complementary products related to the core industry” (Viederyte & Didziokas, 2014, p. 169). Figure 10 shows a graphical illustration of the cluster surrounding the Panama Canal and the logistics sector, whereas the bubble size indicates the relative importance in 2013. Blue bubbles represent directly related industries, whereas orange bubbles represent supporting industries and actors. In this respect, logistics service suppliers are supported by service providers for commodity and ships, ranging from warehousing and storage, labelling and product finishing to container and ship repairs. As part of the country’s growth strategy, the development of SEZs in the Canal Zone and attraction of MNEs shall bring more related industries to the country. The focus herein lies in distribution centres and light manufacturing industries including reverse logistics and final assembly of i.e. high-tech products. Proximity to logistics providers and ports enables them to operate in likewise proximity to their markets around the region with low transportation costs for their products. Logistics activities must therefore be perceived as a catalyst for new industries to thrive, however six of eight informants complained about the slow progress in attracting and developing such value-added activities. They claim that despite the arrival of value-added activities, they are rather of a traditional sort, dealing with re-exportation, packaging etc. A lack of value-added activities has been uttered in high-technology and e-commerce activities. Although i.e. Hewlett Packard built a repair and refurbishment department, the cases are few and exceptional.



Figure 10 - Industries within the Panama Canal Cluster; blue – directly related industries; orange – supporting industries; (Baril et al., 2013, p. 28)

Other related industries which may capitalize on the proximity to logistics are financial services and tourism. The ports, canal and canal zone offer immense potential for touristic exploitation with the strategic plans indicating a focus on luxury tourism, attracting guests with high purchasing power. On the other hand, the financial service industry grew expertise out of Panama's status as a tax haven and predominantly operates in the areas of consumer and corporate banking, as well as insurances. In recent years, the initial strong banking secrecy laws have been eroded as the sector was under international suspicion of being involved in money laundry and tax evasion. The situation escalated until peaking with the revelation of the Panama Papers scandal. In consequence, the government sought to adapt and weaken banking secrecy laws to be unlisted from international grey and blacklists. Few informants could provide knowledge and opinion on the financial sector, however three concluded that the local financial sector is not strongly involved in logistics and related industries. They claim that the financial sector operates largely in international markets and the local real estate market, while lacking the knowledge and understanding of the local logistics and related sectors.

Government and Chance

Government and chance are additional variables influencing a cluster's environment. On the one hand, government has a variety of measures at hand to influence the cluster environment and actively does so. Among others, the canal expansion, FDI attraction through tax incentive and establishment SEZs are among the most potent measures to affect the cluster's competitiveness. However, during the Varela administration infrastructure investments have been reduced to maintain GDP growth at a sustainable level. To coordinate further action regarding the logistics cluster, the Martinelli administration created the Logistics Cabinet residing in the presidency. Members of the cabinet are important public entities such as the ACP and Tocumen Airport, as well as ministries. The cabinet's office is tasked to act as a forum for coordination among cluster members, private, public and educative institutions, facilitating the articulation of industry needs to the government. All informants were aware of the existence of the Logistics Cabinet, while some actively participate. Despite the informants' positive perception of the office as a step in the right direction, three informants claimed that it is not a cabinet that is needed but a properly staffed ministry to coordinate the sector. They criticized the multitude of ministries and voices involved in arriving at decisions, resulting in slow pace of government action. Moreover, informants criticized that only companies residing in the Panama Pacifico SEZ can rely on a one-stop shop for administrative issues and stipulate the creation of a one-stop accessible to all companies of the country and process optimization through digitalization of administrative processes.

Lastly, the chance factor concerns "factors that are largely outside the scope of control of individual actors in an industry" (Benito et al., 2003, p. 2012). These are economic factors such as "market cycles, exchange rates, and oil price levels to issues such as new technology that on the extreme can erode entire industries" (ibid.). Logistics are particularly prone to these factors as transportation always involve issues of fuel pricing. Moreover, possible competition may arise from other countries in the region attempting to build both, wet and dry canals (Dettoni, 2017; Telesur, 2016). Nonetheless, the attempts did still not pass the project stage and observers doubt their actual execution. Hereafter, chance factors will not find further attention due to the complexity of the issue and space restrictions.

Constructing the Diamond

Based on the elaboration on the factors relevant for competitiveness in the previous section, a Porter's Diamond model for the Panamanian logistics sector was created. Figure 11 illustrates the factors and the dynamics among them. Demand conditions and the context for strategy and rivalry appear favourable for the cluster as Law 41 of 2007 and the many SEZs exempt companies from tax in income earned abroad. This allows for the setting up of regional headquarters, serving international demand and the region of Latin America with a low tax burden, resulting in a competitive advantage to the cluster. Likewise, the central location of the country presents an excellent circumstance for logistics activities, including supply-chain management. The central location in-between the American continents, high connectivity to markets and position on the juncture of a major global trade route enables businesses to conduct centralized warehousing activities and reverse logistics. Furthermore, the forces of globalization and local market growth make it likely that such operations can be centralized in Panama as hub serving local, regional and global functions. The large presence and further arrival of MNEs make it likely that such operations will be increasingly moved and located in

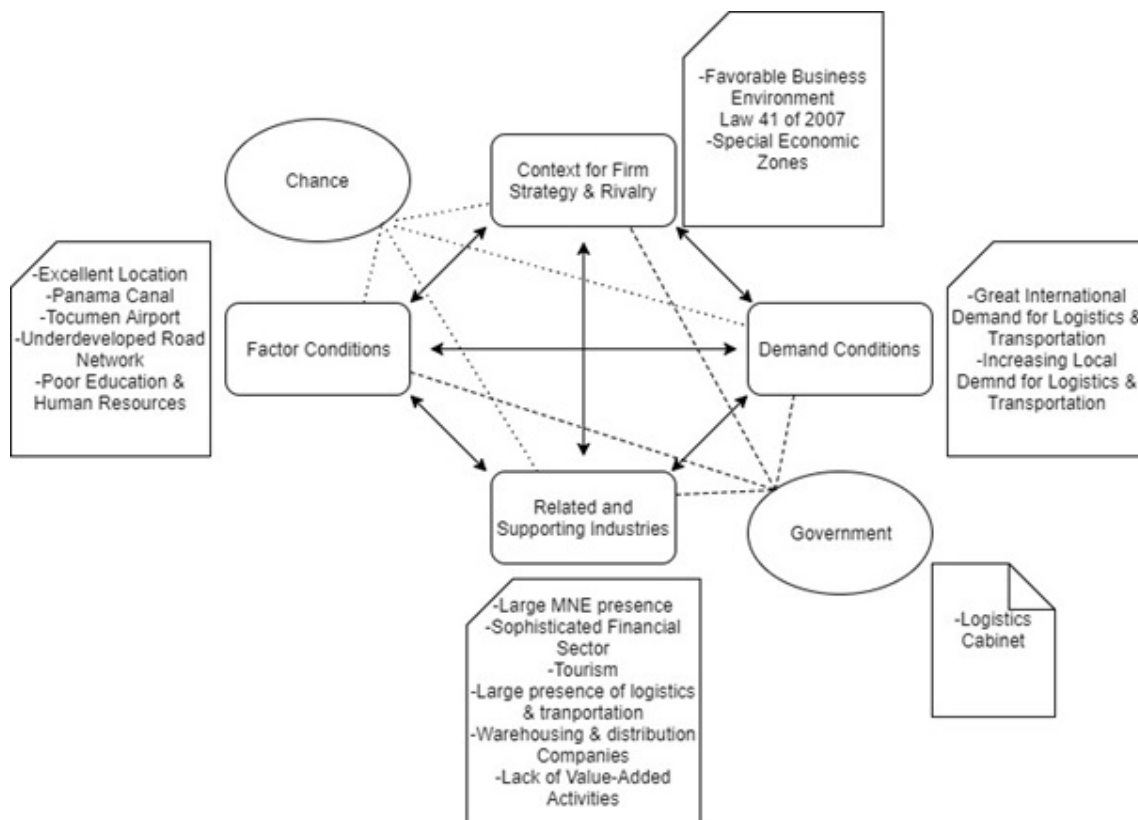


Figure 11 - Application of Porter's Diamond Framework on the Panamanian Logistics Cluster

Panama. Nonetheless, the sole presence of MNEs has not yet resulted in the arrival of the sought for value-adding activities.

This could stem from the greatest weakness of the cluster found in the factor conditions, the poor education and human resources, as well as road connectivity issues. It appears that the relevant policy areas and individual projects have not been subject to comprehensive planning but are regarded in isolation from each other, not involving the relevant stakeholders in the process. Despite the formation of the Logistics Cabinet in 2012, informants pointed out that communication with the government remained poor until the presidency of current president Varela. During his presidency, businesses found that they were increasingly included in consultations, among others resulting in the construction of the ITSE. The cabinet and its office moreover concluded a roadmap to improve administrative processes, facilitate customs in the short term and pave the way to become a logistics hub. For the long-term, a logistics master plan is being created currently. However, some informants uttered dissatisfaction with the pace of government, creating yet another plan instead of acting.

Panama – How to become a Singapore of Latin America?

The previous section has shed light on policy outputs and their relation to growth as the eventual policy outcome. Subsequently, the attempt is to close the arch and focus on sub-question three – *What does it take to become a ‘Singapore of the Americas’?* The purpose of this section is to give policy recommendations on future interventions and actions by the national government to optimize policy activities and achieve better results in output and outcomes. Chapter two has pointed to the factors of success of Singapore’s policies, consequently these will serve as reference points.

Indeed, Panama achieved success in some of Sheffi’s policy theory components. Considerable investments have been dedicated to the expansion of critical infrastructure, namely the Canal and the ongoing expansion of Tocumen Airport deemed successful by informants. Equally, Panama has been successful in providing incentives to encourage asset development and private investment through encouraging gross capital formation and the

attraction of FDI and manifold MNEs while the performance of regulations affecting the business environment proved positive with room for improvement by further digitalization.

Despite these impressions, major challenges lie ahead for the Central American nation if it truly seeks to dedicate itself to become the hub of the Americas – A Latin American Singapore. The biggest challenge will be to maintain the presence of MNEs, complicated by the lack of skilled labour. Although the wide population has access to education, it remains of mediocre quality requiring employers to engage in additional internal training. The government should design programs in close cooperation with the relevant stakeholders from the business community, identifying actual requirements of companies towards the workforce. Education policy proved to be volatile in Panama as each new incoming administration seeks to introduce changes. However, education policy results require time to materialize and should outlive more than only one administration by far.

Another issue with ample space for improvement concerns the land provision and zoning for the creation of logistic assets. The major SEZ Panama Pacifico in line with the manifold smaller SEZs under Law 32 of 2011 suffer from poor connectivity. It is urgent to fix this problem to enjoy the zones' full potentials while possibly reducing the amount of smaller SEZs. They are simply too manifold and miss deliberate purposes and planning. Reducing their number would substantially reduce the cost of fixing connectivity issues, meanwhile eliminating arbitrarily established ventures. Latin America's largest free trade zone in Colon needs to overthink its business model and modernize as the facility still functions as a traditional free zone focusing on re-exportation, an outdated conception of what once was the largest free zone in the world.

Concludingly, it has become apparent that deliberate and thoughtful planning is complicated by the involvement of many public stakeholders in the Logistics Cabinet. While it is supposed to function as a coordinating body, its role should be reconsidered. To effectively produce policies, the understaffed office should be elevated to a potent agency or ministry. The sheer size of the logistics and transportation sector would legitimize the step, while informants stressed the urgent need to have a more capable and potent actor in the sector.

VI. Conclusion

This work sought to answer how Panama's policy aimed at fostering its logistics-intensive cluster promotes the country's economic growth. Doing so, the reader has been introduced to the conception and theory of clusters to show how location and regions play an increasingly vital role in public policy. It has been shown that clusters, indeed, do benefit growth through the effects of agglomeration economies and increased innovative capacities fostered by knowledge spillovers or MAR-externalities. Within an ideal cluster, companies engage in cooperation with competition, enhancing local as well as global competitiveness of the region or locality.

The newly emerging study of logistics intensive clusters revealed that these types of clusters provide some distinct benefits to local economies as they are prone to attract other industries highly dependent on logistics service provision. The academic consensus so far has been that cluster policy should be neutral towards industries, focus on the provision and enhancement of external economies and should not seek to create clusters from scratch. In contrast, logistics clusters require guided and deliberate government intervention and investment. Logistics and transport infrastructure is costly, yet a precondition for the initial establishment of logistics industries. Thus, logistics clusters may indeed be created from scratch depending on the circumstances of the locality.

Subsequently, the author has discussed Panama's current policies of relevance for logistic cluster facilitation, based on Sheffi's policy theory. The government devoted substantial financial resources to the expansion of transportation and logistics infrastructure, proving successful in encouraging private investments by the attraction of MNEs and FDI. The latter proved to be substantial driver of growth for the Panamanian economy. Land provision and zoning through the establishment of SEZs used to be a factor of success in the past, demonstrated by the Colon Free Trade Zone. However, since the new millennium their performance has been curbed by a lack of coordination and poor connectivity. Despite current connectivity issues Panama Pacifico is a model for the future, whereas Colon Free Trade Zone needs to innovate and update its business model. While the performance of Panama's current business regulatory framework appears exemplary for the region, the country's poor state of development of its human capital remains a complicating issue and may put at risk the advances and success on other areas. It can be concluded that the country's impressive

economic growth of the last two decades largely results from Panama's ability to capitalize on its locality in combination with the unique facility of the Panama Canal, as well as the capacity to encourage gross capital formation, as well as attract and absorb vast amounts of FDI and MNEs.

Having assessed Panama's policies aimed at fostering the country's logistics intensive cluster, the greatest achievements were the expansion of infrastructure, encouragement of private investment and asset development, and the favourable business environment. Although there is space for improvement in these areas, the performance is widely positive. On the other hand, to become a Singapore of Latin America, Panama needs to face some major challenges. The biggest challenge ahead is doubtlessly the urgent need to develop the country's human capital. While the economic performance is exceptional in regional comparison, poor public primary and secondary education, as well as inappropriate and outdated tertiary programs endanger the sustainability of the growth seen in the last two decades. Moreover, the SEZ regimes should be reassessed to give distinct purposes to individual zones, therewith combating earlier arbitrarily implemented projects. The Logistics Cabinet is a well-intentioned attempt but deserves more competences and authority. Considering the sheer size of Panama's logistics sector and the importance thereof for the national economy, the elevation of the cabinet to a ministry can be easily justified.

This work relevance arises from the fact that the evaluation of policy theory for logistics clusters has been vastly side-lined so far. As Panama's logistics cluster as well as logistics clusters as such remain understudied, the author contributes to resolving the matter. Thus, the great strength of this study lies in applying the modern cluster conception paired with theory-based evaluation approaches to contribute to contemporary research. Nonetheless, generalizability of this work is limited, due to the highly individual nature of clusters and employment of an in-depth single-case study approach. Moreover, a weakness must be localised in the assessment of the business regulatory framework and education policy. Each area is so vast that comprehensive assessments require a study of their own and simply would have burst the scope of this paper.

Concludingly, further efforts should be dedicated to theory-based evaluation of Sheffi's policy theory for logistics cluster facilitation in other cases and locations to confirm its relevance. Continuous evaluation of Panama's logistics cluster should be performed to assist

local policymakers in future policy decisions and adjustments. Lastly, the academic consensus that cluster policy should not pick winners needs to be re-examined. The example of Panama's logistics cluster and indications from other cases looked upon by Sheffi has shown that policymakers, indeed, may pick winners. This appears most relevant for small economies with high dependence on certain industrial sectors.

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VIII. Appendices

Appendix 1 – The Panamanian Logistic Cluster: Semi-Structured Interview Framework

I. Introduction of key-informant and organization of concern

Who are you and what is your role within the organization?

II. Government Policies

1. Seaports, the Panama Canal and Tocumen Airport are the most critical physical assets to the logistic sector. ***Do you think the investments dedicated to their expansion have been and will be sufficient to maintain and strengthen Panama's competitiveness?***
 - Follow up: Road traffic has been an ongoing problem in the metropolitan area and beyond. *To what extent does this problem curb the performance of the logistic sector?*
2. Logistics and related operations require vast space. The return of the Canal Zone provided the government with land to develop ports, terminals and Special Economic Zones (SEZs). ***Do you think the government develops the terrains wisely?***
 - Follow up: *Will there be enough terrain available for the future development of logistic and related activities as the canal amplification is anticipated to increase cargo traffic drastically?*
3. The national government gives incentives to foreign companies, multinationals and organizations to invest and operate in Panama [Ley 41 (2007)]. ***Do you think the laws have been effective in attracting firms and bringing employment?***
 - Follow up: *How has the presence of multinationals benefited the logistic sector?*
4. The performance and results of Panamanian educative institutions have been subject to harsh criticism (Pisa). ***Do the logistic and related sectors encounter a sufficient pool of skilled labour on the Panamanian labour market?***
 - Follow up: *Do you think the establishment of the Instituto Técnico Superior del Este will ease skilled labour shortages?*
5. ***Do you think the national governments regulations (trade, taxation, immigration, environmental etc.) offer a generally favourable environment for logistics and related operations?***
6. ***Where do you see a need for more efforts by the national government to support the logistic sector?***

III. Cluster Environment

- 1. How does your organization cooperate with local businesses and organizations through the Logistics Cabinet?**
 - Follow up: *Are you satisfied with the degree and quality of cooperation in the logistics cabinet?*

- 2. Do you see an emergence of value-added activities around the canal, ports and logistics facilities?**

- 3. Individual and open and ad-hoc questions by the interviewer.**

Appendix 2 - List of informants & Interview Consent Forms

Dr. Ricardo Ungo

Manager, Business Development Section; Executive Vice Presidency for Planning and Business Development at the Panama Canal Authority (ACP)

Rodolfo Sabonge

Deputy Director of the Institute of Canal Studies at the International Maritime University of Panama; Former Executive Vice Presidency for Planning and Business Development at the Panama Canal Authority (ACP)

Carolina Herrera

Executive Director of the Logistics Business Council

Luciano Fernandes

Executive Director of the Panama Maritime Chamber

Ilyam Vezhmyra Chang Rechy

Operation Analyst at Manzanillo International Terminal, Colón

Harry Gonzales Lozano

Logistics Specialist at the Logistics Cabinet, Secretary of Competitiveness and Logistics

Dr. Maximiliano Jiménez

Director General at the Georgia Tech Panama Logistics Innovation and Research Centre

Jean-Bernard Digeon

Project manager at Panama Trade and Investment Agency (PROINVEX), Panamanian Ministry of Commerce and Industry

Interview Consent Form

Research project title: *The Panamanian Logistic Cluster – A Trajectory for Sustained Growth?*

Research investigator: *Daniel Geilenberg*

The interview will take approximately 45 to 60 minutes. It is not anticipated that there are any risks associated with your participation, but you have the right to stop the interview or withdraw from the research at any time.

1. I agree to be interviewed for the purposes of the student project named above.
2. The purpose and nature of the interview has been explained to me, and I have received the master thesis proposal by the student.
3. I agree that the interview may be electronically recorded.
4. Any questions that I asked about the purpose and nature of the interview and assignment have been answered to my satisfaction.
5. Choose a), b) or c):
 - a) I agree that my name may be used for the purposes of the project only and not for publication.
 - b) I understand that the student may wish to pursue publication at a later date and my name may be used.
 - c) I do not wish my name to be used or cited, or my identity otherwise disclosed, in the project.

Name of interviewee *Ricardo Viny*

Signature of interviewee *Ricardo Viny*

Date *May 2nd, 2017*

I have explained the project and the implications of being interviewed to the interviewee and I believe that the consent is informed and that he/she understands the implications of participation.

Name of interviewer *Daniel Geilenberg*

Signature of interviewer *D. Geilenberg*

Date *02.06.17*

Interview Consent Form


Research project title: *The Panamanian Logistic Cluster – A Trajectory for Sustained Growth?*

Research investigator: *Daniel Geilenberg*

The Interview will take approximately 45 to 50 minutes. It is not anticipated that there are any risks associated with your participation, but you have the right to stop the interview or withdraw from the research at any time.

1. I agree to be interviewed for the purposes of the student project named above.
2. The purpose and nature of the interview has been explained to me, and I have received the master thesis proposal by the student.
3. I agree that the interview may be electronically recorded.
4. Any questions that I asked about the purpose and nature of the interview and assignment have been answered to my satisfaction.
5. Choose a), b) or c):
 - a) I agree that my name may be used for the purposes of the project only and not for publication.
 - b) I understand that the student may wish to pursue publication at a later date and my name may be used.
 - c) I do not wish my name to be used or cited, or my identity otherwise disclosed, in the project.

Name of interviewee *Rudolfo Sabariego*

Signature of interviewee 

Date *23 May 2017*

I have explained the project and the implications of being interviewed to the interviewee and I believe that the consent is informed and that he/she understands the implications of participation.

Name of interviewer Daniel Geilenberg

Signature of interviewer 

Date *23 May 2017*

Interview Consent Form

Research project title: *The Panamanian Logistic Cluster – A Trajectory for Sustained Growth?*

Research investigator: *Daniel Geilenberg*

The interview will take approximately 45 to 60 minutes. It is not anticipated that there are any risks associated with your participation, but you have the right to stop the interview or withdraw from the research at any time.

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2. The purpose and nature of the interview has been explained to me, and I have received the master thesis proposal by the student.
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4. Any questions that I asked about the purpose and nature of the interview and assignment have been answered to my satisfaction.
5. Choose a), b) or c):
 - a) I agree that my name may be used for the purposes of the project only and not for publication.
 - b) I understand that the student may wish to pursue publication at a later date and my name may be used.
 - c) I do not wish my name to be used or cited, or my identity otherwise disclosed, in the project.

Name of interviewee

Carolina A. Herrera

Signature of interviewee

Carolina A. Herrera

Date

05/09/17

I have explained the project and the implications of being interviewed to the interviewee and I believe that the consent is informed and that he/she understands the implications of participation.

Name of interviewer

Daniel Geilenberg

Signature of interviewer

D. Geilenberg

Date

05 May 2017

Interview Consent Form


Research project title: *The Panamanian Logistic Cluster – A Trajectory for Sustained Growth?*

Research investigator: *Daniel Geilenberg*

The interview will take approximately 45 to 60 minutes. It is not anticipated that there are any risks associated with your participation, but you have the right to stop the interview or withdraw from the research at any time.

1. I agree to be interviewed for the purposes of the student project named above.
2. The purpose and nature of the interview has been explained to me, and I have received the master thesis proposal by the student.
3. I agree that the interview may be electronically recorded.
4. Any questions that I asked about the purpose and nature of the interview and assignment have been answered to my satisfaction.
5. Choose a), b) or c):
 - a) I agree that my name may be used for the purposes of the project only and not for publication.
 - b) I understand that the student may wish to pursue publication at a later date and my name may be used.
 - c) I do not wish my name to be used or cited, or my identity otherwise disclosed, in the project.

Name of interviewee LUCIANO FERNANDES

Signature of interviewee 

Date 5 MAY 2017

I have explained the project and the implications of being interviewed to the interviewee and I believe that the consent is informed and that he/she understands the implications of participation.

Name of interviewer Daniel Geilenberg

Signature of interviewer 

Date 05.05.17

Interview Consent Form

Research project title: *The Panamanian Logistic Cluster – A Trajectory for Sustained Growth?*

Research Investigator: *Daniel Gellenberg*

The interview will take approximately 45 to 60 minutes. It is not anticipated that there are any risks associated with your participation, but you have the right to stop the interview or withdraw from the research at any time.

1. I agree to be interviewed for the purposes of the student project named above.
2. The purpose and nature of the interview has been explained to me, and I have received the master thesis proposal by the student.
3. I agree that the interview may be electronically recorded.
4. Any questions that I asked about the purpose and nature of the interview and assignment have been answered to my satisfaction.
5. Choose a), b) or c):
 - a) I agree that my name may be used for the purposes of the project only and not for publication.
 - b) I understand that the student may wish to pursue publication at a later date and my name may be used.
 - c) I do not wish my name to be used or cited, or my identity otherwise disclosed, in the project.

Name of interviewee

Nyam Chang

Signature of interviewee

Nyam Chang R.

Date

26.05.17

I have explained the project and the implications of being interviewed to the interviewee and I believe that the consent is informed and that he/she understands the implications of participation.

Name of interviewer

Daniel Gellenberg

Signature of interviewer

D. Gellenberg

Date

26 May 2017

Interview Consent Form

Research project title: *The Panamanian Logistic Cluster – A Trajectory for Sustained Growth?*

Research investigator: *Daniel Geilenberg*

The interview will take approximately 45 to 60 minutes. It is not anticipated that there are any risks associated with your participation, but you have the right to stop the interview or withdraw from the research at any time.

1. I agree to be interviewed for the purposes of the student project named above.
2. The purpose and nature of the interview has been explained to me, and I have received the master thesis proposal by the student.
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5. Choose a), b) or c):

a) I agree that my name may be used for the purposes of the project only and not for publication.

b) I understand that the student may wish to pursue publication at a later date and my name may be used.

c) I do not wish my name to be used or cited, or my identity otherwise disclosed, in the project.

Name of interviewee

Harold Gonzalez Lozano

Signature of interviewee



Date

5/5/2017

I have explained the project and the implications of being interviewed to the interviewee and I believe that the consent is informed and that he/she understands the implications of participation.

Name of interviewer

Daniel Geilenberg

Signature of interviewer



Date

05 May 2017

Interview Consent Form

Research project title: *The Panamanian Logistic Cluster – A Trajectory for Sustained Growth?*

Research Investigator: *Daniel Geilenberg*

The interview will take approximately 45 to 60 minutes. It is not anticipated that there are any risks associated with your participation, but you have the right to stop the interview or withdraw from the research at any time.

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- b) I understand that the student may wish to pursue publication at a later date and my name may be used.
- c) I do not wish my name to be used or cited, or my identity otherwise disclosed, in the project.

Name of interviewee

Abraham Jimenez Arceles

Signature of interviewee

[Handwritten Signature]

Date

10.05.17

I have explained the project and the implications of being interviewed to the interviewee and I believe that the consent is informed and that he/she understands the implications of participation.

Name of interviewer

Daniel Geilenberg

Signature of interviewer

[Handwritten Signature]

Date

10.05.17

Interview Consent Form


Research project title: *The Panamanian Logistic Cluster – A Trajectory for Sustained Growth?*

Research investigator: *Daniel Geilenberg*

The interview will take approximately 45 to 60 minutes. It is not anticipated that there are any risks associated with your participation, but you have the right to stop the interview or withdraw from the research at any time.

1. I agree to be interviewed for the purposes of the student project named above.
2. The purpose and nature of the interview has been explained to me, and I have received the master thesis proposal by the student.
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5. Choose a), b) or c):
 - a) I agree that my name may be used for the purposes of the project only and not for publication.
 - b) I understand that the student may wish to pursue publication at a later date and my name may be used.
 - c) I do not wish my name to be used or cited, or my identity otherwise disclosed, in the project.

Name of interviewee JEAN-BERNARD DIESEN

Signature of interviewee 

Date 11/05/2017

I have explained the project and the implications of being interviewed to the interviewee and I believe that the consent is informed and that he/she understands the implications of participation.

Name of interviewer Daniel Geilenberg

Signature of interviewer 

Date 11/05/17

Appendix 3 – Policy Timeline

