In Search of Symbioses:
An Assessment of the Relationships between Two Industrial Estates and Their Adjacent Communities in Trinidad, West Indies

By

Kristal M. Peters
Bachelor of Architecture
Howard University, 2007

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Author

Department of Urban Studies and Planning
May 20, 2010

Certified by

Professor Judith Tendler
Department of Urban Studies and Planning
Thesis Supervisor

Accepted by

Professor Joe Ferreira
Chair, MCP Committee
Department of Urban Studies and Planning

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Abstract

After gaining independence in 1962, the government of Trinidad and Tobago chose to pursue economic development via industrialization, and specific to its case, through resource-based industrialization (RBI), that is, the development of heavy industries related to oil and gas resources. Over the past five decades, the twin-island Republic of Trinidad and Tobago has significantly developed its energy sector, and has emerged as a prominent actor in the global oil and gas market. Petroleum operations have been in existence in the country for more than a century; since the 1970s, with the appearance of gas-based industries, these industries have flourished and expanded, with many being accommodated within one of several industrial estates located on the Trinidad mainland. These estates were created to provide the basic amenities, facilities and services necessary for industrialists to establish their plants. The national economy on a whole has benefitted from the establishment of these industries through revenues generated by the export of their products, but have these benefits trickled down to the local economy – to those who reside within the host communities of these industrial estates? What sort of relationship exists between industrial estates and their host communities? This research looks at two industrial estates and their respective host communities in Trinidad to determine wherein lie the symbioses between industry and community in each case; under what conditions are these links created; and finally, what conditions can lead to their propagation of these established connections.

Acknowledgements

It is a daunting task to even think about the list of persons I need to thank for helping me to reach this stage in my life. It has been a long and arduous, exciting and surprising journey with many blind corners; only a few years ago I would have never imagined being where I am today.

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Thank you to the Corporate Scholarship Award Committee of Petrotrin, which has supported me throughout the pursuit of this degree. Thank you going beyond your call of duty and investing in the future of Trinidad.

Thank you to all persons who participated in this research project; to all those who helped shape my ideas; to all those who assisted me in acquiring data; to my father and Steffan for accompanying me on my photo-excursions; and to all those who agreed to be interviewed or who provided me with information relevant to this research.

Finally, thank you to my dear friend Dr. Andre Marlon Collins. You are my inspiration. Rest in peace.

Table of Contents

List of Acronyms

ALNG – Atlantic Liquefied Natural Gas Company of Trinidad and Tobago
CAER – Community Awareness and Emergency Response
CENTRIN – Central Trinidad Steel Limited
COSTAATT – College of Science, Technology, and Applied Arts of Trinidad and Tobago
CSR – Corporate Social Responsibility
CTTRC – Couva/Tabaquite/Talparo Regional Corporation
DESALCOTT – Desalination Company of Trinidad and Tobago
EMA – Environmental Management Authority
eTeck – Evolving Tecknologies and Enterprise Development Company Limited
FDI – Foreign Direct Investment
IDC – Industrial Development Company
IEMP – Integrated Emergency Management Plant
IGL – Industrial Gases Limited
ILO – International Labor Organization
ISCOTT – Iron and Steel Company of Trinidad and Tobago
ISI – Import Substitution Industrialization
KTO – Kern Trinidad Oilfields Limited
MEEI – Ministry of Energy and Energy Industries
MNC – Multinational Corporation
MSTTE – Ministry of Science, Technology and Tertiary Education
NEC – National Energy Corporation of Trinidad and Tobago Limited
NESC – National Energy Skills Center
NGC – National Gas Company
OWTU – Oilfield Workers Trade Union
PFBC – Point Fortin Borough Corporation
PLIE – Point Lisas Industrial Estate
PLIPDECO – Point Lisas Industrial Port and Development Company
PLPN – Point Lisas Nitrogen Limited
POWERGEN – Power Generation Company of Trinidad and Tobago
PPGPL – Phoenix Park Gas Processors Limited
PRIDCO – Puerto Rico Industrial Development Company
RBI – Resource-based Industrialization
STCIC – South Trinidad Chamber of Industry and Commerce
T&T – Trinidad and Tobago
TBTL – Trinidad Bulk Traders Limited
TLL – Trinidad Leaseholds Limited
TNA – Trinidad Northern Areas
TNC – Transnational Corporation
TPD – Trinidad Petroleum Development Company
TTEMAS – Trinidad and Tobago Emergency Mutual Aid Scheme
TTMA – Trinidad and Tobago Manufacturer's Association
UAN – Urea and ammonium nitrate
UBOT – United British Oil Traders

UNCTAD – United Nations Conference on Trade and Development
UNIDO – United Nations Industrial Development Organization
UTT – University of Trinidad and Tobago
UWI – University of the West Indies
WIPC – West Indies Petroleum Company

Introduction

The small twin-island Republic of Trinidad and Tobago, the southern-most country in the Caribbean archipelago is atypical compared to the other Caribbean islands. Tourism is not the main sector, nor is there a strong agricultural monoculture. Interestingly, most of the country's revenue is acquired via the oil and gas sectors. The country is naturally endowed with an abundance of oil and gas reserves[1], and even though its reserves are not as significant as those found in other countries, its geographic location, its political stability, timely and strategic economic planning, and sound financial investments in national development projects has allowed it to become one of the key players in the global petrochemical sector.

Trinidad and Tobago is located just east of the northeastern region of Venezuela; at the closest point the two countries are merely 7miles (11.25 km) apart. This position puts it just beneath the hurricane belt and has also spared it from earthquake activity. The country seems to be generally immune to natural disasters, and has been fortunately spared the setbacks that these disasters can cause. The national economy has been saved from the burden of post-disaster reconstruction with the path towards development being relatively unencumbered (in comparison to other neighboring Caribbean states which are frequently hit by hurricanes and other natural disasters) by physical catastrophes.

This geographic position also puts Trinidad and Tobago at the gateway between the South American region to the south, and the Caribbean and North America to the north. The country lies along one of the great circle transshipment routes that also passes through the Panama Canal. Coupled with the country being a source for reliable and affordable fuel, this location makes it a preferred transshipment hub for many shipping companies[2]. Additionally, due to the political stability[3], as well as the stability in the foreign exchange rate[4] in Trinidad and

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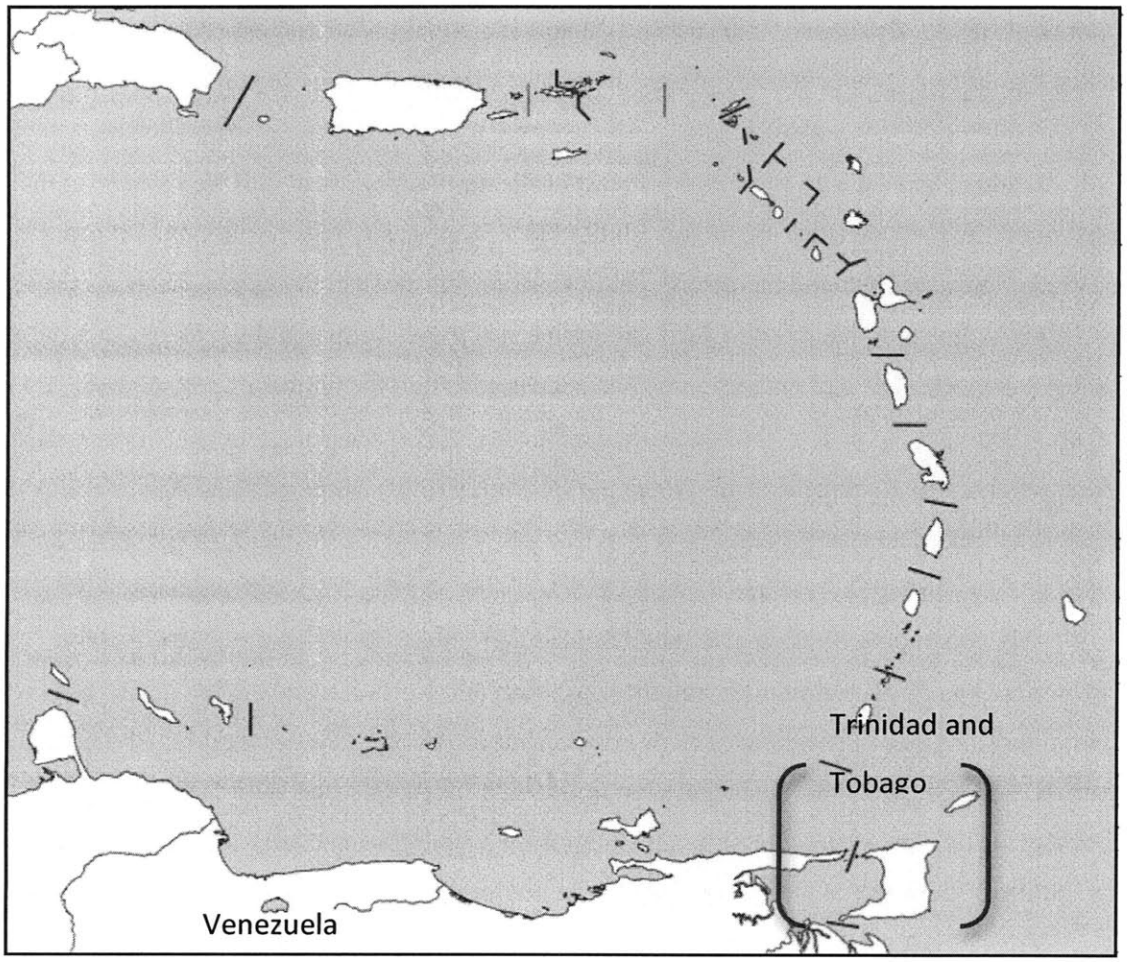
[1] Oil reserves estimated at 728.3 million bbl, ranking 42nd highest in the world; Natural gas reserves estimated at 531.5 billion cubic meters, ranking 32nd highest in the world. CIA, The World Factbook -- Trinidad and Tobago, 01 04 2010, <https://www.cia.gov/library/publications/the-world-factbook/geos/td.html>.

[2] Other competing transshipment ports are located in Columbia and the Dominican Republic.

[3] In roughly the past 20 years, politics have been dominated by only two political parties. Fortunately, even when there is a change in majority leadership, the subsequent government has maintained the commitments

Tobago compared to that of many neighboring Latin American states, and accompanied by its secure financial services sector, many firms prefer to locate their main offices in the island republic while they conduct business in the region. Furthermore, the recent introduction of Spanish as the first foreign language of Trinidad and Tobago in 2004, positions the country to become better trade partners through better communication with their Spanish-speaking neighbors. In 2004 alone, more than TT$1.3billion out of a total of over TT$41billion worth of goods were exported to Spanish speaking countries (Ministry of Trade and Industry 2007). In its *Investment Policy 2007-2012* green paper, the Ministry of Trade and Industry highlights 11 key factors which make Trinidad and Tobago a desirable location for foreign investors (see Figure 1).



Map 1: Lesser Antilles (Wikipedia 2009)

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to investors established by the former government.

[4] Over the past 15 years, the TT dollar has consistently maintained an exchange rate to the US Dollar of $US 1 to $TT 6.30 +/- .03 cents. Ministry of Trade and Industry, Trade and Investment Policy 2007-2012, Green Paper (Government of Trinidad and Tobago, 2007).

A snapshot of the country's current economy provides an optimistic outlook. According to the 2009 World Economic Outlook Database published by the International Monetary Fund (IMF), Trinidad and Tobago has the second highest GDP per capita in the Latin American and Caribbean region at US$17,585.81 in 2009[5]. Between 2000 and 2007 the average economic growth rate was 8% per annum far surpassing the regional average of 3.7% for the same period (CIA 2010).

Country	2003	2004	2005	2006	2007	2008	2009
Bahamas, The	19,559.52	19,301.54	20,916.88	22,094.43	22,448.70	22,359.28	21,727.86
Trinidad and Tobago	8,815.54	10,289.65	12,341.61	14,176.87	16,133.10	19,869.59	17,585.81
Antigua and Barbuda	9,475.71	10,165.66	10,729.33	12,227.30	13,878.80	14,555.98	13,871.97
Barbados	9,922.24	10,367.11	10,999.27	11,645.99	12,404.39	13,314.16	13,003.06
Venezuela	3,285.13	4,353.53	5,453.19	6,834.24	8,281.91	11,388.33	12,354.30
St. Kitts and Nevis	7,546.27	8,158.41	8,791.58	9,596.26	9,853.58	10,309.55	10,121.26
Uruguay	3,652.74	4,161.47	5,287.34	6,041.12	7,296.78	9,653.91	9,448.97
Chile	4,698.20	5,981.58	7,287.82	8,941.84	9,881.43	10,116.97	8,852.96
Mexico	6,807.90	7,290.86	8,167.97	9,082.26	9,692.94	10,199.62	8,040.24
Brazil	3,085.39	3,654.20	4,787.34	5,870.21	7,106.64	8,295.00	7,737.32
Argentina	3,370.59	3,975.25	4,704.30	5,458.22	6,616.53	8,171.13	7,508.05
Panama	4,150.21	4,469.64	4,790.52	5,217.42	5,828.59	6,784.08	7,144.94
Grenada	4,708.09	4,601.27	5,377.29	5,479.98	5,925.55	6,587.29	6,629.78
Costa Rica	4,284.16	4,450.63	4,680.21	5,174.20	5,912.20	6,543.69	6,361.30
St. Vincent and the Grenadines	3,590.41	3,885.49	4,172.31	4,662.87	5,111.73	5,615.21	5,837.07
Suriname	2,619.75	2,937.98	3,499.13	4,127.70	4,617.93	5,503.91	5,818.95
St. Lucia	4,656.24	4,922.34	5,335.90	5,593.89	5,700.41	5,806.02	5,777.24
Dominica	3,665.74	3,977.89	4,173.67	4,424.14	4,756.44	5,081.87	5,238.91
Dominican Republic	2,014.84	3,507.28	3,425.72	4,070.31	4,534.75	4,991.82	4,951.60
Colombia	2,058.11	2,510.29	3,139.48	3,474.21	4,377.18	4,988.87	4,661.55
Jamaica	3,565.99	3,827.30	4,192.05	4,478.77	4,836.46	5,198.73	4,397.48
Peru	2,323.97	2,600.45	2,917.38	3,339.59	3,802.84	4,447.81	4,376.71
Belize	3,610.52	3,859.34	3,820.60	4,028.39	4,108.29	4,240.53	4,258.73
Ecuador	2,229.76	2,505.76	2,813.98	3,057.74	3,335.09	3,928.08	3,939.50
El Salvador	2,692.62	2,807.76	3,013.01	3,269.90	3,546.74	3,823.64	3,806.18
Guatemala	1,814.34	1,933.74	2,145.03	2,322.11	2,549.99	2,850.09	2,601.87
Paraguay	988.683	1,215.93	1,292.38	1,568.20	2,025.97	2,601.09	2,168.57
Honduras	1,180.96	1,244.58	1,342.42	1,474.07	1,647.76	1,826.14	1,862.60
Bolivia	896.638	954.726	1,015.58	1,197.24	1,352.48	1,655.59	1,715.93
Guyana	991.995	1,041.05	1,089.41	1,200.76	1,404.57	1,509.13	1,558.23
Nicaragua	726.689	793.517	843.464	890.363	940.192	1,027.84	995.109
Haiti	368.606	432.517	517.625	570.435	711.127	790.247	772.381

Table 1: GDP per Capita for Latin American and Caribbean Countries (IMF 2009)

[5] Bahamas has the highest GDP per capita in the region at US$22,359.28. See appendix for full listing.

Undoubtedly, industrialization in Trinidad and Tobago has contributed significantly to the country's overall economic development. This mineral economy[6] as a whole has benefitted from the successful growth of the energy sector – today petrochemicals account for roughly 40% of export revenues, is valued at US$13,590,573 (International Trade Center 2008), and accounts for 46% of the country's GDP (US Department of State 2009).

Oil and gas industries have been so well developed that Trinidad and Tobago is currently the fifth largest world exporter of LNG, largest supplier of LNG to the US, and the world's top exporter of methanol and ammonia. The government of Trinidad and Tobago continues to forge ahead with further development and expansion of the energy sector, and is currently undertaking plans to create two new industrial estates, which will host more gas-based heavy industries including an aluminum smelter.

[6] Mineral economies are those which earn more than 40% of their foreign exchange from mineral exports, and which also generate at least 10% of their GPD from mining activities. (Auty and Warhurst 1993)

Geographic location
•7 miles from Venezuela •Close to South America, Central America and Caribbean •Lies along the great circle transshipment route that passes through the Panama Canal
Educated workforce
•Free tertiary education to nationals and numerous institutions from which to choose •New academic and training programs created to meet demands of industry
Affordable energy
•Commercial rate as low as US$0.03/kwh •Industrial rate as low as US$0.01/khw
Low corporate tax
•Currently at 25% •Petrochemical companies taxed at 35% •Energy companies taxed at 55%
Market accessibility
•Markets in Latin America, Caribbean and North America.
Solid local manufacturing sector
•Both in energy and non-energy indsutries •Potential for establishment of numerous joint-ventures to extend backward and forward linkages
Stable and reliable macroeconomic structure
•Second highest GDP per capita in the Latin American and Caribbean region at US$17,585.81 in 2009 •Average annual economic growth rate between 2002 and 2007 at 8%
Sound infrastructure
•2 international airports •Extensive road network •19 industrial estates focused on manufacturing and light industries, and information technologies •1 main industrial estate for gas-based industries, with 2 more currently under construction
Language
•English is the national language. •Spanish is the official second language.
Investment protection
•Through several bilateral trade agreements
Intellectual Property Rights protection
Foreign Exchange stability
•Consistent foreign exchange rate of US$1 to TT$ 6.30 +/- $0.03

Figure 1: Summary of characteristics that make Trinidad and Tobago desirable to foreign investors (Ministry of Trade and Industry 2007)

Sector	% Of GDP	Value (Billions USD)
Petroleum	46	9.61
Financial Services	11	2.3
Distribution, including restaurants	11	2.3
Manufacturing (food, beverages, assembly, chemical, printing)(excludes oil refining and petrochemical industries)	5	1.05
Construction and quarrying	9	1.88
Transport / Storage / Communication	5	1.05
Government Services	6	1.25
Education, Cultural Community Services	2.2	0.46
Electricity and water	0.9	0.19
Agriculture (sugar, poultry, other meat, vegetables, citrus)	0.3	0.06
Hotels and Guesthouses	0.4	0.08
Total		**20.23**

Table 2: Economic profile of Trinidad and Tobago (US Department of State 2009)

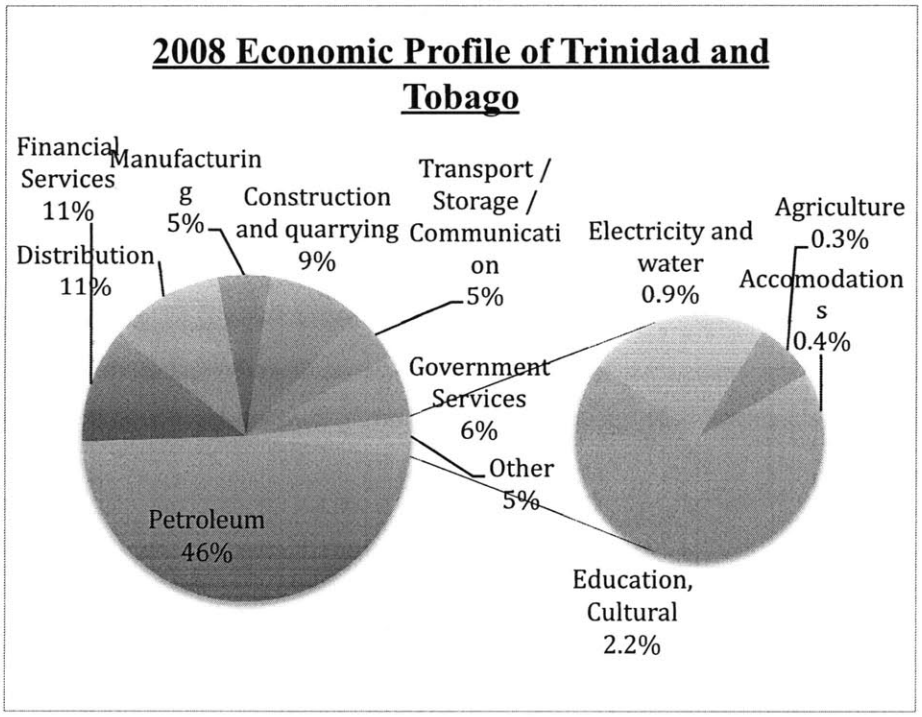

Figure 2: 2008 Economic Profile of Trinidad and Tobago

While the benefits of industrial development to the national economy are clear, direct benefits to the local communities that host these productive oil and gas industries remain a contentious and disputed issue. Poverty, unemployment, and academic attrition rates are high in some of the communities that host these prosperous industries. In areas designated for the location of new industrial estates (e.g. Union Village/La Brea, South East Point Lisas, and Chatham) community members have become quite vocal in demanding consultations and negotiations with the National Energy Corporation – the government agency responsible for siting and developing new heavy industrial estates for the energy sector. No longer are they content with and placated by vague promises of employment, improved infrastructure, economic development and other projected externalities of industrial development. With more than 100 years of experience in oil production, and approximately 30 years of experience with gas-based industries, locals have had sufficient experience with industrialization to know that the mere presence of industry within the local vicinity will not automatically generate and sustain these spillovers. Residents now demand assurances to questions about how these new industrial estates will impact employment, the environment, infrastructure, housing and the local economy. With greater access to and availability of information (e.g. via the Internet) locals are ever-more vigilant about industrial activity taking place in their communities, and in some instances have organized themselves into lobby groups to monitor the activities of their industrial neighbors, to protest against violations, and to communally voice their grievances.

Thus far, I have not been able to find any published studies focused on assessing the relationship between heavy industries and the communities in which they are located in Trinidad, suggesting that this type of evaluation has not taken place. Even in light of the fact that the government of Trinidad and Tobago is about to undertake another wave of massive industrial expansion with the creation of two more gas-based industrial estates, there still is no evaluation of the successes, failures, and lessons that can be garnered from the decades of experiences that have come across through the development of oil and gas industries. This research project thus attempts to begin to fill this deficit, and to open the way for further discourse and investigation of issues surrounding the relationship between industrial estates and their host communities.

This current research is the continuation of my undergraduate thesis entitled "The Redevelopment of the Guapo/Clifton Hill Beachfront: Creating Symbioses between Industry, Community and Environment". At that time I was studying architecture, and my proposed

solution to help generate these sought-after symbioses was, of course, an architectural intervention – a building complex. Upon completion of that project, I had the disturbing awareness that as well-intentioned as my proposal was, there was dire lack of consideration of the economic, social and political climate enveloping the "Industry, Community and Environment" as the key entities of that project. This sudden awareness of my insufficient knowledge of matters related to economics, social science and political theory led me to pursue this current Master degree in planning, and three years later return to a topic similar to that of my undergraduate thesis, but in a very different manner and with very different views. Once again the main actors are the industrial firms and their host communities but with this research I focus on the strengths of their relationships; I have chosen two sites – Point Fortin and Point Lisas – to conduct this sub-national analysis. I now seek to investigate whether the local communities in which heavy industries are clustered are also benefitting from the presence of these industrial neighbors in their midst; in what ways have industries contributed positively to the development of the communities in which they are located; and what factors have contributed towards the creation and perpetuation of these symbioses. More specifically, my thesis attempts to address the following questions:

- What are the positive symbioses between industrial estates and their host communities;
- Under what conditions are these connections forged and propagated;

Each of the host communities under investigation have formed similar symbioses with their industrial neighbors, however, the strength and depth of these ties vary owing to numerous factors such as the communities' history, previous relationship with industry, types of industry, and accessibility to other urban centers, to name a few. In both Point Fortin and Point Lisas, the strongest symbioses are found in employment, and education and training, primarily by means of industry-initiated CSR programs and/or government-led programs.

In order to provide the theoretical background of my research, I begin with an investigation of topics pertinent to my analysis – Industrial Estates, Corporate Social Responsibility, and Foreign Direct Investment. Then, I provide an overview of the methods of research adopted for this project. Next, is an exploration of the history of industrialization in Trinidad and Tobago, chronicling from the origins of industry to the current state of affairs, highlighting significant milestones along the way. Subsequent to the chronology of the country's industrialization history, is that of the communities under investigation. The following section describes the current state of the communities of Point Fortin and Point Lisas, and their associated

industrial estates. Then, I delve into a deeper exploration and analysis of the main symbioses discovered between the industrial estates and their host communities, after which I conclude with a summary of what this research has revealed.

Prominent Themes and Related Research

As explained, this thesis seeks to uncover the relationship between industrial estates and their host communities, by addressing the following questions:

- What are the positive symbioses between industrial estates and their host communities;
- Under what conditions are these connections forged and propagated;

The literature reviewed for this thesis focuses on four major topics: Industrial Estates as instruments to promote industrialization, Corporate Social Responsibility, and Foreign Direct Investment.

Material on industrial estates elucidates the historical evolution of these entities, the foundational theories supporting their establishment and promotion, and descriptions of the numerous permutations of industrial estates as related to the various geographical, political and economic contexts in which they exist. Within the exploration of this topic I focus on the various actors involved in the dynamics of industrial estates.

Literature about Corporate Social Responsibility (CSR) focuses on the efficacy of these programs to the host companies as well as the beneficiaries of these programs. Within the industrial estates under investigation are numerous firms who have varying degrees of CSR engagement with their neighboring host communities and beyond. The literature surveyed highlights the motivations for companies engaging in CSR programs, the anticipated payoffs, and the actual benefits to the host company. The literature also reflects on the perception of CSR programs from the point of view of their recipients.

Finally, material on Foreign Direct Investment (FDI) will present the broader context of the operations of transnational/multinational corporations (TNCs / MNCs) in developing countries and the impact these foreign entities have on national and local economies. FDI has been adopted as a strategy for the promotion of industrialization in many developing countries; the survey of this material will highlight the merits and demerits of such strategies in order to set the framework for understanding the dynamics between the tenants of the industrial estates under investigation and their neighboring host communities.

Industrial Estates

The term industrial estate is a British term that is synonymous to the American term industrial cluster or industrial park[7]. The term industrial estate is used in Trinidad, and so for this thesis that is the name that will also be used. According to Bredo (1960), an industrial estate is "a tract of land developed and subdivided into plots according to a comprehensive plan with provisions for roads, transport and public utilities with or without built-up (advance) factories, sometimes with common facilities and sometimes without them, for use of a community of industrialists". [8]

Much of the literature on the establishment of industrial estates in developing countries came out of the 1950s and 1960s (Farookhi 1962; Hackett 1956; Sutherland 1960; United Nations 1961; Urban Land Institute 1961). The proliferation of industrial estates in developing countries coincided with the wave of decolonization sweeping across the globe as many states became independent, took charge of their own economic affairs, and they explored strategies for economic development. The structural change theories put forth by Caribbean economist Sir Arthur Lewis were prominent also at this time. Lewis advocated that developing countries should adopt policies to structurally change their economies from being agriculture-driven to being industry-oriented through the utilization of surplus labor to develop labor-intensive, highly productive industries in urban centers. Influenced by these structural change theories, many developing countries pursued economic development by means of import substitution industrialization (ISI) such as Argentina, Brazil, Mexico, and, to a lesser extent, Chile, Uruguay and Venezuela. One of the main criticisms of Lewis's theory is that the surplus labor that he

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[7] Other names given for industrial estates are: Industrial District (USA; Nepal); Insutrial Area (India; Mexico); Industrial Town or City (Mexico, Brazil, Ghana); Industrial Tract (USA); Industrial Subdivision (Puerto Rico); Industrial Zone (Italy); Trading Estate (UK); Industrial Trading Estate (UK; Pakistan); Industrial Estate (UK, Canada, India, Pakistan, Sri Lanka, Jamaica, [and Trinidad and Tobago]) (Gloeckner 1966)

[8] The United Nations Industrial Development Organization (UNIDO) describes three entities that are created by governments to establish industries; they are: industrial zones, industrial areas and industrial estates. An industrial zone is "an area of raw land set aside for industry. In general it is created by a municipal by-law and is part of an urban renewal or development programme" (UNIDO, 1978). And industrial area is "a parcel of improved land subdivided into plots for the accommodation of industrial establishments and offered for sale or for lease. It can be an effective stimulant to industrial development, especially in the large- and medium-scale sectors" (Ibid).

described fluctuated with the agricultural seasons – during the harvesting and planting season there was less surplus labor because these were the periods when there would be high demand for labor in the agricultural fields, whereas during the growth period there would be less demand for this labor, and hence, a greater surplus. Lewis anticipated that the migration from rural to urban would lead to a balance in the productivity within each location with labor operating at maximum efficiency, with little or no surplus. In actuality, a recurrent trend was massive migration from the rural areas to the urban centers, a decrease in productivity of the agricultural sector because of the deficit of labor, and underutilization of the labor in the urban centers because there were not enough jobs to absorb the existing manpower.

Industrialization was seen as a means to diversify the countries' economies by allowing for the production of a variety of goods, both for domestic and foreign consumption. It was thought that the production of an assortment of goods would create a variety of backward and forward linkages and new networks, and the increase in variety and volume of exports would generate more foreign exchange which would allow the given country to import more goods. It was also hoped that industrialization would generate more employment and furthermore, a more skilled workforce. With all of these hopes and aspirations, developing nations embarked upon the road to industrialization, hoping to reach the levels of development attained by their former colonists. One strategy for encouraging industrialization and enticing firms to set up industries locally was to establish industrial estates.

Industrial estates were first established in the UK and the US in 1896 and 1899 respectively. The "Mother of Industrial Estates" was Trafford Park Estates established in Manchester, England, whilst the Clearing Industrial Estate in Chicago was the pioneer US estate. It would take several decades after the establishment of these first estates to generate momentum and support towards the utilization industrial estates as mechanisms for industrialization and employment generation in either country. The 1930s depression in the UK was the impetus for the establishment of many more industrial estates by the government as a means of providing labor to the masses. In the US, private firms spurred the proliferation of industrial estates especially after World War II with the establishment of branch plants throughout the country and also internationally. Industrial estates also became popular in developing countries post-WWII when many colonies were becoming sovereign states.

At the United Nations Seminar on Industrial Estates in 1961, industrial estates were recognized as effective tools for (i) industrial development promotion, (ii) the modernization of industrial enterprises, and (iii) augmenting the productivity of industrial enterprises by lowering costs and raising product quality (Gloeckner 1966). Bredo (1960) found extensive evidence to support the assertion that industrial estates can assist in structuring industrial growth and that they had been used as an enticement to attract firms to new communities seeking to industrialize in order to diversify their employment sectors and to expand their tax revenues to finance community services. Industrial estates achieve economies of scale in construction and operation thus enabling estate developers/managers to offer firms more competitive rates as tenants as opposed to if these same firms were to try to set up their industries independently and outside of an estate. Many industrial estate developers provide land, utilities, access routes, port facilities, etc. as a package to tenants at more affordable rates, and with less hassle in securing lease contracts and loans, and in obtaining necessary permits and licenses necessary for construction and operation.

According to Bredo (1960), the economic advantages of industrial estates stem from the following circumstances:

- Economies of scale from the development of the industrial estate;
- The clustering of firms to allow for the accumulation of external economies;
- Increased feasibility of service provision due to the establishment of a critical mass of firms;
- Reduced risk to the individual firm again because of the clustering of other firms.

He also states, "The industrial estate is a device by which local government can provide special incentives to encourage industrialization in their localities", and then further explains that there are various advantages to be gained by the various stakeholders (industrialists, local community, and national community) from the establishment of industrial estates: (See diagram below).

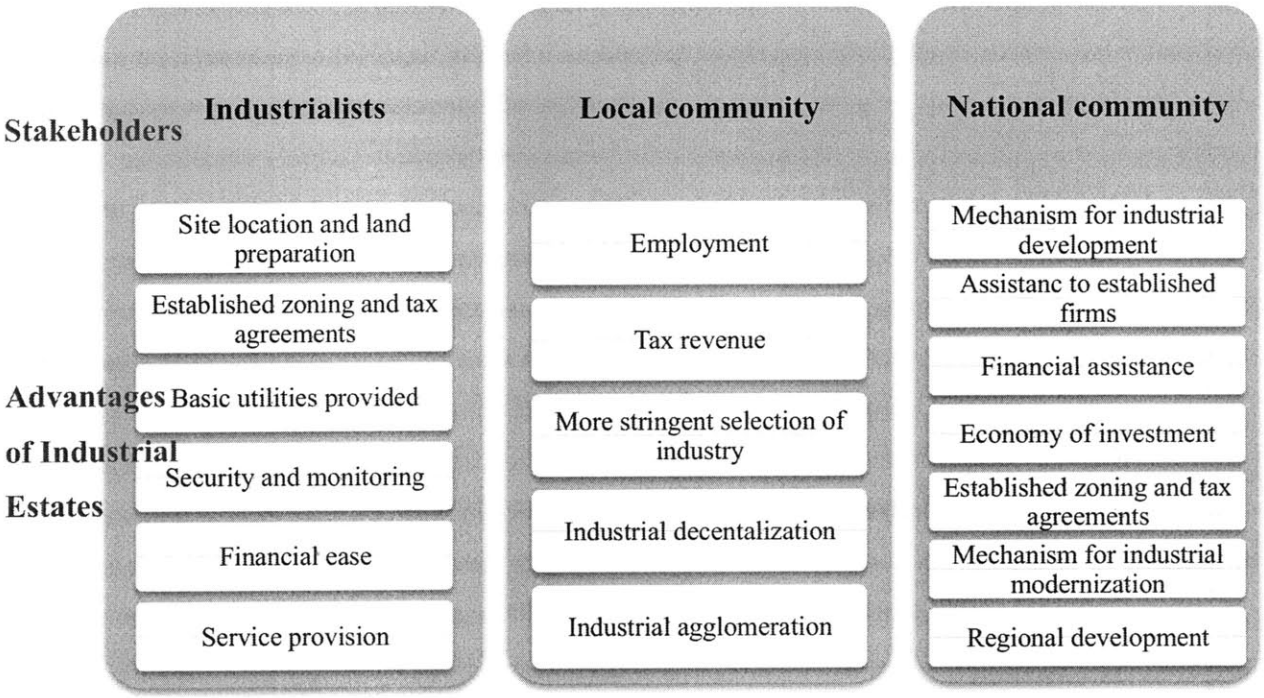

Figure 3: Advantages of Industrial Estates to Various Stakeholders

Additionally, the literature on industrial estates is skewed. Literature from earlier decades focuses on cases of industrial estates created to host small- and medium-scale industries in developing countries - (Farookhi 1962; Hackett 1956; Sutherland 1960; United Nations 1961; Urban Land Institute 1961) – while more recent literature focuses on examples of larger scale heavy industries in industrial estates in developed, industrialized countries - (Roberts 2004; Lai 2005). While there are a number of industrial estates with small- to medium-scale industries in Trinidad[9], these industries do not dominate the economic output of the country, instead it is heavy industry that dominates the export basket. What makes Trinidad and Tobago unique is that instead of developing its economy using industrial estates to host small- and medium-scale

[9] These parks fall under the management of eTeck. eTeck is the government agency mandated to help diversify Trinidad and Tobago's non-energy sectors and export basket, through the development of light industrial park to host various non-energy industries (including Information Computer Technology, knowledge-based and downstream energy industries). There are currently 17 such parks distributed throughout the country, with 8 more under construction. eTeck receives it directives from the Ministry of Trade and Investment. The established parks are located in Abbattoir, Beethan, Biljah, Chase Village, Diamond Vale, East Dry River, Frederick Settlement, Harmony Hall, Lady Hailes, Macoya, Morvant, O'meara, Plaisance Park, Point Fortin, Sea Lots, Trincity, and Milford (Tobago). New parks are to be located in Endeavour, Frederick Settlement, Factory Road Park, Preysal, Dow Village, Reform, Debe and Point Fortin.

industries, it was the development of industrial estates to host heavy industries that propelled the economy. Trinidad's situation does not align with those outlined in the above-cited literature; its situation is unique – it is a small-island, developing nation in the Caribbean, with a mineral economy, that successfully introduced resource-based industrialization to today host an extensive array of heavy industry enterprises. Even though its gas reserves are small compared to the endowments of other larger countries (See table in the appendix), it has managed to monetize its limited reserves enough so that it is a noteworthy global competitor in gas-based industries and natural gas production.

The Point Lisas Industrial Estate (PLIE) is by definition and characterization an industrial estate. PLIPDECO[10] is the landlord, and in this capacity provides and maintains the basic infrastructure (e.g. roads, drainage, port, etc.), leaving the provision of other amenities (e.g. water, electricity, etc.) to various service companies. There are currently 78 tenants on the 860 hectare PLIE, 28 of which are heavy industries, 12 are light, and 38 are related to services[11].

On the other hand, the situation in Point Fortin is more akin to an industrial area that hosts a cluster of industries. It is an industrial cluster and not an estate because there is no one landlord overseeing and managing the land and facilities which they utilize. The current small cluster of 4 industries (Atlantic LNG, TBTL, Trinmar, and Damus) in Point Fortin is the result of a very slow evolution and expansion.

In Trinidad and Tobago, it is either one of the two government agencies -the National Energy Corporation of Trinidad and Tobago (NEC), or the Evolving Tecknologies and Enterprise Development Company Ltd. (eTeck)[12] - that makes the decision to of where to site new industrial. In fact, when asked about their role in the siting of the imminent Point Lisas South and East Industrial Estate, officers of the Couva/Tabaquite/Talparo Regional Corporation said they had not

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[10] PLIPDECO is a publicly traded state agency with 51% ownership by the GOTT, and 49% of its shares held privately. It has two main operational foci: as a landlord in charge of managing the PLIE, and secondly, as the owner and operator of the Point Lisas Industrial Port which is attached to the PLIE.

[11] See appendix for full listing of PLIE tenants.

[12] The NEC is the government agency responsible for the establishment of industrial estates for heavy industries in the energy sector. While eTeck is the government agency responsible for the establishment of industrial estates for light / downstream industries (e.g. information computer technology, knowledge-based industries, etc.)

been consulted during the planning stages, and only came to know of the new estate through a third party source. Local government authorities are responsible for assessing property, and granting building permits. In theory they can object to new industrial developments in their vicinities by delaying or denying building permits. However, in reality, there is typically a higher power (central government) that is in support of the establishment of new industrial estates. This power puts pressure on the municipal authority to not delay or deny the passing of building permits. Furthermore, it is not within the auspices of the local government to provide incentives to industrialists. These incentives are decided upon at the central government level by the Ministry of Trade and Industry[13].

The lack of communication and collaboration during the planning, and feasibility assessment stages often means that there are conflicts between the development goals and plans of the local community and those of the industrial developers. The opportunity for collaboration and cooperation, and for building mutual trust and respect is lost due to this void in communication leading at times to avoidable challenges later on.

Trinidad and Tobago's path of development vis-à-vis industrialization from 1962 – the year the country gained independence – to present day has had many obstacles and there were many failures along the way. However, the energy sector has survived these failures. After the collapse of its economy in the 1980s, there was strict structural transformation of the economy, especially with regards to the role of the state in industrial development, and government expenditure practices. Trinidad and Tobago has managed to transform itself, to adjust and adapt to changing circumstances, thus now finding itself positioned as a key player in the global energy market. Trinidad and Tobago learned many lessons related to the challenges faced by a small island state and developing nation introducing large-scale heavy industries, such as how to negotiate and secure trade agreements with its market, how to attract foreign investors within a specific market (e.g. natural gas) to its shores, how to brand itself as a sound and competitive location for the establish of new industries, etc. By studying Trinidad's growth trajectory, other developing countries with similar constraints and endowments can perhaps avoid some of the errors made and pains endured by Trinidad and Tobago.

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[13] MTI's incentive regime includes: The Fiscal Incentives Act, The Corporation Tax Act, The Income Tax (In Aid of Industry) Act, the Value Added Tax Act, The Free Zones Act, The Customs Act, The Tourism Development Act (Ministry of Trade and Industry 2007).

Corporate Social Responsibility

The concept of corporate social responsibility (CSR) relates to positive, proactive measures and interventions adopted by firms in the interest of social development as well as their own profit margins, and has been around since the 1970s, though such practices date back much further. The World Business Council for Sustainable Development defines CSR as "the continuing commitment by business to behave ethically and contribute to economic development while improving the quality of life of the workforce and their families as well as of the local community and society at large", however, even this group admits that there still is no general consensus about this definition. Over the past several decades there have been numerous studies conducted attempting to establish the relationship between CSR programs and the financial performance of the benefactor firms – that is, there have been attempts to determine if CSR "pays off" to the firms that host these programs. Many of these studies have focused on correlations between CSR programs and short-term profits - (Ullmann 1985; Wood and Jones 1994). The results of these investigations have been inconsistent, thus leaving the answer to the question of direct gain to the firms unclear.

Rhetoric in support of, as well as against, firms adopting social responsibility policies have been published en masse. Paul A. Samuelson (1971), a prominent economist, is one in support of CSR strategies. He states that, "a large corporation these days not only may engage in social responsibility, it had damn well better try to do so," implying that firms which neglect to socially connect with their communities run the risk of not being as successful as one which does. In support of this view, Keith Davis (1973) presents several of the typical arguments in favor of CSR as follows:

- Long-term self-investment – the communities in which firms operate oftentimes have expectations that the firms will contribute towards the accomplishment of certain social goods. In order to improve their chances of success within their communities, firms should strive to cultivate a positive relationship with the said community. Assistance towards the accomplishment of the community's social goods and goals is one way that firms can reinforce their positive relationship with the community. This case is more applicable to situations in which the community is the consumer of the firm's product, and so in that case,

the community represents the firm's market. Any ill feelings by the community can then directly impact the firm's profits.

- Public image – closely associated with having a positive relationship with its neighbors, is presenting a good image to that community. Good public imagery allows the firm to access a broader potential customer and employee base, which in turn may have a positive impact on its productivity and profitability. Again, this case applies when there is a relatively close relationship between the firm as supplier and the community as its market.

- Corporate viability – next, adjacent to public imagery is corporate viability – that is, the ability of the firm to project to the public that it is competent in providing expected services. The Iron Law of Responsibility predicts that should a firm fail to exercise its perceived power in a particular domain, society will rescind this power from the firm and reallocate it to what it perceives to be another competent firm. Therefore, it is in the firms' interest to present itself as being competent in fulfilling social expectations.

- Evasion of Government Regulation – should the behavior of firms be perceived as insensitive or detrimental to the community in which it operates, government may intervene with regulations to ensure desired behaviors are achieved. When firms demonstrate self-initiative in regulating their own behavior, they earn the trust of the community and government thereby reducing scrutiny and calls for external regulation. Self-imposed regulation can be more desirable to firms because it allows for greater flexibility and customization of programs to suit their operations.

On the other side of the debate is Milton Friedman (1971) who is a critic of CSR. His contention against CSR interventions is that, "few trends could so thoroughly undermine the very foundations of our free society as the acceptance by corporate officials of a social responsibility other than to make as much money for their stockholders as possible." His argument falls under the rubric of classical economic doctrine of the free market. Similarly, some arguments against CSR programs, as presented by Davis (1973) are:

- Maximization of Profits – inherent in this classical economic argument is the position that the function of corporate firms is to generate profits for their stakeholders, and so they should

focus solely on this and not distract themselves with social activities that are not in their purview.

- Costs of Social Engagement – this argument discourages firms from participating in social engagements because doing so will put a strain on their limited resources. Firms should only venture into social engagements if they are certain that their resources are renewable. Furthermore, forcing firms to engage in social activities can be detrimental to marginal firms that may not have sufficient resources to invest in these social programs.

- Weakening of Firms' Primary Purpose – social engagements may prove to be a distraction to the economic productivity of firms, may cause discordance amongst their leaders' interests, resulting in its diminished capacity as a business entity which in turn will also diminish its capacity in social engagement. Furthermore, adopting the responsibility of addressing social maladies puts firms at risk of becoming scapegoats for the very problems they attempt to resolve. Firms can potentially become the culprits for social ills with which they have responsibility.

- Lack of Accountability – firms may be well intentioned in their attempts at benevolence to the public, but in the absence of measures of accountability the public runs the risk of negative outcomes of the firms interventions. Davis states that, "until society can develop mechanisms which would establish direct lines of social accountability from business to the public, business must stand cleat of social activities and pursue only its goal of profit."

In their paper entitled *How Corporate Social Responsibility Pays Off,* Burke and Logsdon (1996) investigate how CSR programs could be strategically beneficial to firms even when their contribution cannot be measured as a separate line item contribution to the firms' profit margins. In this investigation of how firms can mutually serve their own interests while serving the social interests of their stakeholders they determine that value creation is the primary objective of CSR programs and develop five dimensions with which to assess value creation:

- **Centrality** – how closely aligned is the firm's CSR policy with the firm's mission and objectives;

- **Specificity** – extent to which the firm can reap some of the benefits of its own CSR programs rather than have these benefits be diffused amongst the wider society. An example of a non-specific CSR intervention is the creation of a playground in the community. In this case, anyone and everyone can benefit from the existence of the playground, while it does not hold any specific benefit to the firm itself. On the other hand, and example of a specific CSR intervention is the sponsorship of technical equipment at a local academic institution. If the sponsor firm then has a research and development relationship with.

- **Proactivity** – extent to which the CSR program is in response to anticipated "emerging economic, technological, social or political trends and in the absence of crisis conditions"

- **Voluntarism** – discrete and autonomous decision-making by the firm in order to avoid extraneous compliance mandates. This is synonymous with Davis' above-mentioned theme of "evasion from government regulation".

- **Visibility** – the degree to which the firm makes its CSR program observable, with the hope of gaining recognition from their stakeholders. This dimension is a delicate one. Firms may attempt this tentatively because there is no guarantee of successful execution of their intervention, thus they run the risk of drawing negative attention to themselves should the effort turn out poorly. However, on the other hand, should the initiate program be a success then they stand to benefit from their efforts being highlighted.

The debate surrounding the merits and demerits of firms engaging in CSR programs is well established. In this thesis, I shall focus on the merits of CSR both to the firms that initiate such programs, and to the recipient community. Further on in this report I will highlight instances in which the actions of firms speaks to their attempts at ensuring long-term self-investment, improving their public image, demonstrating their corporate viability, responding to socio-cultural norms and stockholder interests, and avoidance of government regulations.

Foreign Direct Investment

Foreign Direct Investment (FDI) involves one country or foreign firm investing in a project in another country. Within the past couple decades FDI has been promoted as a catalyst for economic development in the developing world. Multinational Corporations (MNCs) are now welcomed in developing countries as channels for establishing export markets. Dunning (1981) and Narula (1996) both posit that FDI-assisted development takes place when the host developing country absorbs, adapts, and disseminates the positive spillovers generated from the interaction between the multinational ownership advantages and the local location-bound characteristics.

FDI has essentially been the driving force behind the introduction and development of industrialization in Trinidad and Tobago. From the onset of industrialization more than a century ago, it has been common to find that foreign firms are the ones embarking upon entering into new frontiers of industry in Trinidad. At the beginning of the 20th century, after the successful drilling of oil in southern Trinidad, foreigners rushed to establish companies in the country to tap into the newfound wealth. At that time Trinidad was a British colony and so their influx of foreigners (mainly British) to the small island to establish oil companies is not a true case of FDI because Trinidad was part of the British Empire.

Once Trinidad gained independence in 1962, there was the immediate recognition that there was not enough local capital, nor capacity, to set up large-scale industries that would generate employment and produce goods for export. The country's first attempt at winning over foreign investors by following PRIDCO was a failure. There did not exist any working agreements between Trinidad and the US, and so Trinidad could not compete with Puerto Rico for the US market.

Today, the majority of the heavy industry firms in Trinidad are foreign firms. Local firms complain that they are not given any preferential treatment to assist them with setting up industries in their own domestic market. Numerous perks are presented to foreign firms to attract them to the island. In fact it would seem that at times foreign firms are given such enticing deals, which are detrimental to the local population. This is done under the misperception that firms are more eager to respond perks such as tax breaks, cheap labor and leniency in regulation. Tendler (2000) found in her studies that firms were actually much more responsive to the prospect of

there being a large local market for their products, and that locales which attracted foreign firms whose operations/products integrated into the production line of locally produced goods were much more likely to benefit from the presence of the foreign firm.

Tendler also found that oftentimes locales competing for the foreign investors were afraid to make demands of the investor in a true quid pro quo fashion. The competing locale would seek to accommodate the needs of the foreign firm without asserting what it desired in return, thus possibly leading to a situation in which the recipient locale is dissatisfied with the outcome of presence of the investor because desired spillovers are not generated.

Hanson (2001) has found that foreign investors are sensitive to the local characteristics of their host communities in the following ways: they are deterred from investing where taxes are high (naturally), while they are very much attracted to places where there is a well-educated workforce and large local market for their goods. Hanson also mentions that there is very little evidence of host countries experiencing positive spillovers from the presence of the foreign firms.

One of the most anticipated positive spillovers from the presence of foreign firms in a developing country is the transfer of technical skills and knowledge to the local population. However, nature of the operations at many of the firms within this study (highly mechanized with little labor post-construction / during operation) precluded opportunities for locals employed at these firms to learn new skills that could allow them to eventually launch their own operations. The acquisition of new skills is more likely in manufacturing firms where the process of design and assembly is more easily observable, and where the final consumer product can be reverse engineered. According to Barclay, "the foreign investor has played virtually no role in enhancing the country's indigenous technological capability... the foreign investor's contribution has been mainly limited to training nationals in the operations and maintenance of the process plants." In the context of the heavy, mineral industries in Trinidad, the final product is an intermediate chemical product used as input in other industries; the industrial processes involved in the creation of the final product do not allow for the acquisition of skills that are easily transferable.

One of the spillovers of FDI in Trinidad has been the sponsorship of the National Energy Skills Center. In the 1990s the Ministry of Energy and Energy Industries mandated from a core group of the country's larger natural gas firms to make financial contributions towards the

establishment of the National Energy Skills Center, which would serve to train youth in skills areas related to the energy industry.

Table 2: Ownership Information for Gas-based Industries in Trinidad

Company	Start-up year	Estimated Cost (US$ m)	Original Ownership	Current Ownership Status	Product
Yara (Trinidad) Limited	1959	n.a.	W.R. Grace	Norsk Hydro (1992)	Ammonia
Trinidad Nitrogen Company Limited 1	1977	125.0	51% GOTT, 49% W.R. Grace	GOTT Norsk Hydro (1992)	Ammonia
PCS Nitrogen Trinidad Limited 1	1981	333.3	GOTT, Amoco	PCS (1995)	Ammonia
PCS Nitrogen Trinidad Limited 2	1984	172.5	GOTT, Amoco	PCS (1995)	Granular urea
Trinidad and Tobago Methanol	1984	182.8	100% GOTT	CL Financial, Ferrostaal AG, Helm AG and Methanol Holdings Trinidad Ltd.	Methanol
Trinidad Nitrogen Company Limited 2	1988	350.0	51% GOTT, 49% W.R. Grace	Norsk Hydro (1992)	Ammonia
Phoenix Park Gas Processors Limited	1991	98.8	Natural Gas Company of Trinidad and Tobago (local partner), Conoco, Pan West	Natural Gas Company of Trinidad and Tobago, Conoco, Pan West, Methanol Holdings Trinidad Ltd. (1996)	Propane, butane, and natural gasoline
Caribbean Methanol Company	1993	200.0	Clico Energy (local partner), Ferrostaal AG, Helm AG	CL Financial (local partner), Ferrostaal AG	Methanol
Trinidad and Tobago Methanol 2	1996	235.0	GOTT, Ferrostaal AG, Helm AG	CL Financial (local partner), Ferrostaal AG, Helm AG and Methanol Holdings Trinidad Ltd.	Methanol
PCS Nitrogen Trinidad Limited 3	1996	75.0	PCS	PCS	Ammonia
PCS Nitrogen Trinidad Limited 4	1998	265.0	PCS	PCS	Ammonia
Point Lisas Nitrogen Limited	1998	300.0			Ammonia
Methanol IV	1998	265.0	Clico Energy (local partner), Ferrostaal AG, Helm AG	Clico Energy (local partner), Ferrostaal AG	Methanol
Methanex Trinidad Limited	1999	261.0	Beacon Energy, Amoco, MG Methanol	Methanex, bpTT, JP Morgan Chase	Methanol
Caribbean Nitrogen Company Limited	2002	300.0	CL Financial (local partner), Ferrostaal AG, Proman, Kellog Brown & Root, EOG Resources, Duke Energy	CL Financial (local partner), Ferrostaal AG, Proman, Kellog Brown & Root, EOG Resources, Duke Energy	Methanol
Atlas Methanol Unlimited	2003	300.0			Methanol
Nitrogen 2000 Unlimited	2004	315.0			Ammonia
ISG Trinidad Unlimited	2004	--			Hot briquetted iron
M5000	2005	450.0			Methanol

Damus	1973		(Private local)		Fabricatio n
Atlantic LNG Train 1	1999		BP Trinidad LNG B.V. (34%) British Gas Trinidad LNG (26%) Repsol LNG Port Spain B.V. (20%) NGC Trinidad and Tobago (10%) Suez LNG Finance S.A. (10%)		LNG
Atlantic LNG Train 1	2002		Amoco Trinidad LNG LLC (42.5%) British Gas Global Investments B.V. (32.5%) Repsol Overzee Financien B.V. (25%)		LNG
Atlantic LNG Train 1	2003		Amoco Trinidad LNG LLC (42.5%) British Gas Global Investments B.V. (32.5%) Repsol Overzee Financien B.V. (25%)		LNG
Atlantic LNG Train 1	2005		BP (Barbados) Holding SRL (37.78%) British Gas Trinidad LNG Limited (28.89%) NGC LNG (Train 4) Limited (11.11%) Repsol Overzee Financien B.V. (22.22%)		LNG
Trinmar			Texaco Trinidad Inc, 33.3%; Petrotrin, 66 2/3%		
Trinidad Bulk Traders Ltd.	2005		CL Financial		Ethanol

Methodology

As the title of this thesis states, I am "in search of symbioses" between industrial estates and their host communities in Trinidad. By symbioses, I mean that I am specifically looking for the positive (for either one or both entities) relationships between industrial estates and their host communities. A more balanced assessment would have also investigated negative relationships, but given the limited time to conduct the necessary research, I opted to focus on the positive aspects of the interrelation. Additionally, one finds that more often than not, attention is focused on negative elements as if that is entirely representative of a given situation, or, as if the presence of any negativity inherently and irrevocably discounts the validity of positive aspects. I do not deny that there are negative aspects to the relationship between industrial estates and their host communities; however, my intent here is to focus solely on the positive aspects to gain a better understanding of the factors contributing to their establishment and propagation.

The primary modes of investigation for this research project were (i) stakeholder interviews, (ii) data collection, and (iii) direct observation. Between July 2009 and April 2010, I conducted field research in Trinidad during several trips there. Then while in the US, I collected data primarily via the Internet and local library resources. Given that the majority of the information gathered is qualitative in nature, this report itself it presented as a narrative of a sub-national analysis of the two stated areas of interest. The unavailability and the inaccessibility of substantial quantitative material rendered in depth quantitative analysis impossible. The limited quantitative material obtained is used to provide a snapshot of the conditions described.

Stakeholder Interviews

Numerous stakeholders were interviewed to obtain different points of view of the evolution of industrialization in Trinidad and Tobago, and its impact on local communities as well as other sectors. The persons interviewed represented the industrial sector (e.g. National Energy Company, Atlantic LNG Company of Trinidad and Tobago, Petrotrin, etc.), local government (the Couva/Tabaquite/Talparo Regional Corporation, and the Point Fortin Borough

Corporation), businessmen from the defined host communities, local professionals (e.g. local professors and researchers who have conducted relevant research, or worked on relevant projects), community activists and local residents. Interviewees were solicited via email, via telephone, or randomly off of the streets, and subsequent interviews were conducted either in person or via telephone. The majority of the interviews were recorded manually, and only on a few occasions were they recorded digitally using a voice recorder. The interviews were informal and conversational in nature. The first questions posed were general questions related to the interviewees' job position, age, place of residence, relationship with industry and community, etc. Then I proceeded to more poignant questions specific to the interviewees' background.

Data Collection

This mode of information gathering proved most challenging because of the limited records, the inconsistency of the data collected, and the limited access to these records. Data on populations, employment and sectoral output were collected from various government ministries (e.g. the Ministry of Planning, Housing and the Environment; the Ministry of Energy; Ministry of Trade and Industry, etc.). Requests to various firms for data related to their expenditures on CSR programs, number of employees, etc., mostly went unanswered. Few companies posted their annual reports online. Since many of the tenants of the industrial sites under investigation are foreign, private firms, they are not obliged to make public their annual reports. Data of specific dates related to the significant milestones throughout the industrial development of Trinidad were obtained from various historical narratives.

Data collection also entailed collecting cartographic material and photographs of the sites. This material was available at local public libraries, the local municipal corporation office, from industrial firms, and from personal collections. Even though the Freedom of Information Act has been enacted since 1999, there is still reluctance to disclose information at many of the local government agencies. I believe that some of this reluctance stems from the staff inexperience with responding to requests fro information. Other obstacles to data collection were the long bureaucratic chains of command and inefficient modes of communication. Some agencies required formal written requests for information and would not accept requests sent electronically (via email, even if it was a scanned image of the original hard copy of the same document). Additionally, many email address and telephone numbers online or in print were in fact non-functional.

Direct Observation

During Summer 2009 and Spring 2010, I visited the sites under investigation several times in order to become more familiar with their layout and setting. Given that I grew up in Point Fortin, I was already quite familiar with the layout of the town and the location of its industries. Over the past few months I focused more on the physical interstices between the industrial borderlines and the rest of the community – in many cases these interstices were the buffer zone areas. In Couva/Point Lisas I also paid attention to these interstices, looking at what sorts of activities took place within these buffer zones, how they evolved, and if they were regulated. Examination of these interstices had the potential to indirectly reveal the impact of industrial activity on the activities of their neighbors. For instance, improperly discharged effluents from an industrial estate can create a zone of contamination (a sort of no-man's land) between the edge of the industrial estate and the perimeter of the community.

I used photography as a means of capturing my direct observations. Through the process of photographic documentation, I, as the photographer found myself more observant of my surroundings, of the subjects of my photographs, of the relationships and juxtapositioning of various subjects than when I was a passive observer. Also, the photograph documents (captures) the given scene at a moment in time, allowing me to "revisit" these sites as often as I needed to in order to observe them again, and in greater detail. My photos served to draw attention to the fact that physical elements of industrial estates spill over beyond their official limits into their host communities thus affecting access and movement within the community.

To conclude, with the above-stated methods of investigation I was able to assess various threads of interrelation between industry and community, and to then determine that the strongest connections lie with employment, and education and training. The interviews, data collection and direct observations have allowed for a much more integrated and thorough understanding of the key actors, their roles, and the implicit connections amongst the various entities.

The Industrial Evolution of Trinidad and Tobago

"Blessed as we are with hydrocarbon resources, we have a choice to make. There have been attempts to persuade us that the simplest and easiest thing to do would be to sit back, export our oil, export our gas, do nothing else and just receive the revenues derived from such exports and as it were lead a life of luxury – at least for some limited period. This, the government has completely rejected, for it amounts to putting the entire nation on the dole.

Instead we have taken what may be the more difficult road and that is accepting the challenge of entering the world of steel, aluminum, methanol, fertilizer and petrochemicals, in spite of our smallness and in spite of our existing level of technology. We have accepted the challenge of using our hydrocarbon resources in a very definite industrialization process."

- Dr. Eric Williams, first Prime Minister of Trinidad and Tobago. Excerpt from speech made at inauguration of the Iron and Steel Company of Trinidad and Tobago (ISCOTT) in 1977.

An Englishman, Walter Darwent, drilled Trinidad's first successful oil well in 1866 in Aripero, South Trinidad. Darwent had been deployed to Trinidad by the West Indian Petroleum Company (WIPC) as a superintendent to explore for oil. WIPC was the first company established in Trinidad[14] for the purpose of drilling for crude oil in Trinidad. Prior to that oil had been extracted from pitch from the La Brea pitch lake using special refinement techniques. Crude oil, extracted from subterranean reservoirs is of superior quality to pitch oil, so when these reservoirs were first found there was the realization that there could be greater commercial potential of this product. However, many speculators were doubtful of the potency of this drilled oil, and preferred to continue to refine oil from pitch. Later in 1866 the Paria Petroleum Company Limited became the first local company to drill and prospect for oil. Darwent died suddenly and prematurely in 1868 and in his absence the interest in oil drilling languished for roughly three decades until the turn of the century when there was renewed interest in the viability of oil drilling in Trinidad.

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[14] WIPC was incorporated in the US in 1865.

Coinciding with the beginning of the 1900s were changes in the global oil market. The invention of the electric light bulb by Edison had lead to a reduction in the use of kerosene as fuel for lighting. Then, with the growth in automobile production and use, there was a coinciding increase in the demand for gasoline fuel. Darwent's well was rediscovered in 1901 by Randolph Rust an Englishman in search of oil in Trinidad. Beeby Thompson, a pioneer in the establishment of the oil industry in Trinidad and a London-based petroleum consultant, speculates that the first commercial oil well was drilled at Well No. 3 in Point Fortin by the Trinidad Petroleum Company (TPC) in 1907. Commercial production[15] commenced in 1908, and refinement then followed in 1912 with the construction of the country's first refinery in Point Fortin by the United British Oil Traders, a Shell subsidiary. This was the beginning of the first oil boom in Trinidad with the number of new oil companies rapidly increasing – 1909 saw the establishment of 2 new companies, in 1910 there were more than 30 (!), 8 in 1911, and 17 in 1912. Thus, in total, between 1909 and 1912 – in just three years – more than 57 oil companies were established in Trinidad.

Higgins, comments that, "in the early days the industry was greatly hindered by complications arising from the lack of a clear Government directive or policy regarding oil developments." This lack of direction and engagement slowed down the development of oilfields, and eventually the oil companies themselves took the initiative to develop the necessary infrastructure (e.g. roadways). By the end of the 1920s Trinidad was "the largest oil producer in the British Empire and oil provided more than 50% of export revenues. The figures for 1927 show that oil exports were valued at £1.78 million and that the industry, oil and asphalt, contributed 23% of the colonial revenue of £1.66million" (Higgins 1996).

The boom in the oil industry from the beginning of the twentieth century created a demand for labor. Many of the technical staff and skilled employees were expatriates because the locals had no experience in this field. Additionally, it was difficult to lure locals into this type of work because the locations (mainly Point Fortin and Guayaguayare) were rural, inaccessible and lacking in social amenities. Ellis Lewis, a local historian recounted that, "nationals preferred to work in the city and elsewhere than in Point Fortin" given the hazards associated with this type of work and the perception of Point Fortin being "dull and uninteresting". According to Higgins

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[15] Commercial production means that enough revenue has been generated from production to recuperate the original drilling and production costs, and also allows for profitable operations.

(1996), "the need for an improved and technically equipped staff and trained employees was becoming increasingly evident during the twenties. The earlier American drillers had been a tough lot, largely a law unto themselves, and their weekend parties often resulted in quite a lot of repairs to put the drillers' quarters back into condition! However, more equable and balanced types were gradually being recruited and generally the operation of drilling remained in their hands, with the British dominating the production and refining operations and increasing in numbers on the geological side, although there were still several Swiss in exploration geology." The demand for labor gave rise to the migration of Grenadians to Point Fortin.

The 1930s proved to be a period of depression in the oil sector in Trinidad. Up until this time Trinidad's primary markets for its petroleum products were Britain and the US. Then in 1929, the US stock market crashed, bringing the US economy to a lull and in turn decreasing the demand for Trinidad oil. One year later significant oil reserves were discovered in Oklahoma and East Texas, further reducing the demand for Trinidad oil because of the surplus supply now available to the US market. Main oil companies based in Trinidad suffered heavy losses and in an attempt to reduce these losses they terminated the services of many of their employees. This led to civil unrest and uprisings within the labor movement. This crisis reached its peak in 1937 with widespread labor unrest and full-blown protests by oilfield workers.

In the 1940s World War II broke out and again there was an immediate need for fuel for war crafts. Production rose dramatically in Trinidad, and amongst the main producers the decision was made to cease exploration efforts and focus all attention on production. There was full employment at the national level and the country's economy continued to thrive off of the proceeds of the oil sector. As Higgins recalls, "improved agreements were made with the trade unions covering grievance procedures, wage rate, overtime rate, paid vacation entitlement and other benefits, whilst apprentice training schemes were extended. Employee training schemes were developed to upgrade the skills of the industry personnel and place them in line for promotion." The US set up three military bases in Trinidad and the deployment of more than 20,000 military personal to the country further stimulated the local economy. In the wake of the war, the foreign military personnel withdrew from Trinidad, taking with them some of the local economic activity, but the country still continued to thrive because it took other former oil producing countries some time to establish their production operations, and for new import and export relationships to be established between suppliers and demanders.

The latter part of the 1950s saw many changes in the local oil sector. For one, in 1956 TLL was bought over by the US firm Texaco, after which BP acquired 75% controlling interest in TPD. In the context of local politics, the People's National Movement emerged under the leadership of Dr. Eric Williams in 1956, and in the context of business, the South Trinidad Chamber of Industry and Commerce (STCIC) was established in the same year. The STCIC would later become a key player in the development of the country's gas industries. In 1960 Apex Oilfields was acquired by BP; so too was KTO in 1961.

In the 1960s, around the time of Trinidad and Tobago's independence, development organizations were encouraging developing and underdeveloped countries to engage in industrialization as a means towards economic development (United Nations 1961 & 1962; Bredo 1960), and when Trinidad and Tobago received independence in 1962, and the aforementioned Dr. Eric Williams became the country's first Prime Minister, there were numerous questions about which development path the country should adopt. The development theories of prominent economist, Sir Arthur Lewis, a native of the neighboring Caribbean island of St. Lucia, were popular at the time. Lewis encouraged developing countries to adopt light industries focused on manufacturing as a means of developing and diversifying their economies. Dr. Williams (1955), strongly influenced by the teachings of Lewis stated, "It will be much more profitable for West Indian governments, if they are able to raise money for industrialization, to develop light industries using imported raw materials than to put it into some of the heavy industries which use up much capital and little labor."

It should be emphasized that by this time Trinidad and Tobago already had six decades of heavy industry activity in oil production on its soil, however, the majority of the companies involved in these operations were foreign firms (some multinationals like Shell and British Petroleum), and the oil-related activities were fairly isolated in their geographical location in specific parts of the country, and only a small fraction of the national population was engaged in the oil industry. Thus, for the most part, the oil sector was still seemed "foreign" to many locals, and reinforcing this was the perception that locals could not manage such a huge globally oriented industry. Many Trinidadians felt that the country should follow its regional neighbor Puerto Rico and pursue the development via a robust manufacturing sector focused on producing goods for export. Trinidad did attempt to follow in the footsteps of Puerto Rico - the Fiscal Incentives for Industry Act was legislated and foreign firms were invited to establish their

industries in Trinidad. They were given five- and ten-year tax holidays, and raw materials and capital goods could be imported free of duties (Mottley 2008).

However, Trinidad found that it could not compete with Puerto Rico as a destination for new firms (especially US firms) because of special agreements between the US and Puerto Rico, which made the latter an attractive location for US investors. Thus, even though Trinidad studied and subsequently tried to emulate the policies and strategic model of Puerto Rico Industrial Development Company (PRIDCO), it found that this iso-mimicry would not guarantee success. The lesson learned was that because Trinidad did not have the same special agreements with the US (or any other industrialized nation for that matter) it would be very difficult to attract investors to establish firms there. Better incentives and infrastructure would need to be offered in order to woo investors. After 10 years of futility, this "Industrialization by Invitation" strategy was abandoned.

Heading in the direction of import substitution, the government then implemented the "Negative List" of items that would require a license for importation. To help further spur local manufacturing the national Industrial Development Company (IDC) constructed several industrial estates with factory shells to help alleviate the burden of capital expenditure by investors. By the 1970s, mattresses, garments, radios, TVs, car batteries, motorcars, home appliances, light bulbs, processed foods, furniture, and construction components were being produced locally. Locals acquired skills training in the assembly of components to produce these items, and so manufacturing evolved beyond the processing of commodity goods to more advanced and more variation of products. The government then made additional investments in a number of vocational and technical schools to ensure an educated workforce trained in the skills necessary for the emerging industries.

In the post-war years the Oilfield Workers Trade Union (OWTU) had managed to negotiate significant wage increases for oilfield workers. In fact the increase was more than 40% above that of retail prices! The existing oil companies found themselves in the situation in which labor became a significant factor to their overall operating costs. Shell approximated that 50% of its costs were attributed to labor. Now some of these firms tried to implement strategies to reduce their workforce in order to cut costs. Both Shell and Texaco succeeded and were once again able to maintain profitable operations, but British Petroleum (BP) faced with stern opposition from the OWTU and languishing profits decided to withdraw its operations from Trinidad all together.

In 1969 the government purchased the local assets of BP, its first major thrust into the energy sector. By this time locals had gained sufficient knowledge on petroleum exploration, production and refinement that it was capable of taking over operations from BP who was growing less interested in their languishing land fields. In 1971, also faced with industrial pressure and falling profits Esso decided to sell its marketing and distributing assets to the Trinidad and Tobago government. In 1974, a similar episode to that with BP took place - Shell felt that its producing and refining assets were in decline and thought it best to relinquish its Trinidad assets. Once again the Trinidad government stepped in; it purchased Shell's estate holdings, and created in its place the Trinidad and Tobago Oil Company (TRINTOC).

The government was gaining experience in the acquisition of foreign-owned oil production and refinement assets, and the subsequent organizational restructuring and human resource placement that was necessary to get the plants in optimal operation. Almost six decades had passed since the inception of commercial oil production and refinement in Trinidad, and during that time knowledge of refinery operations, resource management, markets, sales, etc. had been acquired by locals who then came to hold all levels of positions within the new nationalized oil company. In a fifteen-year period the Trinidad and Tobago government had thrice undertaken negotiations for assets take over and by the third time the government was able a good price and payment schedule for the purchase. It was apparent that the government and local workers were acquiring international marketing, finance and negotiating skills, and this brought them positive attention on the global market making it easier to pursue future partnerships with international firms.

In the midst of the government's petroleum assets acquisition run the global oil crisis was in full swing escalating oil prices from US$2.50 per barrel to US$34.00. What was an oil crisis for most of the world became an "oil boom" for Trinidad. GDP contribution from the petroleum sector rose from 22% in 1970 to 43.6% in 1974! A recurring trend with the Trinidadian economy is that in times of global crisis when there is a shortage of petroleum products or a sudden increase in demand, these are the times when the country's economy grows fastest, and these are the most prosperous times. With monetary limitations on development alleviated because of the sudden inflow of income, the government invested in a number of commercial enterprises in which it was either majority or full owner. The table below lists some of the Trinidadian government's commercial enterprises between 1979 and 1985. It should be noted that even

though there were several large-scale gas-based industries in operation at this time, they were not as profitable as expected due to the volatility of gas prices as well as an overestimation of the volume of existing gas reserves. The country thus still relied heavily on its oil revenues, however, with rapidly falling oil prices, the government found it more and more challenging to support its public expenses. In 1986 oil prices plummeted to US$10/barrel officially send the country into a recession. The bust hit the country hard and there was a period of recession when unemployment rose again and many people migrated seeking a better life in the US or Canada. The government had failed to save enough during the good time for the rainy times, and now a deluge was upon the country and all they had was a flaccid raft to keep them afloat. Lesson to be learned – in good times, save for bad times.

Let's return to the 1950s for a moment to take note of some other notable events. Up until this point in the narrative the industrialization described has been associated with oil. Another point to note is that most of this oil-based industrialization occurred in the southern parts of Trinidad – either in the southwest (Point Fortin) or in the southeast (Guayaguayare). At this point, Trinidad and Tobago entered into a new realm of industrialization based on natural gas. Around this time an ambitious group of southern businessmen put forth the proposal to establish an industrial estate and deep-water harbor along the western coast of Trinidad. At first they were only interested in establishing a port to serve the southern part of Trinidad, since the port of San Fernando had been shut down, and this in turn had a crippling effect on southern business enterprises. With the port of San Fernando closed, all imported goods were received at the port of Port of Spain, in the capital city, and then had to be transported over land to the south of the island. At that time, overland transportation from north to south was cumbersome, due to the limited roadways, train lines and vehicles. This group of businessmen formed the South Trinidad Chamber of Industry and Commerce (STCIC). They soon began to entertain the notion of and industrial estate (catering to heavy industries) to accompany the port they wanted.

A team of local engineers and analysts were assembled to conceptualize prospects for gas-based industrialization, and based on their expertise it was found that there was sufficient gas reserves for electricity generation throughout the country, and furthermore the gas could also be used as feed stock for ammonia, methanol, acetic acid, steel, aluminum and LNG. By the 1970s Amoco had made significant finds in natural gas which would be the base input for a number of industries set up at what would become PLIPDECO. It took several years for the STCIC to

convince the government to support and invest in this venture. In 1971 the government bought majority ownership of PLIPDECO.

Today, the 860-hectare Point Lisas Industrial Estate is filled to capacity with around eighty industrial and service firms. It boasts of twenty-five energy-based industries – four nitrogen ammonia plants, one urea plant, six ammonia plants, seven methanol plants, four direct reduced iron plants, one desalination plant and two power generation plants, amongst others. Not only did the government succeed in monetarizing its natural gas by attracting firms which used the gas as an input base material, it managed to expand the gas-industry sector beyond the confines of the Point Lisas Industrial Estate. The Atlantic LNG Company of Trinidad and Tobago was established in 1995 and now operates on of the world's largest natural gas processing trains; Atlantic is also the largest consumer of natural gas in Trinidad.

The period 1969 – 1984 was unarguably the fastest period of growth in Trinidad and Tobago, and arguably also the period when there was the steepest learning curve. Although there was initial hesitation and even reluctance to enter into the realm of gas-based industries, and to adopt new leadership roles, once the decision was made to embark on this endeavor, highly ambitious visions were defined for the breadth and depth of this track of industrial development. The then Prime Minister envisioned two-pronged returns on these new industrial investments – financial returns and social returns. Needless to say, in the case of the former, there was the expectation of profitability and sustainability. Then, with regards to social returns, it was anticipated that locals would become technologically and technically proficient in the arena of heavy industries (petroleum, petrochemicals, steel, etc.) and that this engagement would lead to local R&D initiatives. Furthermore, it was anticipated that this initial base of industrialization would serve as a foundation for future expansion into a variety of downstream industries thus strengthening the backward and forward linkages of the sector. In summary, "the amalgam of platform and downstream, with deep links back to the rest of the economy through the provision of utilities, other raw material and services would then draw up a huge swathe of the economy and, especially, a significant sector of the labor force, into a perpetual cycle of modernization, skills upgrade, and higher standard of living for the majority of the population" (Mottley 2008). Unfortunately, not all of these aspirations were realized - in particular, the broad range of downstream industries did not develop as much as anticipated, thus leading to other segments of the cycle of modernization (namely, increase in the number of persons employed within the

energy sector which in turn would lead to improved living standards for the masses) not attaining the hoped for level of development.

Because Trinidad and Tobago is a mineral economy focused on resource-based industrialization[16], it is extremely vulnerable to the fluctuations of the prices of the energy commodities on the global market. Time and again the country has experienced periods of boom followed by periods of bust. Trinidad and Tobago had become a petro-state with the following characteristics described by Watts (2005): Trinidad and Tobago was a rentier state in which the revenues generated from oil contributed significantly to the country's GDP; there was fiscal centralization – oil revenues (including taxes and royalties) were collected by the central government, and then unevenly redistributed to the population, omitting significant portions of the population from the benefits of these oil windfalls; and finally, political mechanisms played a prominent role in how oil rents were collected, distributed and spent. Trinidad and Tobago has come to exhibit the symptoms of an unstable and dysfunctional petro-state as outlined by Ian and Karl (2003) in the *Bottom of the Barrel* report. In Trinidad and Tobago the oil windfalls:

- Encouraged overzealous visions and dramatic increases in consumption appetites;
- Led to rapid expansion in public expenditures in public service wages and the establishment of non-competitive and non-profitable state enterprises;
- Created fiscal management problems;
- Led to negligence of non-petroleum sectors;
- Encouraged rent-seeking behavior.

Many of the characteristics that Watts associated with the development of oil-dominant economies are now also evident and relevant given the current situation of gas domination in Trinidad's economy.

In 1992 the government of Trinidad and Tobago published a Green Paper entitled *Energy Policy for Trinidad and Tobago,* which highlighted the government's new position and approach to industrialization. The state relinquished its role as prime investor and entrepreneur, and adopted the position of facilitator of foreign investment. The three principal components of the new industrial policy were:

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[16] Resource-based industrialization is the development of industries to further process mineral resources into a product for use within another industry.

- Establishing an infrastructural foundation for successful private sector investments in the energy sector.
- Buttressing the channels through which the state implemented industrial policy.
- Establishing in state agencies responsible for industrial policy promotion and execution, leadership in entrepreneurship and calculated risk-taking.

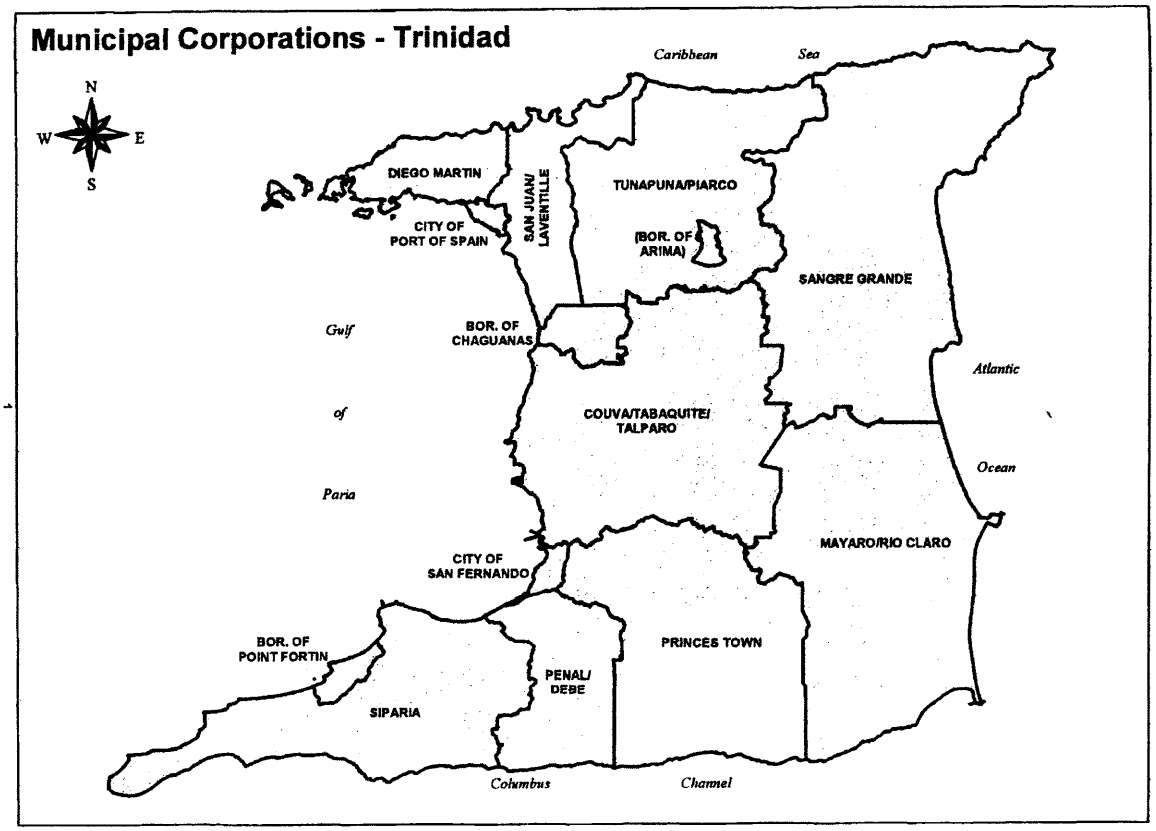
The current government forges ahead with plans to create several new industrial estates this rime the focus is on the establishment on downstream industries that will utilize the primary products of the existing industries on the Point Lisas Industrial Estate and in the Point Fortin industrial cluster. It remains to be seen if with this new wave of industrialization the wealth generated within out mineral economy via resource-based industries will reach a greater percentage of the population.

...

In the previous section I focused on the industrial evolution of Trinidad and Tobago primarily at the macro/national scale. There, I presented a broader picture of events taking place domestically and internationally and the impacts that these events had on the industrial development of the country, as well as events taking place at the national level which have had an impact on local communities. I will now turn my attention to the micro scale focusing on the industrial evolution of each of the two communities under analysis – Point Fortin and Point Lisas – from their establishment as towns to their current status and conditions.

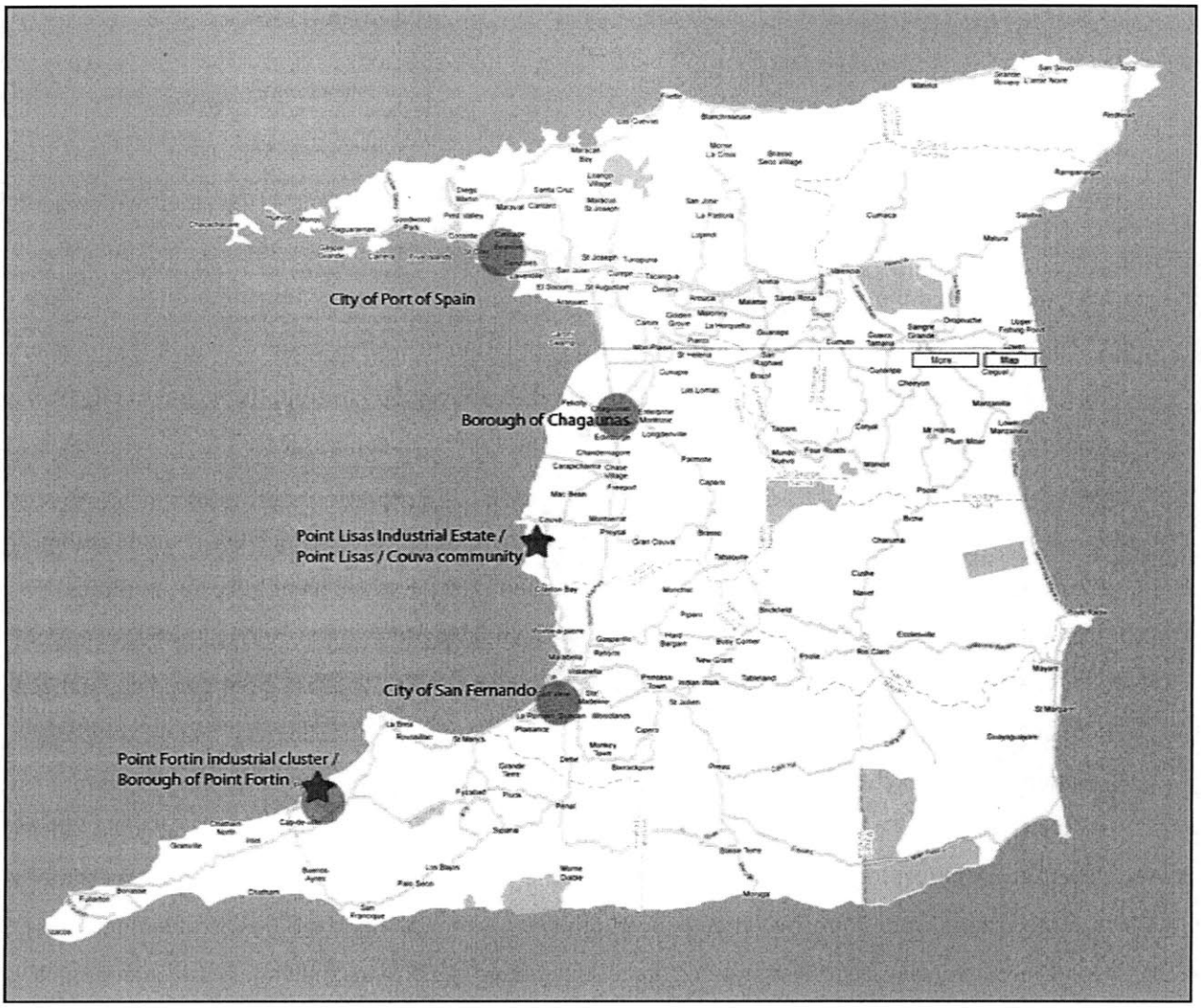
...

In Trinidad local government consists of 14 municipal bodies[17], 8 of which are regional corporations, 3 borough corporations, and 2 city corporations. Municipal bodies are responsible for the provision of community sanitation services, the construction and maintenance of local infrastructure, the maintenance of public grounds, inspection and approval of building and housing development plans, and the assessment and collection of land and building taxes (Ministry of Local Government 2008). Cities and boroughs have the additional responsibility of collecting dues and charges from markets and abattoirs, and the issuance of food badges and vendor licenses.



Map 1: Municipal Corporations of Trinidad

[17] Arima Borough Corporation, Chaguanas Borough Corporation, Couva/Tabaquite/Talparo Regional Corporation, Diego Martin Regional Corporation, Mayaro/Rio Claro Regional Corporation, Penal/Debe Regional Corporation, Point Fortin Borough Corporation, Port of Spain City Corporation, Princes Town Regional Corporation, San Fernando City Corporation, Sangre Grande Regional Corporation, San Juan/Laventille Regional Corporation, Siparia Regional Corporation, Tunapuna/Piarco Regional Corporation.



Map 2: Trinidad showing major urban centers

Point Fortin

Point Fortin is one of three Borough Corporations in the country (the other two being the Chaguanas Borough Corporation and the Arima Borough Corporation). It is located along the southwestern tail of the island of Trinidad, covering an area of approximately 9 square miles/ 23km^2. It consists of 10 communities[18] with a population of 19056 persons[19] which is equivalent to 1.5% of the national population. Point Fortin is 31 miles / 50 km from the southern city of San Fernando, and 79.5 miles /128 km from the capital, Port of Spain.

Access to Point Fortin is limited. The Southern Main Road, which has a single lane in each direction, connects Point Fortin to San Fernando. For decades there have been political promises of the extension of the Solomon Hochoy highway to Point Fortin, but these promises have not been materialized. This portion of the Southern Main Road is heavily used and in need of constant repair due to damage from heavy vehicles transporting materials to and from the industries located between San Fernando and Point Fortin[20]. Another access road to Point Fortin diverts from the Southern Main Road at Oropouche Junction, passes through Fyzabad and then Petrotrin's Forest Reserve Camp. Access through Forest Reserve is restricted to persons with authorization from Petrotrin. There are yet other access roads via Los Bajos and Erin, but these last three points of access mentioned are all quite circuitous routes, much less direct and much more time-consuming than the Southern Main Road.

In December 2008, a water-taxi service was introduced to alleviate the traffic congestion between Port of Spain and San Fernando. There are plans to have this service extended to Point Fortin with the terminal located in Clifton Hill. Coastal property was appropriated to establish the facilities associated with this water-taxi terminal, however, there is no evidence of physical work going forth towards the materialization of the promised water-taxi service.

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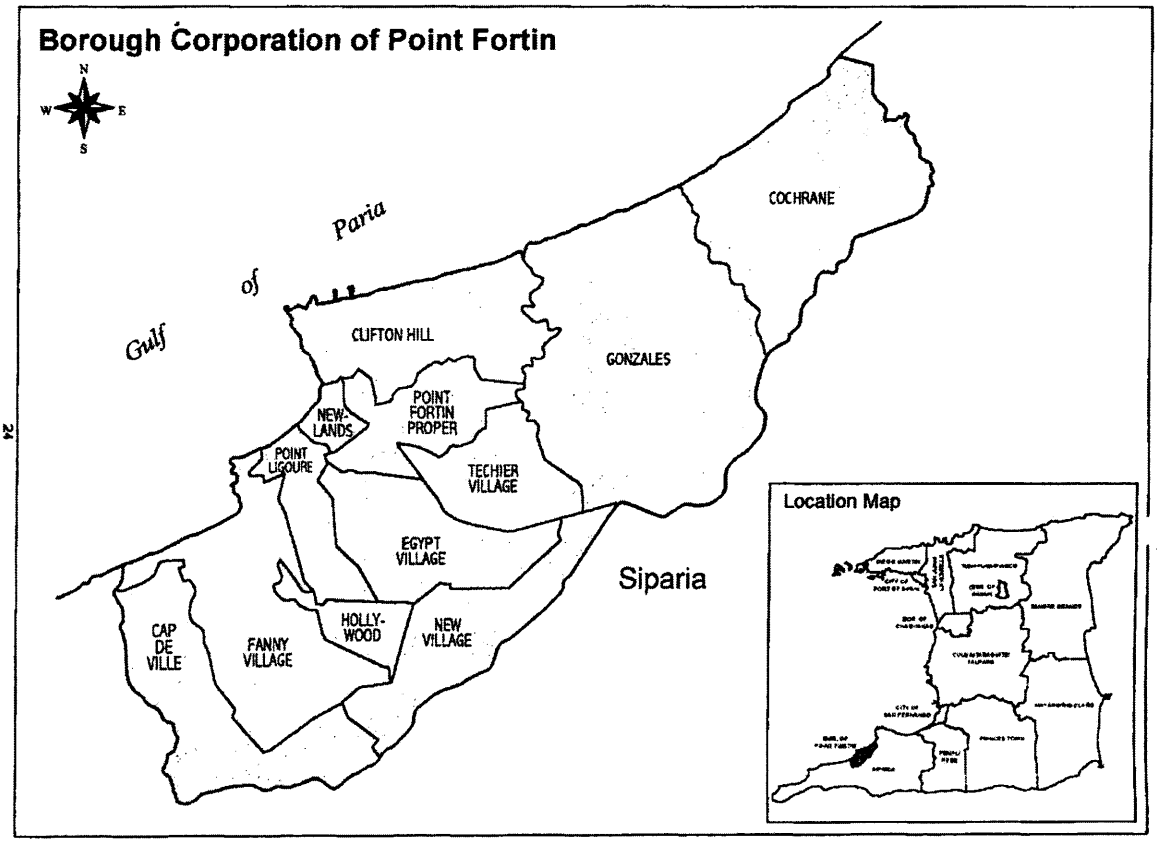
[18] Cochrane, Gonzales, Clifton Hill, Point Fortin Proper, Techier Village, Newlands, Egypt Village, new Village, Hollywood, Point Ligoure, Fanny Village, Cap de Ville.

[19] 2000 Population Census

[20] Some of the numerous industries between San Fernando and Point Fortin include the La Brea Industrial Estate Company Ltd. (LABIDCO), and the Union Estate (currently under construction) which will host an aluminum smelter as well as new power plant.



Map 3: Borough of Point Fortin

Community Name	No. Households	No. Persons	No. Dwelling Units	No. Business Places
Point Fortin Proper	925	2722	1019	343
Point Fortin Central	1433	4584	1566	247
Clifton Hill	86	307	128	19
New Lands	20	637	213	127
Techier Village	496	1534	522	50
Egypt Village	647	2106	703	51
Point Fortin North	532	1833	556	69
Cochrane	126	432	129	16
Gonzales	406	1401	427	53
Point Fortin South	2825	9897	3005	207
Point Ligoure	426	1400	443	32
Hollywood	203	765	217	13
New Village	483	1668	510	33
Fanny Village	1062	3749	1147	81
Cap de Ville	651	2315	688	48
Socially Displaced	-	20	0	0
Local Total	5715	19056	6146	866

Table 3: Point Fortin communities

Atlantic LNG, TBTL and Trinmar are located on contiguous lots along the coast, adjacent to the Point Ligoure and Clifton Hill neighborhoods. Damus is located further inland along the main road leading into the Point Fortin Central area. In total these industries occupy 110 hectares, approximately 4.6% of the area of the borough. Additionally, Petrotrin still owns roughly 1400 additional hectares of land in Point Fortin. This means that 62% of the area of Point Fortin is occupied and or owned by industrial enterprises.

Map 4: Aerial view of Point Fortin

Map 5: Aerial view of Point Fortin

The town of Point Fortin was essentially created by oil; the discovery of oil in the Point Fortin led to operations of surveying, drilling, and eventually refining bringing a resident workforce to settle in the area. Prior to the discovery of oil here in the early twentieth century, the area was undeveloped with only a couple cocoa and coconut plantation estates and few inhabitants. The development of the site is due to the Englishman Beeby Thompson, who speculated that there was oil to be found in Point Fortin, given the geological analyses conducted

by Cunningham Craig, a government-appointed geologist. Thompson also found Point Fortin to be suitable for setting up a camp, jetty and refinery. In 1906 he set out to acquire concessions for land, and authorization to obtain machinery, equipment and to engage personnel. By 1907 the jetty was built and railway construction was underway. Drilling began in 1907, and by 1910 Thompson succeeded in acquiring roughly 3800 acres of land, "the whole operation was modernized, complete with office buildings, machine ship, power plant, telephones, water supply, tankage, and extension to the railway, more roadways, and an extension to the jetty. Construction of a refinery was started" (Higgins 1996).

With the growth of oil operations in the area, the need for infrastructure, workers' housing, social services and amenities became evident. Oil operations attracted many workers, but interestingly many of these workers were migrants from Grenada rather than locals. Many locals felt that Point Fortin was too rural and unattractive and also at that time oil work was not lucrative. UBOT (a subsidiary of Shell) was primarily responsible for the development of Point Fortin since the majority of the (male) residents there were employed with the company. It constructed residential clusters in a hierarchical system based on different occupational ranking within the company. Thus, it was clear at what level one worked within the company based on one's residence. The oil industry contributed significantly to the development of the town of Point Fortin even going as far as to take over some of central government's responsibilities of provision for the residents there. For instance, they constructed a significant portion of the housing stock in the community and provided free electricity, gas, sanitation and water for residents (Mathison 1962). They also constructed and maintained the road networks[21].

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[21] "In the early days the industry was greatly hindered by complications arising from the lack of clear Government directive or policy regarding oil developments... Oilfield development was also slowed down by the lack of roads in southern Trinidad. In 1911, the Director of Public Works, Mr. Bell, proposed a major road building programme aimed at meeting current and future transportation needs. The Government agreed that a certain amount of road building should be done each year, and made plans for a series of main agricultural and oilfield roads. In the oilfield area work was started on a road from Brighton to Point Fortin, to form part of the Southern Main Road. A junction road from Fyzabad to the Guapo area was planned, but not built, and in the end this was constructed by the oil companies. Since then the oil companies have laid over 200 miles (320) of road in the area. The Rio Claro. Guayaguayare road was also started, but only 8 miles (13km) were completed b the Government, the rest being built by an oil company." - A History of Trinidad Oil, George Higgins.

Point Fortin, by all measures is a company town. Porteous (1970) describes the company town as: "a settlement completely owned, built and operated by an individual or corporate entrepreneur, ... essentially a temporary pioneering device, especially suited to conditions obtaining in nations undergoing rapid economic development. In economic pioneering the town is used to open up previously unexploited territory" [22]. Because Point Fortin is a community that was literally built by Oil, and because the oil company took over many of the responsibilities that normally would have been managed by the government, the oil company established itself as Point Fortin's patriarch, and the residents of that community came to depend on it for its needs. Initially the town sprouted roots when Beeby Thompson began his oil drilling operations there, but when larger oil companies such as UBOT/Shell began operations in the area, more advancements were made to make the town a habitable place for the workers who were permanently stationed there.

During the 1930s there was nation-wide unrest amongst labor groups protesting against low wages and poor working conditions. In Point Fortin, the workers also protested against their poor living conditions. Perhaps the most significant outcome of these protests was the formation of the Oilfield Workers Trade Union (OWTU), one of the strongest labor unions in the country even today. After the 1937 uprising, UBOT initiated a housing and community development program to provide housing for the majority of its workers, and also to provide for the social needs. In true company town fashion, housing settlements were created separating workers into different neighborhoods based on their employment status and grade within UBOT. Three principal housing neighborhoods were established:

- Clifton Hill – reserved for white expatriate senior staff.
- Mahaica – reserved for local (Trinidadian) junior staff / middle management.
- Techier Village – designated for weekly and hourly paid workers.

An exclusive neighborhood along the beachfront complete with swimming pool, tennis courts, basketball courts, golf course, yacht club and sports club, was created for the expatriates and their families. For the local residents the oil company provided recreational parks and sports

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[22] Porteous goes on to state, "As a method of social pioneering it is a means of uplifting and moulding the worker through the socio-religious ideals of the philantrophic industrialist. In both cases, however, the town's raison d'etre is the lack of initiative on the part of non-company private enterprise or local government in providing a total infrastructure for he new community. In general, extractive company towns have een the product of economic pioneering."

clubs. This manner of community development mimicked the plantation social structure in that there was a tendency to promote those of lighter complexion to higher positions within the company, and also to provide them with the better housing which was also located closer to the housing community of the white expatriates. Additionally, this created social stratifications causing further division among the community members. Even today, there still exists residue of this system of social stratification in the stigmas still attached to certain neighborhoods.

By the time that UBOT became Shell, the company's influence in life in Point Fortin was so pervasive that it entered in local politics. Shell executives elected the village council chairman and secretary, and while residents elected other village committee members, Shell had to then ratify all committee programs. From 1956 Shell began to divest its social responsibilities to the local and central government, having them assume responsibility for utilities, the hospital, and schools. The next step in divestment involved the Shell creating a program to allow employees to purchase the houses they were renting from the company.

During the *Oil Boom Years (1973-1982),* while the rest of the world was struggling through what they considered to be an oil crisis, life in Point Fortin had reached its peak in terms of economic growth and standard of living. In 1974 the government had purchased Shell's assets and nationalized the oil company to produce the Trinidad and Tobago Oil Company (TRINTOC). Much of the expatriate community returned to their country of origin and more locals occupied managerial positions. By this time several generations of Point Fortin residents had been employed in the local oil company and everyone was virtually connected to the company either directly or indirectly. It can be said that knowledge of working in the oil industry was (and still is) ingrained in this community.

In the wake of this period of prosperity came a great bust in the early 1980s. The price of oil declined steeply to US$10/barrel, and then after the government had acquired Texaco's holdings, it was decided that production at the Point Fortin refinery was no longer financially feasible and operations there would be terminated. The closure of the Point Fortin refinery had devastating effects on the community. The Point Fortin community was twice hit hard. First there was the national depression due to the collapse of the oil prices. Then second was the closure of the town's main employer, the TRINTOC refinery. With the relocation of the refinery's operations to Pointe-a-Pierre, there was an exodus of the middle class management personnel to the newly acquired refinery some 32km away, close to the city of San Fernando. Unemployment

rose as the TRINTOC relieved many of its workers. The local business sector and economy first stagnated and then went into decline. There was talk for some time about the establishment of another industry to replace the oil refinery but nothing ever came to fruition.

Point Fortin would remain in depression until its new "godfather"– the Atlantic LNG Company of Trinidad and Tobago - arrived in 1995. Construction of Train 1[23] began in 1996 and was completed ahead of schedule and under budget in 1999. This stage of construction created many jobs for the residents of Point Fortin, and once again the town economy thrived. However, once construction was complete, and the plant was in production mode, few jobs were retained because operations are highly mechanized requiring little manpower to monitor and maintain the systems. Alas, again unemployment increased in Point Fortin.

So pleased were investors and the government with the success of this first Train that Atlantic received approval to construct two more Trains which were completed in 2002 and 2003 respectively. Again, there was a brief period of prosperity with the creation of numerous jobs during construction, however, this time a smaller workforce was required because the scale of construction was not as grand because much of the groundwork has already been completed during the construction of Train 1. Again, post-construction, there was a rise in unemployment. This cycle repeated itself once again with the construction of Train 4.

Undoubtedly, ALNG is currently the largest industrial actor in Point Fortin, and its operations have the greatest impact on the activities in the community. However, let us not forget that there are three other heavy industry firms in Point Fortin, namely, Damus, Trinidad Bulk Traders Limited (TBTL) and Trinmar. Trinmar has been in existence in Point Fortin since the middle of the twentieth century, but due to its relatively small physical base which is somewhat hidden from public view, coupled with the fact that its major operations take place offshore, this industrial firm seems to always be in the shadows of its neighboring industrial firms. Today Trinmar thrives in the Point Fortin community, considered to be a permanent element in the industrial landscape of the community.

Damus began as a non-specialized labor contractor in 1973, and has successfully expanded its operations to now hold the title of the "Largest Mechanical Fabrication and

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[23] The term "Train" refers to a separate natural gas liquefaction unit.

construction Contractor in Trinidad and Tobago and the Eastern Caribbean" (Damus Ltd. 2005). This privately owned family business has a operations branch in Point Fortin to serve the fabrication needs of the heavy industry firms in the area.

Incorporated in 2003, and then launched in 2005, TBTL is the first locally built and locally owned facility in Trinidad that produces fuel-grade ethanol for export. This firm operates under special arrangements with Petrotrin – the plant is constructed on Petrotrin-owned land, and the firm utilizes Petrotrin's vacant storage tanks and port facilities. This arrangement allow Petrotrin to earn revenue from the lease of its facilities to TBTL, otherwise these facilities would be idle. TBTL is a very small firm, occupying only one hectare of land, and employing less than 50 persons. It is the newest industry to enter into the industrial cluster in Point Fortin.

Returning to the survey of industrialization in developing countries literature, one finds that the numerous publications related to industrial estates as a tool for industrialization tend to focus on the development of small to medium industries. There is no mention of the establishment of large-scale industries in developing countries understandably so because many of the then emerging economies simply did not have the capital or human resources to embark on that scale of industrialization. Again at this point I will reiterate that the situation in Point Fortin with these industrial firms does not constitute an industrial estate. What we have here instead is an industrial cluster. There was no master plan to create an industrial estate here, instead industry developed in support of mineral-extraction activities in the area.

Point Lisas

The Point Lisas Industrial Estate lies within the Couva/Tabaquite/Talparo Regional Corporation (CTTRC). It is one of the largest regional corporations in terms of physical expanse (it covers approximately 277.85square miles/719.64 km²), but is also one of the most sparsely populated municipal corporations in the country, with a density of 230 persons/km². There are 93 communities within the CTTRC, with a total population of 162,779 persons[24]. Out of these 93 communities, the area of analysis, which is equivalent to the "host community", is comprised of 17 communities with a total population of 33203 persons[25]. This cluster represents roughly 20% of the total population, number of households, number of buildings, number of dwelling units, and number of institutions of the regional corporation, and 27% of the number of business establishments. These communities lie within a 4-mile radius of the estate and are all west of the Solomon Hochoy Highway which is the main north-south connector route throughout the island.

Total Area	277.85 square miles / 719.64 km²
Number of communities	93
Total Population	162,779
Density	230 persons / km²

Couva is the main urban center for this regional corporation. Its location puts it in a strategic position to access surrounding major transportation routes, commercial centers, and industries:

- It is close to Chaguanas, the fastest growing area in Trinidad, perhaps soon reaching city status. It is one of the densest commercial areas of the country. Chaguanas is about 8.5 miles from Couva.
- It lies along the Southern Main Road which connects main urban centers Chaguanas and San Fernando. Prior to the construction of the Solomon Hochoy highway, the Southern Main

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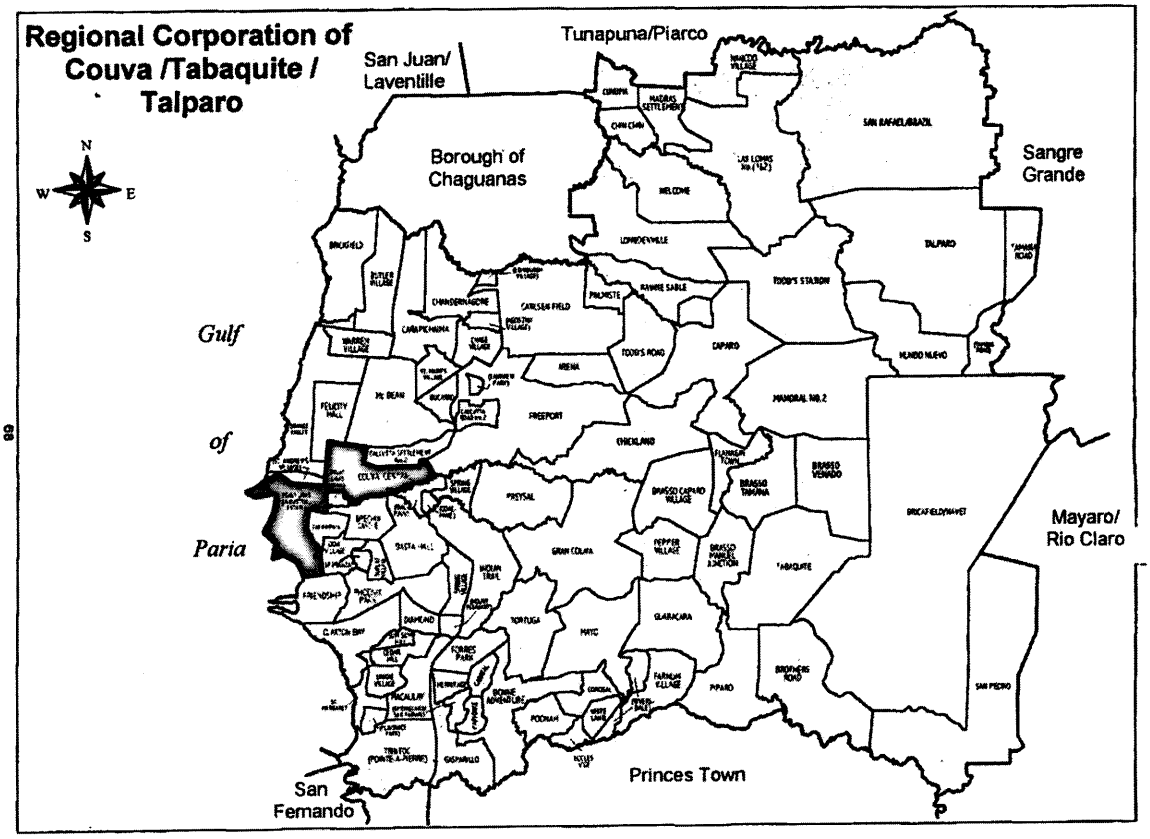
[24] 2000 Population and Housing Census Trinidad and Tobago. See appendix for full listing of all communities within CTTRC.

[25] The communities included are: Basta Hall, Brechin Castle, Calcutta Settlement, California, Couva Central, Dow Village, Esperanza, Felicity Hall, Friendship, McBean, Orange Valley, Ouplay, Phoenix Park, Point Lisas Industrial Estate, Point Lisas (NHA), Spring Village, St. Andrew's Village.

Road was the main thoroughfare connection the north and south of the island. Persons living and working between San Fernando and Valsyn still heavily traverse it.

- It is also easily accessible off of the Solomon Hochoy highway that spans most of the north-south axis of Trinidad.



Map 6: Couva/Tabaquite/Talparo Regional Corporation

Community Name	No. Households	No. Persons	No. Dwelling Units	No. Business Places
Basta Hall	336	1369	347	17
Brechin Castle	95	384	97	28
Calcutta Settlement	152	680	147	21
California	714	2716	703	125
Couva Central	884	3262	889	394
Dow Village	898	3603	873	82
Esperanza	86	326	82	9
Felicity Hall	122	529	121	8
Friendship	65	212	83	17
McBean	1202	4977	1237	129
Orange Valley	255	1102	260	18
Ouplay Village	204	786	209	16
Phoenix Park	386	1507	386	30
Point Lisas Industrial Estate	626	2491	627	214
Point Lisas	786	2874	792	36
Spring Village	695	2631	689	59
St. Andrew's Village	731	2754	735	59
Local Total	8237	32203	8277	1262
National Total	343180	1262366	353097	
% Of National Total	2.4	2.5	2.34	

Table 4: 17 Communities included in area of investigation

Constructed in the late 1960s, the estate went through many years of poor performance, before the government of Trinidad became the majority shareholder in the late 1970s, after which the estate became a prosperous enterprise. The estate now covers 860 hectares and hosts 78 tenants ranging from heavy industries – methanol, urea, ammonia, natural gas – to light industries – food – to service industries and retailers. (See attached list of tenants). There are now plans to expand this estate on adjacent lands to create 1725 hectare the Point Lisas South and East Industrial Estate.

Highlights of the Point Lisas Industrial Estate:

- World class petrochemical and industrial estate of 860 hectares
- Over USD$3 billion invested in estate development and equipment
- 9 Ammonia plants
- 1 Urea plant
- 7 methanol plants
- 1 iron and steel plant
- 1 natural gas processing plant
- 1 chlorine plant
- 1 iron carbide and 1 hot briquetted iron plant
- 2 power generation facilities
- 1 desalination plant

The Point Lisas Industrial Estate (PLIE) was created on what was formerly land owned by the national sugar company (Caroni 1975 Ltd). It was the South Trinidad Chamber of Industry and Commerce (STCIC) who initiated the idea of this industrial estate. Stakeholders and businessmen in the south felt their prosperity threatened when the main southern port of San Fernando was closed and so the only main port of entry for their goods was the Port of Port of Spain in the capital. The businessmen first thought of creating a southern port to match the capacity of the one in Port of Spain, but then they eventually began to toy with the idea of an associated industrial estate to further expand industrialization in the southlands. This industrial estate would host natural gas based heavy industries geared towards export.

Map 7: Aerial view of Couva/Point Lisas with the Point Lisas Industrial Estate

At the time of PLIE's inception, Couva was a small agricultural town with strong roots in the sugar industry. In fact, just adjacent to the main entry of PLIE was the country's main sugar refinery – Brechin Castle. Many of Couva's (as surrounding neighborhoods) residents were employees of the sugar industry and did not see much opportunity for long term employment with the new industrial estate because many of them had only basic levels of education, and were inexperienced with industrial labor – up to this time the main activities in this vicinity were linked to agriculture and industry was a foreign sector to these local residents. As was to be expected, there were protests against the industrial estate on the grounds that the sugar industry workers saw it as a threat to their livelihoods. In 1975 the government acquired the sugar refinery, incorporating the sugar company as Caroni (1975) Ltd. It is reported that Caroni (1975) Ltd. was profitable only for one year during its existence - and that was during its first year of operation under state ownership and management. Many locals felt that Caroni was not a worthwhile investment as it was constantly pulling resources from the nation's treasury.

During its development, the planners of PLIE constructed some 1100 houses adjacent to the estate. It was hoped that these houses would be allocated to the estate workers. Instead, these residences were taken in by the government as addition to it social housing stock. Proposals were also made to create an executive-type neighborhood in the area to house the expatriates who worked on the estate, but Caroni (1975) Ltd. refused to release any more of its lands to the industrial estate. It should be noted that when the STCIC acquired lands for the industrial estate from Caroni, Caroni was still foreign owned and managed. In their defense the STCIC and planners claim that these lands were poorly suited for sugarcane cultivation and so was not much of a loss to Caroni. On the other hand Caroni workers felt that their lands had practically been given away, and the loss of land resulted in workers having to relocate to other plots of land.

Caroni and PLIE continued to co-exist for more than 25years, until Caroni's closure in 2003 leaving 10,000 workers unemployed. Since inception in 1975, Caroni (1975) had been an unprofitable[26] state enterprise that continuously and exceeding burdened the national treasury. There are no reports tracking the movements of these employees to determine how many remained in retirement, how many are now working for other companies, how many are now self-

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[26] Caroni (1975) achieved profits in only one year of its 28-year existence – that was in 1975, the year of its inception.

employed, into which new fields have these former sugar workers ventured, the age of these workers at the time of their voluntary separation, etc.

From my personal observations, it appears that the residents of Couva/ Point Lisas have a somewhat distant relationship with the PLIE, and their attitude towards the industries can best be described as lukewarm to indifferent. While some are employed directly with companies on the estate, many are employed in the local business sector. Without a doubt the PLIE has given rise to the growth in the service sector (particularly restaurants, industrial servers, and general contractors) of Couva, but still only few local residents are employed directly with estate tenants.

Chronology of milestones in energy industries in Trinidad and Tobago

- 1866 – Darwent well drilled in Aripero. First successful oil well drilled.
- 1908 – Commencement of commercial production of oil in Trinidad.
- 1909 – 1912 – More than 57 new oil companies established in Trinidad.
- 1912 – Commencement of oil refinement by UBOT at new refinery in Point Fortin.
- 1929 – US stock market crash.
- 1956 – TLL bought over by Texaco.
- 1956 – Establishment of the People's National Movement political party.
- 1956 – Establishment of the South Trinidad Chamber of Industry and Commerce.
- 1960 – BP acquires assets of Apex Oilfields.
- 1961 – BP acquires assets of KTO.
- 1962 – Trinidad and Tobago becomes an independent state.
- 1963 – Commission of enquiry established to investigate the prospects of further developing oil industry.
- 1966 – PLIPDECO established.
- 1969 – Amoco finds substantial oil reserves off east coast of Trinidad.

---------- 1st wave of industrial policy in Trinidad and Tobago ----------

- 1969 – Government acquires local assets of British Petroleum.
- 1971 – Government becomes main shareholder in PLIPDECO.
- 1972 – Establishment of the National Petroleum (NP) Marketing Company of Trinidad and Tobago.
- 1973 – GDP US$1,309 million; foreign exchange reserves US$47 million.
- 1973 – Arab-Israeli war, and ensuing oil restrictions causes oil prices to jump from US$2.50/barrel to US$34.00/barrel.
- 1973 – Creation of the National Gas Company of Trinidad and Tobago (NGC).
- 1974 – Government purchases refinery and land holdings of Shell.
- 1974 – Government introduces Petroleum Taxes Act - new petroleum taxation policy designed to extract more revenue.
- 1975 – Government hosts conference entitled *The Best Use of our Petroleum Resources.*

- 1977 – Launch of nation's gas-based development initiatives with the production of ammonia by Trinidad Nitrogen Company (Tringen).
- 1978 – Peak oil production at 240,000 barrels/day.
- 1979 – Establishment of the National Energy Corporation (NEC) to facilitate gas-based industries.
- 1980 – Commencement of production at the Iron and Steel Company of Trinidad and Tobago (ISCOTT) at PLIE.
- 1981 – Launch of Fertilizers of Trinidad and Tobago (Fertrin) ammonia plant at PLIE.
- 1982 – GDP US$8,140 million; foreign exchange reserves US$3,080 million; government revenue peaks at TT$7.118 billion.
- 1983 – Launch of Urea Company of Trinidad and Tobago at PLIE.
- 1984 – Launch of Trinidad and Tobago Methanol Company (TTMC).
- 1985 – Government purchases Texaco Trinidad Incorporated.
- 1986 – Oil prices plummet to US$10/barrel.
- 1989 – Trinitopec and Trintoc initiate the Lease Ownership and Farm Out programs – invitation to small companies to re-establish active roles in upstream activities and to bid for control of land on which they can conduct exploration and production.
- 1990 – Foreign exchange reserves drop to US$492 million (down from US$3080 million in 1982); external debt US$2,508 million.
- 1991 – Establishment of Phoenix Park Gas Processors Ltd. (PPGPL) to extract valuable liquids from gas stream.

---------- 2nd wave of industrial policy in Trinidad and Tobago ----------

- 1992 – Publication of Green Paper "Energy Policy for Trinidad and Tobago". Pivoting point for industrialization in Trinidad – government no longer chief entrepreneur and investor in industrial projects.
- 1993 – Launch of Caribbean Methanol Company (CMC) – first totally private sector financed petrochemical plant at Point Lisas.
- 1993 – Gas production at 400mcf/day.
- 1995 – Metals Industry Company (MIC) Limited established to train personnel in metal crafts.
- 1995 – Atlantic LNG Company of Trinidad and Tobago formed.
- 1996 – Construction of the Atlantic LNG plant in Point Fortin commences.
- 1996 – Gas production surpasses that of oil.

- 1998 – National Energy Skills Center (NESC) established to train personnel in plant construction, process-plant operations, and plant maintenance.
- 1999 – Launch of production of liquefied natural gas (LNG) in Trinidad at the Atlantic LNG plant in Point Fortin (Train 1).
- 2000 – Construction of ALNG's Trains 2 and 3 commences.
- 2002 – Atlantic LNG's Train 2 begins production.
- 2003 – Atlantic LNG's Train 3 begins production.
- 2003 – Gas production at 1500mcf/day.
- 2004 – Government launches Local Content and Local Partnership Policy Framework.
- 2005 – Atlantic LNG's Train 4 begins production.

Future Industrial Estates

The National Energy Corporation is currently undertaking plans to establish several new industrial estates throughout Trinidad. The overall goals of establishing these estates are to encourage more energy intensive industries while simultaneously expanding out into a broader base of downstream industries. The four new planned industrial estates are:

- The Point Lisas South and East Industrial Estate – this new estate is currently under construction and is located adjacent to the existing Point Lisas Industrial Estate which is filled to capacity. It will accommodate a steel plant, and an ethylene complex, amongst other industries. This estate will be the largest (in terms of area) in the country at 1,725 hectares.

- Union Industrial Estate – this estate is also currently under construction and will accommodate an aluminum smelter and a UAN plant. This estate will be 325 hectares in area, and is 4 miles (6.5km) north from Point Fortin along the Southern Main Road.

- Chatham Estate – a court ruling has stalled plans for construction of this estate indefinitely. Local residents protested against the establishment of the estate claiming that the environmental impact assessments conducted in the area were inadequate and inaccurate, and that the local environment as well as their livelihoods would be irrevocably damaged. Estate size – 935 hectares, 2 miles south from Point Fortin, along Southern Main Road.

- Oropouche Bank Offshore Reclamation – this estate will be located 3.5km off the southwestern coastline of Trinidad and will accommodate a cluster of gas-based industries. Size – 1400 hectares.
  (National Energy Corporation of Trinidad and Tobago 2009)

While there is oftentimes opposition to the placement of industrial estates in certain communities on the argument that the imminent industrial development will disrupt the existing livelihoods and not provide adequate positive spillovers as compensation, there have also been the contradictory argument that certain communities are being given preferential treatment by locating industrial estates in their midst. It is assumed that these communities will in fact benefit

from the positive spillovers that the industrial development will bring. Even though the process of site selection for new industrial sites appears to be an objective process based on a list of primarily physical characteristics[27], there are still allegations of preferential treatment in the allocation of these resources. According to Mottley (2008), "an independent observer would agree that the location of industrial estates in Trinidad and Tobago has been based on pragmatic engineering and business considerations. However, the location of the industrial estate at Point Lisas (rural/Indo) during the first boom provided the rural/Indo constituency with highly favorable access to employment, skill upgrade, and sub-contracting and spin-off business opportunities. Now that the Point Lisas estate has reached its capacity the location of new industrial estates at La Brea, Point Fortin... all in Afro constituencies, is being remarked upon. In the growing racial tensions in Trinidad and Tobago, the location of the new industrial estates is regarded by Indo-Trinidadians as disturbing the present equilibrium, while in the view of Afro-Trinidadians, balance is being restored!" These fears of preferential treatment, of disturbing or restoring balance, are unfounded. Belying these assertions is the assumption that these spillovers are guaranteed to present themselves because of the existence of the industrial estates. I contend that this is not so, and that there are many other contributing factors which will determine how much the host community can and will indeed reap these benefits. Factors such as existing employment pool, accessibility of location, existing economic structure and activities, political structures, access to education and training, local content and local partnerships, just to name a few. Some of these factors will be explored further in this paper.

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[27] Site Selection Criteria:

- Large contiguous parcel > 400 Ha
- Preferably zoned or compatible with industrial use
- Adequate and available external infrastructure
- Affordable, guaranteed, reliable bulk utilities easily available
- Proximity to or potential area for developing deep-water port and harbor facilities nearby
- Stable geological setting - emissions, dip, flows, seeps, mineral, seismicity
- Favorable geotechnical properties to minimize construction costs
- Topography that minimize costly engineering and earthworks
- Minimum environmental / social conflicts for mitigation
- Minimum occupancy and encumbrances to clear
- Ease of acquisition / preferably owned by the State (NEC 2009)

Symbioses

In this research project I attempt to discover the symbioses that exist between industrial estates and their host communities in Trinidad. By "symbioses" I am referring to the positive spillovers that are generated as a result of the interaction between the two entities – the industries and the communities. These symbioses or positive relationships are bi-directional, meaning that they benefit both the industrial firm and the community.

Comparison compatibility

An issue that ought to be addressed here is the entity classification difference between the site in Point Fortin and the one in Point Lisas. More specifically, I am referring to the fact that I have chosen to compare the industrial cluster in Point Fortin to the industrial estate in Point Lisas. The formation of the cluster of industries in Point Fortin occurred organically, and with no common landlord or manager each firm remains independent in establishing its own infrastructure and utilities. On the other hand, in Point Lisas the industrial estate is a sort of base camp with basic infrastructure and utilities into which the tenant firms "plug-in" their plants and factories. The Point Lisas Industrial Port and Development Company (PLIPDECO) serves as landlord and estate manager for all the tenants. Despite these differences in classification, which in turn reflect fundamental differences property management, these two sites still present themselves as strong cases for comparison. While there are many industrial estates for light industries throughout the country, the chosen sites in Point Fortin and Point Lisas are the only two that host a cluster of energy-intensive, heavy industries. My deeper interest lay in discovering the symbioses that are generated between clusters of heavy industries and their host communities.

Heavy industries tend to be more capital and energy intensive and less labor intensive than light industries which tend to be labor intensive. The products of heavy industries tend to be intermediates for use as inputs into other industries, while those of light industries tend to be consumer products. Many of the industries contained in each of the two sites contain firms that produce intermediate products such as methanol, ammonia, urea, LNG, ethanol, etc. Thus the fundamental common threads between the two sites are the scale and nature of their industries'

operations (energy and capital intensive) and the types of products produced (intermediate products).

Key Factors to the Relationships

The current state of relationships between industrial estates and their host communities in Trinidad and Tobago are the result of the convergence of a number of conditions. Not surprisingly there are significant differences between the nature of the relationship between the Couva/Point Lisas community and the PLIE on the one hand, and the Point Fortin community and its local industrial cluster. For instance, one striking difference in the attitude of local residents towards their industrial neighbors – in Point Fortin there is an endemic sense of entitlement to the provision of public goods and social amenities by the industrial firms amongst the residents, while in Point Lisas this sentiment is not as strongly espoused. Key factors contributing to some of these differences are local history (and prior relationship with industry), size of the industrial estate (cluster) and its number of tenants, and location and accessibility.

History

Point Fortin has had a much longer relationship with heavy industry than has Couva/Point Lisas. The town was created as an industrial town (and also as an company town), and for decades almost all facets of life there (work, school, recreation, health facilities, utilities, etc.) were associated with the local oil company (first UBOT, then Shell). In order to exercise greater control over the on-goings in Point Fortin, the local industry adopted many of the responsibilities that would have typically fallen as the state's burden. Decades and generations of this sort of paternalistic relationship engendered a dependency syndrome amongst the residents. Today, the Atlantic LNG and Trinmar bear the brunt of the burden of attempting to meet their social expectations to the local community while at the same time trying to not engage in practices that would continue to foster the community's dependency on industry for its everyday needs.

Conversely, Couva/Point Lisas has had much shorter exposure time to heavy industry (approximately 40 years), had a strong agriculture heritage prior to the introduction of industry (this agricultural heritage is still very strong in the area), and its community developed for the most part independently of the industrial estate. Therefore the residents of this community have a more distant and less dependent relationship with its industrial neighbors. Even though there is a much higher degree of industry concentration in this area than in Point Fortin, there is the feeling

that life in this area does not revolve around industry, and other economic sectors (such as agriculture, services and retail) co-exist and thrive along with industry.

Scale

To continue with the point of the scale of industrialization, unlike Point Fortin, there are so many more industries in Point Lisas that it is more difficult for the community to develop intimate relationships with each of these industrial tenants. The estate is managed by a separate property management company (PLIPDECO) that is responsible for ensuring that the estate layout, safety and security measures meet national standards. Therefore, the burden of responsibility falls on PLIPDECO to monitor the industrial activities on its estates, and similarly the industrial tenants may feel less obligated to engage with the community because the burden of this engagement is diffused amongst so many tenants (a case of diffusion of responsibility). In Point Fortin with so few tenants (in actuality, four firms), there is more pressure on the individual industries to engage with the community. In a sense the firms here are more "visible" and coupled with this visibility is the higher expectation of engagement because of past experiences of having extensive interaction with industry.

Location and Accessibility

Point Fortin is the southern-most urban center on the western side of Trinidad, and can almost be considered to be a dead-end town. Commuting to and from this town is challenging and many believe that if road conditions are improved this would encourage more firms and businesses to be established there because the town would then be more accessible. The next closest urban center where there is a concentration of employment opportunities is the southern city of San Fernando, 32km away. Although not too far in terms of linear distance from Point Fortin, the journey to San Fernando is long and arduous due to the poor condition of the narrow, twisting roadway, and also to the heavy traffic load that traverses it daily.

Couva/Point Lisas is also more favorably located than Point Fortin. This area is just off the Solomon Hochoy highway which is the main north-south thoroughfare in Trinidad. The Southern Main Road also passes through the Couva/Point Lisas area; this is the main secondary north-south thoroughfare in Trinidad. The location of this town is also advantageous because it is in between the country's two main cities, Port of Spain in the north, and San Fernando in the south. And then finally, it lies just 15 minutes south of the fastest growing urban center in

Trinidad – Chaguanas. This strategic location allows Couva/Point Lisas to be exposed to the spillovers generated by the economic activities taking place in these neighboring towns. Similarly, it is likely that the spillovers from the industrial activity in the area is not contained within the area because of the high degree of accessibility. For instance, because Couva/Point Lisas is easily accessible from either north or south, there may be more persons commuting from other parts of the country here, than is the case in Point Fortin which is more remotely located. Furthermore, the port of Point Lisas serves both as an industrial and commercial port, and its relatively easy accessibility to major on-land thoroughfares allows for easy transport of imports and exports. This high level of accessibility makes the Couva/Point Lisas an attractive location for the location of firms; in turn the establishment of firms leads to job creation.

The State

It must be noted that there is a third entity that serves as a facilitator for the dynamics between industries / industrial estates and their host communities. This is the state – the central government. It is the state, through its various regulations and policies, who defines the interface between industry and community. For instance it is the state (through the Ministry of Trade and Industry) that designs and defines policies related to strategies for enticing foreign investors such as tax holidays. The National Gas Company and eTeck are the two government agencies responsible for establishing new industrial estates as well as attracting tenants to set up their firms in Trinidad. Representatives from these companies actively seek out new clients by presenting papers about industry in Trinidad and major conferences, and also hosting major conferences locally so that foreign investors can experience first-hand investment and industrial conditions in Trinidad. One final strategy for attracting foreign investment is posting advertisements in major industry journals.

It is the state, in this case the Ministry of Energy and Energy Industries (2004), that generated the Local Content and Local Participation Policy and Framework for the Republic of Trinidad and Tobago Energy Sector which outlines how industries' initiatives can align with Government's policies to facilitate the growth of national capacity through education and training. The report also highlights mechanisms for incorporating local content and participation through the employment of nationals, contracting local companies and utilization of local capital - while still permitting industries to maintain their commercial integrity.

It is also the state that establishes the framework for how firms ought to "behave" as neighbors within a local community. Since the local government, and far less the local community members, have the opportunity to meet with industry representatives prior to the final decision to site an industrial estate, it is the state that sets the tone for future dialogue and interaction between industry and community. While there is to a certain extent direct interaction between industry and community, it is the state that sets the foundation for how well these relationships can prosper, and it is the state that can facilitate greater interaction by imposing mandates on education and employment as select examples.

Further exploration of these symbioses follows, and even though they are explored as separate topics, it should be noted that there is overlap amongst the symbioses owing to their interconnectedness.

While the differences between locales are substantial, there are also substantial similarities in the way that these communities and their industrial neighbors have connected, namely through **community development and employment**. Having greatest symbiotic strength in these areas should come as no surprise because community development and employment are interconnected threads.

Employment

Job creation is perhaps the most anticipated spillover to be generated from the presence of industrial activity in any given area. Since the discovery of oil back in the mid-nineteenth century, industrial activity was perceived as something to aspire to and encourage because "such activity would increase local trade and employment. Successful results would attract other venturers who "...would spend their dollars in renting our houses, buying our horses, patronizing our hardware and other stores, and buying up our waste land"" (Higgins 1996). However, job creation is one spillover that cannot be contained only for the benefit of the members of the host community. It is one such spillover that conceivably benefits the entire nation (especially given the small size of Trinidad), but it is likely to more so benefit those most close to the source (granted they have the necessary skills).

The situation in Point Fortin is such that apart from the industrial firms, there are a few service firms, retail outlets and government agencies that provide employment, but even collectively their numbers do not compare with those of the industrial firms. Employment opportunities outside of the industrial firms are very limited, leaving many residents to be self-employed, or to engage in informal activities. Many persons fall outside of the realms of industrial employment, service employment, self-employment and informal activities[28], and thus are unemployed. In addition to the limited employment opportunities available within Point Fortin, the town's location also presents a challenge when it comes to seeking employment.

The employment situation in Couva/Point Lisas is somewhat different to that previously outlined for Point Fortin. For one, given the vast number of firms on the PLIE, there are more opportunities for industrial employment in this area[29] and employees can more easily move between firms and are not as pressured to remain loyal to one company. The number and variety of firms located in Point Lisas has generated a much larger service sector here than in Point

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[28] These categories are not mutually exclusive.

[29] Even though many of these firms are capital-intensive, and not labor-intensive, collectively they offer more job opportunities than in Point Fortin.

Fortin. Here service firms (e.g. industrial component fabricators, plant cleaners, warehousing firms, etc.) are tenants on the PLIE and also located throughout Couva proper and beyond.

In addition to bustling industrial and commercial activities taking place in the Couva/Point Lisas area, agriculture is still an active and thriving sector in this area. The reader should recall that the country's main sugar refinery, Brechin Castle, was located in Point Lisas within eyeshot of the PLIE. The closure of the refinery in 2003 because of the financial burden of its operations on the state, left 10,000 persons jobless[30]. Since then, some have found jobs in other sectors, some have entered into early retirement, and some remain unemployed. The government has been offering retraining programs for the former sugar workers to assist then in acquiring skills that will help them find other employment, however, the success rate of this program is unknown.

Operations and Product types

The number of jobs created by the various firms differs greatly depending on the nature of their operations, and in turn the type of end product. The tenants of the industrial estates under investigation are either directly or indirectly involved in energy (oil and gas) related industries. But even within this categorization there are many differences. Oil related industries generate more jobs and are thus more labor-intensive than gas-based industries. With gas-based industries in particular there are great differences in the number of persons employed and amount of revenue generated. Gas-based industries typically fall under one of three broad categories based on the type of end-product:

- LNG production – these operations utilize large quantities of natural gas (60% of gas stock), and generate significant revenues. However, little employment is generated due to the heavy use of machinery in the operations.
- Petrochemical production – with these operations there is moderate use of natural gas (30% of gas stock), with moderate levels of employment generation, and large revenues generated from the products. Petrochemical production offers the opportunity to develop the entire gas industry value chain.

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[30] Not all 10,000 persons were located in the Couva/Point Lisas area. The state's sugar estate holding spanned vast expanses of the country, and so these 10,000 persons were well distributed throughout, perhaps with a higher concentration near to the main sugar refinery.

- Metal production – least gas utilized amongst the three options (10% of gas stock), but greatest generator of employment (and in particular, skilled jobs). However, it does not generate as much revenue as the other options. With this production line there is also the greatest concern about environmental emissions.

Services

In Point Fortin, the 4 firms in the industrial cluster are engaged in a variety of operations from offshore oil drilling, to industrial fabrication, to ethanol production, to natural gas liquefaction. Even though the firms participate in a variety of operations, many of these operations are not labor-intensive and thus not many jobs are created directly.

In Point Lisas, of the 78 tenants of the industrial estate, 28 are heavy industries, 12 are light, and 38 are related to services. Here, there is an even wider variety of types of operations and products. Not only are more jobs created where there are more firms present (even if many of them are not labor-intensive), but these firms in turn call for a number of service providers, and in turn it is the service provider firms that then create many jobs.

With a smaller number of firms engaged in a smaller variety of operations, in Point Fortin there are less service firms and thus less permanent employment. In Point Lisas the prospects or job creation are much greater because of the greater number of firms, the wider range of activities in which they are engaged, and in turn their greater need for a variety of services. The point here is that with heavy industry there is not much direct job creation because many of the firms' operations are mechanized. However, heavy industries require many different services and it is in the provision of these services that jobs are created.

Service provision offers a variety of employment options and greater number of job positions than do the heavy industries. Unfortunately many local service providers are often overlooked in preference to foreign service providers. As was briefly mentioned in the previous section, the government of Trinidad and Tobago has begun to take steps to ensure that foreign firms utilize local labor in their operations. In the past there have been claims of inferior performance of local firms and workers. Many of these claims have been found to be ungrounded and have been dismissed. While the government established policies to ensure that foreign companies utilize local labor, the local service providers must also ensure that they can perform the requested task just as well as another foreign firm. In her research into the implementation of local content mandate by industries, Lou Anne Barclay, UWI Professor, found that one of the condition for the construction of the Atlantic LNG plant in Point Fortin was for US$100million be spent by foreign firms on services provided by local companies. In actually, only

US$25million to US$33million was estimated to have been spent. With such revelations, one has to wonder if there is really an issue of local firms not having enough experience, or equipment, or whatnot, or if the real matter at hand is that the parent company wants to pocket all the payments.

Training

The relationship between industries and tertiary-level academic institutions is symbiotic in nature with each party benefitting from the assets and resources of the other. Each is a complementor to the other seeking various interests that are not mutually exclusive. For instance, the academic institution cite access to additional research funding and industrial technical expertise, internships for students, and employment opportunities for their graduates, as incentives for them to pursue this relationship (National Science Foundation 1982). From the industrialists' point of view, the benefit from access to highly trained students and professors who are engaged with the latest technologies, access to the university's facilities and resources, and an enhanced public image through these social relationships (Phillips 1991).

There are currently a number of partnership programs between industry and acadmia. These types of programs serve to further strengthen the industry-community symbiosis. The University of Trinidad and Tobago has set out to bridge the gap between industry and academia by tailoring its academic programs to be more aligned with industrial trends. Many students are obliged to complete a training period with as assigned industrial partner as a graduation requirement. Students benefits from the real-world experience they are exposed to while the industry has the opportunity to learn about new and different techniques relevant to their operations.

The NESC was established in 1997 to provide industrial training in order to fill the deficit of skilled labor in the industrial sector. Funding to support the NESC comes from contributions from energy industries operating in Trinidad. Some of the main contributors are Atlantic LNG, Methanol Holdings Ltd., NGC, and Petrotrin (Energy Corresondent 2002). These companies were the part of the initial group approached by the government to sponsor these training centers and their hosted programs, subsequently other companies have been asked by the government to contribute 0.5% of their recurrent costs to training. (Barclay 2003). However, as Barclay has also noted, this approach to funding a government-initiated training program is not sustainable because it depends on the benevolence of the host industries. While the industries themselves do

stand to gain from this investment because the program trains persons in industry skills, the demand for these skills will eventually be met with a surplus of labor.

Many of the partnership programs between industry and locals exist at a national level and are not specific to either of the host communities. However, it should be noted that because there is a much greater number and concentration of industrial firms in Point Lisas there are more opportunities for training within this area. Residents of Point Fortin have fewer options with there being only four industries in that vicinity, with only two out of the four (ALNG and Trinmar) known to offer traineeships. However, it should be noted that the Atlantic LNG Company has several training programs specifically for Point Fortin residents to increase the employment opportunities of the residents as well as to ensure that the company itself has a readily available local employment from which to select employees. Other training opportunities come through industry-academia partnerships.

With the majority of heavy industries in Trinidad being foreign-owned it becomes even more important for the government to assert itself as the intermediary between the industry and the community and assure each side that theirs wants and needs are being considered in the process of trying to negotiate the best deal for both parties. Barclay (2003) had found that positive spillovers (particularly for the host locale) manifest themselves when the government of the host country implements selective intervention policies. These policies are aimed at elevating indigenous technological capabilities through the transfer of advanced technological know-how from the foreign investor to the local worker.

Community Development and Corporate Social Responsibility (CSR) programs

This is perhaps the most current and obvious evidence of industrial engagement with community development projects in the local communities. A wide range of community development programs are explored in this section ranging from emergency response planning, to housing, to agriculture, and to environmental remediation.

In both Point Fortin and Point Lisas there is evidence of strong symbioses in community development programs. In each case, industrialists have made significant contributions towards the establishment of community facilities (e.g. the public swimming pool in Point Fortin sponsored by Atlantic LNG; the demonstration garden in Point Lisas sponsored by PPGPL; etc.) and non-infrastructure community development programs such as Atlantic LNG supporting the seed bank agricultural program hosted by the Ministry of Agriculture, Land and Marine Resources in Point Fortin, and Methanex's Community Advisory Panel (CAP) hosting self-esteem and career advisory program with community youth.

In Point Fortin it appeared that only two of the four firms – Atlantic LNG and Trinmar - engaged in (sponsored) community development programs. It must be reiterated that because Point Fortin originated as a company town, and in fact today still bears some of the residue of that legacy, its residents have had a much more intimate relationship with its industrial neighbors than have residents of Point Lisas. Over the years these firms have engaged with community members to assist with the realization of various projects of all kind, however, it is unclear whether there are mechanisms in place to evaluate the efficacy of these sponsored projects in order to help the firms assess the best types of project in which to invest.

Below are summaries of some summaries and descriptions of programs various community development programs sponsored by Atlantic LNG in Point Fortin:

- Point Fortin's Finest – each year Atlantic LNG awards $1000/year bursaries to the top 10 Point Fortin primary school students who score the highest on the Secondary Education

Assessment (SEA)[31] exam. Successful students will receive these bursaries throughout the entire period of the secondary schooling.

- Community Achiever's Programme – this program was launched in 2001 and since then every year ALNG invites community groups to submit proposals for infrastructural projects for which they are seeking assistance towards implementation. Successful applicants receive grants to finance their projects, as well as "Atlantic-sponsored" training to teach various project management skills.

- The Apprenticeship Programme – a three-year training program in Process Plant Operations, Lab operations, Electrical and Instrumentation Engineering, or Mechanical Engineering for Point Fortin youths between the ages of 18 and 30 years. Program participants will receive on-the-job training as well as full sponsorship to pursue a diploma degree relevant to their respective discipline either at the San Fernando Technical Institute or the University of Trinidad and Tobago. Other training programs are the Operator Trainee program and the NESC training program.

- Community Swimming Pool – Atlantic LNG sponsored the construction of the first public swimming pool complex in Point Fortin. Other community infrastructure / amenity development project is the rehabilitation of the Guapo beachfront along with the construction of beach facilities.

- Ministry of Agriculture, Land and Marine Resources 4H Seed Bank Program – in 2009 Atlantic donated approximately $200,000 towards supporting the Ministry's seed collection youth project.

The above-mentioned programs are all exclusive to residents of Point Fortin, but it should also be noted that Atlantic also sponsors national programs. Below is a summary of some of the programs that Atlantic sponsored in 2007 and 2008 and the value of their contributions.

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[31] The SEA is the standardized national secondary school entrance exam.

Sustainability Project or Partnership	Investment (USD) 2007	Investment (USD) 2008
HydroFit for the Elderly		$72, 950
West Indies Players Association		$273,680
Sport for Life		$204,737
Point Fortin Community Pool	$93,175	$190,476
Turtle Village Trust		$177,282
Servol		$166,193
Coalition Against Domestic Violence		$118,238
Contributions to other groups or charities	$258,757	$90,000
Point Fortin Borough Corporation Borough Day Activities	$60,476	$81,428
University of Trinidad and Tobago Pre-University Programme	$47,619	$69,546
Trinidad and Tobago Olympic Committee		$58,825
Point Fortin's Finest Bursaries and Vacation Camp	$45,555	$56,508
United Way of Trinidad and Tobago	$134,759	$52,876
University of the West Indies TeleHealth		$50,000
National Primary Schools Cricket League	$51.37	$34,920
Greening	$23,492	$34,556
Music in Point Fortin Primary Schools		$18,476
National Energy Skills Centers (NESC)		$14,285
Community Achievers		$11,904
Adult Literacy Tutors Association		$10,740
Employee Resident Group		$11.90
Total	$715,198	$1,799,524

Table 5: 2007, 2008 Contributions to community development programs by ALNG (ALNG 2008, 2009)

From this brief survey it is apparent that Atlantic LNG sponsors a range of programs, some exclusive to the Point Fortin community, other open to the national public. One former Public Communications Officer for Atlantic revealed that the company was firm in its commitment to build human capacity amongst the residents of Point Fortin, and they preferred to sponsor programs for human capacity building/ skills training. The rationale behind this is that the company managers acknowledge that Atlantic LNG will only be in operation in Point Fortin for approximately another 10-15 years (this time period is based on the proven and probable gas reserves). Atlantic hopes to prepare the residents of Point Fortin with skills and training that can be transferred to other industries in the wake of Atlantic's cessation of operations in the town. This demonstrates Atlantic's proactivity, that it is thinking about the future of this community and trying to prepare it for this imminent future. Its apprenticeship and training programs demonstrate specificity in that the company is providing training in fields that are related to its own operations. Then finally, by taking on large community-scale project such as the construction of the pool and the beach facilities, Atlantic is ensuring that it leaves a permanent tangible mark that is quite visible in the Point Fortin community.

Trinmar (Petrotrin), like Atlantic, sponsors a number and variety of community programs. However, because Trinmar is a strategic business unit (SBU) of Petrotrin, which is no longer located in Point Fortin, community development programs in sports, music, etc. are available to the national public and not exclusive to the Point Fortin community. Additionally, Trinmar's (Petrotrin's) community engagement programs seem to not be as focused on skills training. Perhaps this is accounted for by the fact that Petrotrin has been a member of the local (Trinidad) community for several decades and perceives itself as a permanent member of the community. With this point of view it may not seem as urgent or necessary to focus so much attention on building human capacity.

Finding information about industry-sponsored community programs in the Couva/Point Lisas area proved surprisingly difficult given the number of industries present there. Below are a few summaries of some of the programs sponsored by various firms:

- PCS Nitrogen's Model Farm – the model farm and Agricultural Resource Center serves as a demonstration center to teach farmers and youth about agriculture and new technologies in the field.

- PPGPL + Petrotrin + NGC New Life Ministries Drug Rehabilitation Center – the Center was recently refurbished with donations from the three energy companies.

- PPGPL and Habitat for Humanity Trinidad and Tobago (HFHTT) - neighboring communities of Pt. Lisas, Couva, Phoenix Park, Windsor Park, Dow Village, California and Claxton Bay were invited to apply to HFHTT for houses. Up to 20 families are to benefit from this program.

- Methanex's Community Advisory Panel (CAP) - hosts self-esteem and career advisory program with community youth.

In Point Fortin there are a number of community development programs being sponsored by the Atlantic LNG Company of TT, and Trinmar. For a long time Atlantic LNG had a bad reputation in Point Fortin. Residents blamed the company for the erosion of the Clifton Hill beachfront which was the community's main hub of recreation. However, in the short time that it has been in existence in Point Fortin, Atlantic LNG has made substantial financial contributions towards various community development programs and has an extensive record of engagement with the Point Fortin community. It has undertaken sponsorship of numerous and significant infrastructure, education, business development, health and safety initiatives, just to mention a few. The company has formed a Community Advisory Team which meets with community members and decides on sponsorship and then provides counseling to funding recipients. One example of long-term engagement is with the Ministry of Agriculture's 4H program. In 2009 alone ALNG donated more than $200,000 to this program. Trinmar has also been a longtime sponsor of community activities within Point Fortin. (More details of engagement by both parties to come).

Industry representatives have mentioned what they perceive as an attitude of dependency by Point Fortin residents. They expressed the impression that in general it seemed as if they were expected to provide for many of the needs of the local residents. The fact that this new "stepfather" (ALNG) is not as "generous" as the former patriarch has added to the resentment from the residents. I put generous in quotation marks because I suspect that ALNG's contributions have been comparable to those of Petrotrin in the past (in terms of monetary value), however, these contributions are now being disbursed through different mechanisms / different programs. So whereas in the past hundreds of families may have benefitted from free utilities (and this

practice continued up to a few years ago!) for instance, now ALNG is funneling monies towards agriculture program, homework and training centers, and the establishment of the community's emergency program. Thus now the benefits of their contributions are less tangible / less material and more structured and geared towards the development of human capacity. The direct recipients of these funds are also a much smaller group, leaving the masses to feel that they have not benefited directly from ALNG's presence.

CSR / community development programs are a way for industries to gain trust from neighboring community members. High-visibility programs in which industrials interact with local community members is a good way to build trust. Another key element to build trust between the two entities is to have open communication. Some firms are willing to spend money on community project to improve the welfare of their neighbors, but in the absence of communication there is the risk that the firms' intention may be misconstrued.

Conclusion

At the beginning of this research project I explored numerous possible symbioses that exist between industry and community, such as environmental impact (typically in terms of rehabilitation or mitigation projects), infrastructure development (e.g. projects dealing with the development of roadways, telecommunications, utilities, etc.), and advancement in social amenities (e.g. schools, hospitals, community centers, etc.). At the end of my analysis I came to the conclusion that the strongest – that is, the most pervasive, most enduring, and having the most potential at capacity building – symbioses lay in community development and employment. While this revelation is not groundbreaking, it is nonetheless still important to ascertain what elements constitute these strong symbioses so that the interacting parties (industrial estates with their numerous tenants, and their neighboring communities) can perhaps better understand in which areas would investments of time, effort and money prove most successful in terms of reaping the most positive outcomes. Identification of these strong symbioses also serves to illuminate the secondary roles of various entities. For instance, by understanding that there is a strong educational connection between industrial firms and the community perhaps then the community can work towards establishing a partnership with the industrial estate managers to facilitate and promote educational opportunities.

There are two main ways in which the presence of heavy industry within a community can be viewed. One way is to view it as a threat to livelihood, to safety, and to health. Even though negative impacts were not explored in this research project, I do not deny that there are indeed potential hazards associated with industrial activity (especially with heavy industrial activity). The other way to perceive the presence of industry in a community is as a unique opportunity for this community to collaborate with their industrial neighbors to pursue mutual interest such as community development. While motivations for engaging in community development projects may vary from the perspective of the industrialist to that of the resident, what is more important is for each party to understand the motivations of the other. Then, if there is still consensus on the desired end result, the two parties should collaborate to chart a path towards this goal.

Industrial estates are tremendous forces for social change – they can change the physical landscape, the social landscape, the economic landscape, etc. of a given place in which they are situated. They consume tremendous amounts of capital and resources, yet the wealth generated from the activities within their walls may never be seen in the immediate vicinity where they are located. This is a sentiment shared by residents of both Point Lisas and Point Fortin alike. But instead of focusing on what industrial estates do not bring to their local communities this project chose to focus on the positive elements of the presence of heavy industry in these two communities.

The first benefit brought to the communities were community development programs. In Point Fortin, it would seem as if the industries have made more significant contributions towards the development of the town than the central government. Part of the reason for this could be that Point Fortin was originally a company town, and in that capacity the industry provided many of the services, utilities and amenities that under normal circumstances the government would have had to provide. While Atlantic and Trinmar are willing to assist with the provision of some elements they are very cautious about not encouraging dependency amongst the townspeople. In Point Lisas, even though there are many more industrial firms, there is less evidence of community engagement by the firms. One possible reason for this is that with so many firms together, they have diffused the responsibility of community engagement amongst themselves. Regardless of the reason for not having more engagement there is great potential for partnership between industrial firms and community members.

In both locales there were numerous instances of community outreach by the industries to assist with various projects within the community. However, there is still a lot of room for improving this sort of relationship. One suggestion for improving the effectiveness and response of industry to the needs of their host community would be for better organization and more collaboration and coordination amongst the various groups within the community. Instead of the current situation in which individual small groups each make their own petition for assistance to the various industries, these community groups should congregate and discuss their common goals and vision for their communities. Wants and needs should be prioritized according to relevance to the aspired target. Cost estimates and project timelines should also be included. Essentially the community should produce a collaborative project proposal to the industries.

In neither community was there any evidence of community groups joining forces to assess their needs and wants and then approaching their industrial neighbors to ask for assistance. One can imagine that some of these companies may be bombarded with innumerous request for financial assistance and eventually they become less willing to donate. Also, many industries

participated in these sorts of community outreach programs in recognition of their social responsibility as fellow community members. However, even though the industries were well-intentioned in their efforts, sometimes their efforts were received with suspicion and skepticism. This I believe stemmed from the industries not communicating well enough to the community their intentions and anticipated outcomes. Better communications between communities and their industrial neighbors will go a long way in strengthening the relationships between the two entities, even beyond the stronger symbioses identified in this thesis.

That state also has an extremely important role to play in the formation and perpetuation of relationships between community and industry. It is at the level of the state – the central government that the decision is first made to situate an industrial estate. This decision is made in the absence of input from community members. While the state typically makes a big effort to attract firms to the industrial estate (especially in the case of foreign firms) less effort is put forth to facilitate good relations between the community and its industrial neighbor. During the bidding process, when the state is still trying to woo the foreign investor to Trinidad's shores, the state should dare ask that the firm makes specific contributions towards the local community. Mandating local content is one way that the state can ensure that the firm's activities benefit the local community.

The other strong link between industry and community was found in employment and training. During construction phases tremendous numbers of jobs are created, however, the vast majority of these jobs will only last up until the end of construction and then once production begins only a few key, skilled staff members will be employed at the industry. This is part of the nature of heavy industry. But all is not lost at the end of construction. During production / operation heavy industries require a lot of services and it is in this sector that there is job growth. A robust service sector to address the needs of the heavy industries will not only create more jobs but also help distribute the wealth generated from the industrial activity.

Again here it is important for the state to put measures and incentives in place to allow for community members to participate either directly or indirectly in the process of industrialization to their own benefit. The mere presence of industrialization within a vicinity does not guarantee the anticipate spinoffs associated with industrial activity. State intervention is needed to help guide and facilitate the opportunities for the two entities to interact under amicable circumstances, and also to monitor the parties to ensure that there are fair relations between them.

Industrial estates bring with them a host of both positive and negative externalities. Knowing the root of wither type is the first step in understanding how these externalities can either be avoided or augmented.

Appendix

Billion cubic metres	From																
To	US	Trinidad & Tobago	Belgium	Norway	Oman	Qatar	UAE	Algeria	Egypt	Equatoria l Guinea	Libya	Nigeria	Australia	Brunei	Indonesia	Malaysia	Total imports
North America																	
US	–	7.47	–	0.48	–	0.09	–	–	1.56	–	–	0.34	–	–	–	–	9.94
Mexico	–	1.28	–	0.08	–	0.09	–	–	1.12	–	–	1.04	–	–	–	–	3.61
S. & Cent. America																	
Argentina	–	0.33	–	–	–	–	–	–	0.08	–	–	–	–	–	–	–	0.41
Dominican Republic	–	0.47	–	–	–	–	–	–	–	–	–	–	–	–	–	–	0.47
Puerto Rico	–	0.81	–	–	–	–	–	–	–	–	–	–	–	–	–	–	0.81
Europe																	
Belgium	–	0.08	– 0.40	0.08	–	2.65	–		0.08	–	–	–	–	–	–	–	2.49
France	–	0.08	–	0.25	–	–	–	7.60	1.06	–	–	3.60	–	–	–	–	12.59
Greece	–	0.08	–	–	–	–	–	0.70	0.16	–	–	–	–	–	–	–	0.94
Italy	–	–	–	–	–	–	–	1.56	–	–	–	–	–	–	–	–	1.56
Portugal	–	–	0.05	–	–	–	–	–	–	–	–	2.58	–	–	–	–	2.63
Spain	–	4.32	0.18	1.05	0.17	5.12	–	4.90	4.91	0.08	0.53	7.47	–	–	–	–	28.73
Turkey	–	–	–	–	–	–	–	4.25	0.08	–	–	0.98	–	–	–	–	5.31
United Kingdom	–	0.47	–	–	–	0.12	–	0.37	0.08	–	–	–	–	–	–	–	1.04
Asia Pacific																	
China	–	–	–	–	–	–	–	0.17	0.25	0.16	–	0.24	3.61	–	–	0.01	4.44
India	–	0.24	0.09	0.08	0.35	7.98	0.13	0.65	0.26	0.44	–	0.41	0.16	–	–	–	10.79
Japan	0.97	0.67	–	0.17	4.25	10.91	7.41	1.12	2.21	1.64	–	2.36	15.94	8.22	18.79	17.47	92.13
South Korea	–	0.84	0.08	–	6.04	11.62	–	0.47	2.13	1.33	–	0.16	0.53	0.98	4.06	8.31	36.55
Taiwan	–	0.22	–	–	0.09	1.10	–	0.08	0.08	1.53	–	1.36	–	–	4.00	3.61	12.07
Total exports	0.97	17.36	0.00	2.19	10.90	39.68	7.54	21.87	14.06	5.18	0.53	20.54	20.24	9.20	26.85	29.40	226.51

Note: The negative entry for 'from Belgium to Belgium' represents the re-export of LNG which was delivered to Zeebrugge terminal and then reloaded and shipped to other destinations.

Table 6: Trade movements 2008 – liquefied natural gas (BP 2009)

	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006
Petroleum Sector (oil and petrochemicals) Output (as a % of GDP)	23.6	23.3	29.9	27.5	29.1	25.3	18.5	22.5	31.3	28.3	26.2	33.9	37.1	42.9	45.1
Petroleum Exports	70.0	64.2	65.5	71.5	72.5	67.7	63.7	64.7	69.7	78.7	73.3	81.5	80.3	88.9	91.0
Oil Sector Only Oil Output (as a % of GDP	21.3	20.7	23.4	21.7	23.9	20.1	14.3	18.0	27.0	24.4	23.1	30.0	32.4	36.7	39.6
Oil Exports (as a % of exports)	54.7	47.5	39.0	46.7	49.9	43.7	41.6	45.7	52.3	59.5	56.8	64.1	56.6	70.2	74.8
Petrochemical Only Output (as a % of GDP)	2.3	2.6	6.5	5.8	5.2	5.2	4.2	4.5	4.3	3.9	3.1	3.9	4.7	6.2	5.5
Petrochemicals Exports (as a % of GDP)	15.3	16.7	26.6	24.8	22.6	24.0	22.1	19.0	17.3	19.1	16.5	17.4	23.8	18.7	16.2

Table 7: Contribution of Petroleum and Petrochemicals to the Economy of Trinidad and Tobago 1992 - 2006

Tenant Name	Heavy	Light	Services
Aerogas Processors Limited			
Air Liquide Trinidad and Tobago Limited			
Alescon Readymix Limited			
Allied Petroleum Marketing Services			
Alpha Transport Limited			
Analytical Technologies Limited			
Ansa McAl Chemicals Limited			
API Pipeline Construction Company			
ArcelorMittal Point Lisas Limited			
Atlantic Plaza Limited			
Atlas Methanol Unlimited			
Business Development Company Limited			
Cargo Consolidators Agency Limited			
Caribbean Nitrogen Company Limited			
Caribbean Petrochemical Manufacturing			
Caribbean Safety Products Limited			
Caribbean Steel Mills Limited			
Industrial Welding Equipment Sales Rentals Limited			
International Trade Managers Limited			
ISG Trinidad Unlimited			
John Williams Construction Limited			
Jokhan General Contractors Limited			
Lennox Petroleum Services Limited			
Magic Mist Services Limited			
Mainstream Foods Limited			
Maritime General Insurance Company			
Methanex Trinidad Limited			
Methanol Holdings Trinidad Limited			
Ministry of Finance (CES Station)			
National Agro Chemicals Limited			
Navarro's Holdings Limited			
Nitrogen 2000 Unlimited			
NM Insertech (Caribbean) Limited			
NM Petrochemicals Limited			
Nu Iron Unlimited			
Nutrimix Feeds Limited			
OGA Contractors Limited			
Paramount Transport & Trading Company			

PCS Nitrogen Trinidad Limited			
PETROTRIN			
Phoenix Park Gas Processors Limited			
Point Fortin Hardware Limited			
Point Lisas Industrial Port Development Corporation Limited			
Point Lisas Nitrogen Limited			
Point Lisas Steel Products Limited			
Power Generation Company of Trinidad and Tobago Limited			
Prestige Holdings Limited			
Process Components Limited			
Process Management Limited			
Qualitech Machining Services Limited			
Ramkissoon's Electrical Limited (Jshco Ltd)			
Readymix (West Indies) Limited			
Reesal Industries Limited			
Refinery & Industrial Fabricators Limited			
Republic Grains Investment Ltd			
S & D Construction Limited			
Sant's Equipment and Rentals Limited			
Scaffolding Manufacturers Trinidad			
Screen Manufacturing Company Limited			
Shell Caribbean Lubricants Limited			
Southern Sales & Services Company			
Southern Supplies Millennium Limited			
Super Industrial Services Limited			
Supermix Feeds Trinidad Limited			
Telecommunications Services of Trinidad and Tobago Limited			
The Dairy House Limited			
The Information Channel			
The National Gas Company of Trinidad & Tobago Limited			
Trinidad & Tobago Electricity Commission			
Trinidad Cement Limited			
Trinidad Energy Investments Limited			
Trinidad Nitrogen Company Limited			
Trintogas Carbonics Limited			
Truspec Plastic Company Limited			
United Engineering Services Limited			
Universal Foods Limited			
Ventrin Petroleum Company Limited			
Yara (Trinidad) Limited			

Table 8: PLIPDECO Tenant Listing 2009

Bibliography

Atlantic LNG Company of Trinidad and Tobago. *Atlantic LNG Company of Trinidad and Tobago.* 2007. http://www.atlanticlng.com/sections.aspx?sid=10 (accessed 2009 йил 15-11).

—. *Atlantic LNG Company of Trinidad and Tobago.* http://www.atlanticlng.com/sections.aspx?sid=10 (accessed 2009 йил 15-November).

Atlantic LNG Company of Trinidad and Tobago. *Sustainability Report 2007.* Port of Spain: AboveGroup, 2008.

Atlantic LNG Company of Trinidad and Tobago. *Sustainability Report 2007.* AboveGroup, 2008.

Atlantic LNG Company of Trinidad and Tobago. *Sustainability Report 2008.* Port of Spain: AboveGroup, 2009.

Atlantic LNG Company of Trinidad and Tobago. *Sustainability Report 2008.* AboveGroup, 2009.

Auty, R., and A. Warhurst. "Sustainable Development in Mineral Exporting Economies." *Resources Policy* (Elsevier Science Ltd.) 19, no. 1 (March 1993): 14-29.

Barclay, Lou Anne A. *FDI-facilitated Development: The Case of the Natural Gas Industry in Trinidad and Tobago.* Discussion Paper, Institute for New Technologies, Maastricht: The United Nations University, 2003.

BP. "BP Statistical Review of World Energy June 2009." 2009.

Bredo, William. *Industrial Estates - Tools for Industrialization.* Glencoe, Il: The Free Press, 1960.

Burke, Lee, and Jeanne M. Logsdon. "How Corporate Social Responsibility Pays Off." *Long Range Planning* 29, no. 4 (1996): 495-502.

CIA. *The World Factbook -- Trinidad and Tobago.* 2010 йил 01-04. https://www.cia.gov/library/publications/the-world-factbook/geos/td.html.

Damus Ltd. *Damus.* 2005. http://damusgroup.com (accessed 2010 йил 15-April).

Davis, Keith. "The Case for and Against Business Assumption of Social Responsibilities." *Academy of Management Journal*, June 1973: 312-322.

Dunning, J.H. *Explaining the International Direct Investment Position of Countries: Towards a Dynamic or Development Approach.* London: Allen and Unwin, 1981.

Energy Corresondent. "Skills Shortage Looms in the Energy Sector." *Business Express*, 2002 йил 2-October.

Farookhi, M.M. "Industrial Estates." *Pakistan Productivity* 3, no. 3-4 (1962): 85-91.

Friedman, Milton. "Does Business Have a Social Responsibility." *Bank Administration*, April 1971: 13-14.

Gloeckner, Peter. *Industrial Estates.* Lahore: Ferozsons Ltd., 1966.

Hackett, Charles W. *An Analysis of Planned Industrial Districts.* Seattle: University of Washington, 1956.

Hanson, Gordon. *Should Countries Promote Foreign Direct Investment?* G-24 Discussion Paper Series, UNCTAD, 2001.

Hosein, Roger, and B. Tewarie. "Dutch Disease and Deja Vu: Policy advice for the T&T economy in the wake of a Second Oil Boom." *West Indian Journal of engineering* 26, no. 2 (2004): 1-21.

Ian, G, and TL Karl. *Bottom of the Barrel: Africa's Oil Boom and the Poor.* Report, Baltimore, MD: Catholic Relief Service, 2003.

International Energy Agency. "Carbon Dioxide Emissions per Capita." 2007.

International Trade Center. "Trade Performance Index (by Sector): Trinidad and Tobago." 2008.

Lai, Hsien-Che. "A comparison of innovation capacity at science parks across the Taiwan Strait: the case of Zhangjiang High-Tech Park and Hsinchu Science-based Industrial Park." *Technovation* 25, no. 7 (July 2005): 805-813.

Ministry of Energy and Energy Insdustries. *Local Content and Local Participation Policy and Framework for the Republic of Trinidad and Tobago Energy Sector.* Port of Spain: Government of Trinidad and Tobago, 2004.

Ministry of Local Government. *Welcome to the Ministry of Local Government Online.* 2008. http://www.localgov.gov.tt/function_of_municipal_bodies.html (accessed 2009 йил 10-11).

Ministry of Trade and Industry. *Secretariat for the Implementation of Spanish.* 2007. http://www.tradeind.gov.tt/SIS/faq.htm (accessed 2009 йил 12-12).

Ministry of Trade and Industry. *Trade and Investment Policy 2007-2012.* Green Paper, Government of Trinidad and Tobago, 2007.

Mottley, Wendell. *Trinidad and Tobago Industrial Policy 1959-2008.* New York: Ian Randle Publishers, 2008.

Narula, R. *Multinational Investment and Ecnmic Structure.* London and New York: Routledge, 1996.

National Energy Corporation of Trinidad and Tobago. *Industrial Estates.* 2009. http://www.nec.co.tt/html/NECestates.htm# (accessed 2010 йил 10-Jan).

National Science Foundation. *University-Industry Research Relationships: Selected Studies.* Washington: US Government Printing Office, 1982.

Phillips, D. "New Alliances for Policy and the Conduct of Research and Education." *International Journal of Technology Management*, no. 6 (1991): 478-487.

Phoenix Park Gas Processors Limited. *Community and Social Responsibility.* 2008. www.ppgpl.com (accessed 2010 йил 19-February).

Roberts, Brian. "The application of industrial ecology principles and planning guidelines for the development of eco-industrial parks: an Australian case study." *Journal of Cleaner Production* 12, no. 8-10 (2004): 997-1010.

Samuelson, Paul A. "Love that Corporation." *Mountain Bell Magazine*, Spring 1971.

Shah, Kalim, and Jorge Rivera. "Export processing zones and corporate environmental performance in emerging economies: The case of the oil, gas, and chemical sectors of Trinidad and Tobago." *Policy Sci* (Springer Science + Business Media B.V.), no. 40 (2007): 265-285.

Sutherland, Alasdair C. "Report to the United Nations on the Social and Physical Planning Aspects of Industrial Estates in Nigeria." 1960.

Tendler, Judith. "The Economic War Between the States." MIT / Bank of the Northeast Project, 2000.

The University of Trinidad and Tobago. *The University of Trinidad and Tobago.* 2010. http://www.utt.edu.tt/index.php (accessed 2010 йил 12-April).

Ullmann, A. "Data in search of a theory: a critical examination of the relationships among social performance, social disclosure, and econmic performance in US firms." *Academy of Management Review* 10, no. 3 (1985): 540-557.

United Nations. *Establishment of Industrial Estates in Under-Developed Countries.* New York, 1961.

—. *The Physical Planning of Industrial Estates.* New york: United Nations, 1962.

United States Department of Agriculture - Foreign Agriculture Service. *Look East to the Caribbean's Food Ingredient Markets.* Washington, 2006 йил June.

United States Department of State. *Trinidad and Tobago (11/09).* 2009 йил November. http://www.state.gov/r/pa/ei/bgn/35638.htm (accessed 2010 йил 19-01).

Urban Land Institute. "Industrial Districts Restudied: An Analysis of Characteristics." *Technical Bulletin*, no. 41 (1961).

US Department of State. "Economic Profile of Trinidad and Tobago." 2009.

Watts, Michael J. "Righteous Oil? HumanRights, the Oil Complex and Corporate Social Responsibility." *Annual Review of Environment and Resources* (Annual Reviews) 30 (November 2005): 373-407.

Wikipedia. "Lesser Antilles Location Map." *Wikipedia, the free encyclopedia.* 2009 йил 29-September. (accessed 2010 йил 20-April).

Williams, Dr. Eric. "ISCOTT Commemorative Speech." 1977 йил October.

Wood, D.J., and R.E. Jones. "Research in corporate social performance: what have we learned?" Paper presented at Conference on Corporate Philanthropy, Case Western Reserve University, 1994.

World Business Council for Sustainable Development. *Corporate Social Responsibility: Meeting changing expectations.* Report, Geneva: WBCSD, 1999.