NEXT BATAM

FOSTERING A RESILIENT GROWTH STRATEGY

A COMBINED TRANSIT ORIENTED DEVELOPMENT AND INDUSTRIAL CLUSTERING STRATEGY, IN ORDER TO CREATE NEW INVESTMENT OPPORTUNITIES AND COMPETITIVE ADVANTAGES FOR THE CITY OF BATAM, A SPECIAL ECONOMIC ZONE AFFECTED BY THE GLOBAL CRISIS
“The idea is that when the cities are integrated, the residents can travel around freely and use the health care and other facilities in different areas, [in addition], it will help spreading industry and jobs more evenly across the region and public services will also be distributed more fairly.”

(Ma Xiangming, Chief Planner, Guangdong Rural and Urban Planning Institute)
NEXT BATAM: Fostering a resilient growth strategy

MSc THESIS:
TITLE
NEXT BATAM: Fostering a resilient growth strategy.
SUBTITLE
A combined transit oriented development and industrial clustering strategy, in order to create new investment opportunities and competitive advantages for the city of Batam, a Special Economic Zone affected by the global crisis.
FRONT AND BACK COVER
View of the Singapore Strait with Batam island (front cover) and Singapore (back cover) (adapted from Bing, 2013)

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FOREWORD

This master thesis represents the final product of my graduation under the departments of Real Estate & Housing and Urbanism at the Delft University of Technology. The project focuses on the spatial and socio–administrative conditions necessary to foster the competitiveness of cities, in particular those appearing and developing in Special Economic Zones (SEZ). During the last three decades, a number of new cities began to develop around the world, in areas where fast industrialization attracted migrant workers. This was possible especially in the SEZs, such as Shenzhen in China, because of the economic deregulation policies these areas applied. However, in the aftermath of the last financial crises, in 1997 and 2008, the multinational companies that begun the industrialization process, started to abandon these areas, most of them reaching sizes comparable to average.

This is also the situation for Batam SEZ, the central case study of this project. Starting from a population counting 3,000, nowadays it counts over 1.2 million, making it easily one of the largest cities in an European context. Currently the foreign companies are leaving Batam the data showing an important drop in its economic competitiveness. If this trend continues, the stakes are high for Batam to become another Detroit case: a ghost town. Considering the fact that in 2008 about 3,000 such SEZs existed, many of which are passing through similar economic problems, the question is what can we do as planners and developers to prevent and reverse this trend? The stakes are high, because many people (according to ILO, about 70 million were directly employed in SEZs in 2007), might risk losing their jobs or being abused, with affect not only on their own personal development but also for the rest of the society where they live and perhaps even beyond that.

From the earliest cities examples until now it is obvious that there is a direct relation between built environment and production, but how do we foster it? My research yielded few results in this direction. Since Ebenezer Howard and the Garden City movement, there is little discourse on what urban planners can do to foster economic and personal development. In my opinion this gap in the planning theory reflects the current trend of relocating the production areas outside Europe and US. Because through this the need to explore these problems also begun to be less important to address. On the other hand, it appears that few good urban planning practices, in terms of fostering economic production and better living quality, are coming from the countries where most of the production ended up, such as China. Yet their progress seems to have sparked more the interest coming from the economists’ side, than that of the urban planners’.

Nevertheless it is true that one cannot appreciate the economic returns a spatial intervention might finally lead to. But this does not exclude for a spatial intervention to create other economic advantages that will positively influence the growth of a city. Judging from their great leap forward in the past decades, it appears that the Chinese authorities succeeded to define a set of benchmarks to evaluate this progress and stir accordingly when things went amiss. And it might be true that the central government still gives public funds to the local authorities to develop their cities, but the number of these cities appears to be much lower than expected. Only those cities that present an strategic economic importance, such as Shenzhen, Shanghai, Beijing, would benefit from this preferential treatment, leaving other cities to provide most of the money for development by themselves (such as Guangzhou).

Eindhoven of the early 20th century, begun developing in similar conditions to Batam, but in the premises of the new 21st century we cannot expect again such cases. After the invention of the state in the Europe of the 20th century, the economic deregulation and globalisation seem to bear little promise in creating a better system. Despite this, the role of the state continues to diminish day by day, China following this trend as well. How do we as planners of the 21st century ensure that the people working in factories now will have a better life than those that lived in the previous century? How can we build sufficient affordable housing relaying less on the state budget? Or how do ensure that everyone, not only those who can afford a car, have a fair access to the job market and high quality public services such as education, health, counselling, culture, etc.?
These were some of the issues and problems I had in mind when researching for this thesis, and it made me realize that once the government role is severely diminished, the local authorities faces large pressures to realize their agenda. And it appears this happens not only in Indonesia, but also in many other European countries as well, because a new working system, to replace the welfare system, has not been discovered yet.

From my position of a dual master graduate I also had to deal with the local authorities’ both sides of the agenda, having to address not only the spatial issues (such as housing, transportation and environment) but also the declining competitiveness. The conclusion I draw from this experience is that in order to make things work, you need to relay equally on both sides and the trick is to conceive a win-win strategy, in which both the social, or the public, and the market, meaning the private companies, needs are addressed in the same plan.

This is also what this project was set to achieve and I believe that it managed to do so. By proposing an transport oriented development and industrial cluster support, new conditions have been created for both the people and the private investment and industry to develop and grow together on the long term.

I am looking forward to put in practice the lessons learned and the knowledge acquired and I hope you will enjoy your reading of this report.

Enjoy reading!
ABSTRACT

Similar to thousands other Special Economic Zone (SEZ) cities around the world, Batam, an Indonesian city-island at the border with Singapore, was developed by the central government to attract foreign investors and develop its industrial basis. Its strategic position made it an excellent location for the Singaporean manufacturing companies, in general light industry and electronics, which were looking for more space and cheaper production costs. But the present economic context, these companies, will leave these cities if the production conditions worsen.

This is also the case of Batam, which began losing competitiveness in favor of other similar but cheaper cities in the SE Asian region, such as Vietnam or Bangladesh. Companies started to leave the city, this fact being confirmed both by the official economic data from the city and by the local media and businessmen.

In the frame of the dual master track of real estate and urbanism, the project hereby is dealing both with the economic and the spatial problems that Batam is currently experiencing. The project addresses the poor housing conditions, reduced public mobility, degrading ecological balance of the island, the loss of competitiveness and the inefficient administration.

The main tool for the planning strategy is a Transit Oriented Development (TOD) plan that uses a Bus Rapid Transit (BRT) system as main public transportation means. In tackling the problems the project uses the transfer stations to create destination activities (such as social and commercial services) and more and better quality affordable housing. The new public transportation system also creates new investment opportunities, along the main BRT lines and around the transfer stations. In dealing particularly with the loss of competitiveness the project proposes a cluster development based on the shipbuilding and oil & gas industry in the island.

Through this intervention the living conditions in the city will improve and new opportunities will be created for larger private investments to take place in order to recover the competitiveness of the city. In this way Batam can better achieve its vision and continue developing on the long –term. Given the strategic importance of Batam at the national level as one of the main gates of foreign direct investment in Indonesia, it is likely that the central government would welcome such a proposal that addresses both the economic prospects and the overall living quality in one integrated spatial strategy.

Keywords: special economic zones, SEZ, transport oriented development, TOD, bus rapid transit, BRT, industrial clusters, competitive advantage, SE Asia, industrial cities
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TERMS AND ABBREVIATIONS:

Bappeda - Badan Pembangunan Daerah or Regional City Planning
BBK SEZ – Batam–Bintan–Karimun Special Economic Zone
BIDA – Batam Investment Development Agency (previously Otorita Batam)
BIFZA - Batam Indonesia Free Zone Authority (previously BIDA)
DMC – Dutch Maritime Cluster
EPZ - Export Processing zones
FDI - Foreign Direct Investment
GDD - Guangzhou Development District (GDD)
ILO – International Labor organization
ITDP – Institute for Transportation & Development Policy
‘kampung’ – village (in Indonesian in original);
‘kampung tua’ – old village (in Indonesian in original), denominting the original villages of the island
‘kecamatan’ - district (in Indonesian in original) it is a sub-division of the ‘kota’
‘kelurahan’ – sub-district (in Indonesian in original) the sub-division of ‘kecamatan’
‘kota’ – municipality (in Indonesian in original) such as in Kota Batam, the Municipality of Batam
KSB – ‘ready-to-build’ plots (from ‘kavling siap bangun’, in Indonesian in original)
Pemko – the elected local government led by a mayor (from Pemerintah Kota, in Indonesian in original)
PRD – Pearl River Delta
R&D – research and design
‘ruko’- shop houses (from ‘rumah toko’ in Indonesian in original),
‘ruli’ – illegal housing or squatting settlements (from ‘rumah liar’ in Indonesian in original)
‘rusun’ – social housing (from ‘rumah susun’, meaning vertical house, in Indonesian in original)
SEZ - Special Economic Zones
TOD – Transit Oriented Development
WTO – World Trade Organization
I. INTRODUCTION
Batam has direct access to the busiest strait in the world - the Singapore strait. Here is a typical view over the strait towards Singapore (photo by the author).
1.1 RESEARCH MOTIVATION

At the end of the 19th century and the beginning of the 20th century, an important number of private entrepreneurs from Europe and North America, were building housing amenities and other facilities (e.g. health dispensaries, kindergartens, sport clubs, shops, etc.) for the use of their workers. These facilities were costly and indirectly related to the main production purposes. Despite this, industrialists such as Anton and Gerard Philips, the founders of Philips, considered them strategic and essential to be built. In time, this attention paid to the workers and their living environment would positively influence not only the growth of the private companies, but also the cities they were located.

This is the case of Philips’ light bulbs’ factory and the city of Eindhoven in the Netherlands. In 1891, the year the factory was established, Eindhoven counted just 4,500 inhabitants, without considering the population of the surrounding villages (Heerding, 1988, p.278). In 1910, in less than two decades, Philips arrives to hire more than 2,000 workers, becoming the single largest employer of the Netherlands.

In the same time, on the Christmas Day of 1919, the founders inaugurates the first houses of “Philipsdorp” (Philips’ Village), a housing project specially built for their workers. The housing units in this residential complex, outside the factory’s premises, were designed “beyond the minimum standard”, with bathrooms and toilets inside the house, gardens behind the house and ceramic tiles and parquet finishes. The houses were rented at rent levels considered affordable for the workers in the company, in time they becoming owners.

This would be one of the first steps in re-shaping the city of Eindhoven through Philips. The spatial and social effects of their intervention can still be easily traced back in the names of streets, football stadium, and other important public buildings and monuments. Currently Eindhoven’s population is 400,000 and it is recognized as an international technology and innovation center.

What made this private corporation, profit oriented, to dedicate its time and money for the development of Eindhoven? Was it unintentional, as an side-effect of their expansion, which dragged the development of the city, or at some point in time this become a strategy on its own, alongside with the globalization of the company beyond the borders of Europe, in order to benefit its own image and reputation? And more important, can the lessons learned from this case help other industrial cities developing nowadays in other parts of the world?

================================

Thousands of similar industrial cities are developing in this moment around the globe, such as in the case of Special Economic Zone cities like Batam, a small Indonesian city-island at the border with Singapore. Since the early ’90s the city passed through an intense industrialization process that attracted more than 1 million people and the city continues to grow. Yet the economic success has not been replicated at the social level, the city still suffering from poor housing conditions, restricted mobility and degrading natural conditions. In addition, the city began losing its competitiveness, in the aftermath of several economic crises, the most recent one in 2008. The example of Philips and Eindhoven proved to be a win – win case, could it be replicated again nowadays in Batam’s conditions?

1.2 THE SPECIAL ECONOMIC ZONES (SEZ) CASE

The project looks into the 21st century relation between cities and industry in the rapidly industrializing areas of developing countries and how these can keep developing on the long-term. Located in the Riau Archipelago province, NW Indonesia, the city of Batam is a similar fast industrializing area. It is located on the largest (412 km²) and the most developed island from a group of around 400 islands, at only 30 minutes away by ferry from Singapore. As such it is strategically located along the busiest sea trade route of the world, which connects Asia to Europe. (fig. 1)
Because of its location, the island was conceived as a deregulated economic zone since 1970 and later on as a Special Economic Zone SEZ (Regional City Planning Department of Batam, 2010) together with the surrounding islands – Bintan and Karimun - in order to attract foreign corporations, in particular those from Singapore.

**TEXT BOX 1: SPECIAL ECONOMIC ZONES (SEZ) DEFINITION**

Special Economic Zones (SEZ) or Export Processing Zones (EPZ), areas appeared in response to the globalization process and the consequent exodus of production facilities, from the developed countries to the rest of the world. Though a generic term that can describe various organization structures, function of the benefits or specialties each offers, SEZ are defined as “geographically delimited areas administrated by a single body, offering certain business incentives to business which physically locate within the zone” (FIAS, 2008, p. 2).

The difference between the SEZ and EPZ is that SEZ can include whole provinces, such as it is the case in the Pearl River delta in China, where Shenzhen SEZ is located, while the EPZ refers to smaller and better delimited, most of the time totally fenced-in, areas that can be reduced to just one factory, such as it is the case in Mexico or Malaysia (Milberg and Amengual, 2008, p.1).

SEZs developments proved a popular strategy implemented by many developing economies in order to attract foreign direct investments (FDI), create jobs, develop exports and generate government revenues. Other benefits created by these areas, are skills upgrading, female employment and indirectly empowerment, technology transfer and regional development (FIAS, 2008, p.32).

In 2008, FIAS estimated the total number of SEZs at over 3,000, located in 135 countries around the globe and accounting for over 68 million direct jobs. Hence, the economic and social contribution of these areas cannot be underestimated. Most of these zones, 38%, are located in the region of Asia and the Pacific, areas where Batam is also located, and they have several specializations or development objectives (table 1). (FIAS, 2008)

<table>
<thead>
<tr>
<th>Type of SEZ</th>
<th>Development objective</th>
<th>Size (ha)</th>
<th>Typical location</th>
<th>Activities</th>
<th>Markets</th>
<th>Example</th>
</tr>
</thead>
<tbody>
<tr>
<td>Technology or Science Parks</td>
<td>Promote high-tech and science-based industries</td>
<td>&lt;50</td>
<td>Adjacent to universities, institutes</td>
<td>High technology activities</td>
<td>Domestic and Export</td>
<td>Singapore Science Park, Singapore</td>
</tr>
<tr>
<td>Petrochemical Zones</td>
<td>Promote energy industries</td>
<td>100 – 300</td>
<td>Petrochemical hubs; efficient energy sources</td>
<td>Petrochemicals and other heavy industry</td>
<td>Domestic and export</td>
<td>Laem Chabang Industrial Estate, Thailand</td>
</tr>
<tr>
<td>Financial Services</td>
<td>Development of offshore financial services</td>
<td>&lt;50</td>
<td>None</td>
<td>Offshore financial and non-financial services</td>
<td>Export</td>
<td>Labuan Offshore Financial Centre, Malaysia</td>
</tr>
<tr>
<td>Software and</td>
<td>Development of</td>
<td>&lt;20</td>
<td>Adjacent to</td>
<td>Software and</td>
<td>Export</td>
<td>Dubai Internet</td>
</tr>
</tbody>
</table>
There are few general characteristics for all SEZ areas around the globe according to FIAS:

- concentration in a few countries - China and Mexico hosting the largest amount of zones in the world;
- concentration in a few product areas – such as electronics, garments and sports apparel; and,
- reliance on female workforce – 60 to 70 % of the total workforce worldwide in these zones is made up by women (2008, p.23-25).

Some experts however doubt the beneficial effect of SEZ on the long term, pointing to issues such as unsafe and unhealthy working conditions, underpayment and abuse of the workers, poor housing, among others. (Jauch, 2002; Aggarwal, 2007; Brown, 2007; Duhigg and Barboza, 2012)

For example, Brown (2007), citing a survey lead in 2005 by Aggarwal in India, Sri Lanka and Bangladesh, points to the precarious labour conditions. The survey asked the investors a range of questions relating to selecting a particular location and nearly 100% of the respondents rated labour law exclusion as “most important”. Citing an ILO report from 2003 Brown states that “working conditions in EPZs are problematic, this issue arises more in the context of longer work hours, more grueling pace of work and the absence of a right to collective bargaining” (p.13).

Another example concerning the living conditions is brought to the light by a detailed study done in Dominican Republic for the International Labour Organisation in 2008. The study analyzed a group of indicators – quality of housing, overcrowding, environmental conditions, and available services – in the SEZ. The conclusion is that the workers in the SEZ have lower living conditions than those at the national average and definitely lower than those of other workers from other private companies outside the SEZs (Milberg and Amengual, 2008, p.42-43).

This is also the case of Batam SEZ. Started in the early ‘70s, Batam’s authorities developed initially several, access restricted, duty-free areas and warehouses. In time the free trade status extended to other 400 islands surrounding it, today being declared a SEZ. The tax-free status and its favorable position brought in foreign investors and created jobs, which contributed in return to the development of the area. This took place especially after 1990, the year when the Indonesian and Singapore governments signed an economic cooperation agreement, known as the SIJORI¹ agreement. (Royle, 1997; Grundy - Warr et al., 1999; Colombijn, 2003; Sparke et al., 2004). Nowadays the island is not anymore a simple spot on the map, but is aspirers to become a regional competition center and the “economic growth locomotive” and “gate of foreign investment” at the national level (Regional City Planning Department of Batam, 2010, p.XXXI).

The relocation of the Singapore manufacturing companies within the city, determined a large immigration process that continues even today. This started to put a lot of strain on the living conditions in the island, even

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¹ The acronym stands for Singapore, Johor province, south Malaysia, and Riau province where Batam SEZ is located.
before 1990, when the island was under development to become an industrial base. The city authorities were not sufficiently prepared to receive this amount of immigration, which started to cause spatial as well social problems. Poor housing conditions and limited mobility for many of the residents, especially the ones from the low and middle income groups, are currently some of the most common spatial problems that are also the most urgent to address. In addition to these, the natural ecosystem of the island began to erode, the urban sprawl and intense industrial activity taking its toll on the natural green areas and the waters surrounding the island.

Apart of these spatial problems, in the past several years, trailing the last economic crises, the economic and administrative conditions have been increasingly challenging for the private investors. Evidence shows that the overall economic competitiveness of the island is in decline and that the private investors are becoming reluctant to start new businesses in the city. These issues are also confirmed by the local businessman and park operators.

1.3 PROBLEM STATEMENT, RESEARCH QUESTIONS AND OBJECTIVE

The main factors contributing to the spatial problems of Batam are: (1) the low quality and insufficiency of affordable housing; (2) an insufficiently developed road system and the lack of a more developed public transportation network; and, (3) the constant city expansion, or urban sprawl, which threatens the ecological balance of the island and is putting at risk the island’s fresh water resources. These problems are essential to address because they directly affects the living quality and the development of the residents, while restraining the socio-economic potential of the island.

In addition to these spatial problems, research shows that Batam is also dealing with (4) loss of competitiveness, because of the 1997 and 2008 financial crisis; and, (5) administrative issues affecting the investment opportunities and the overall city growth as a result of an inefficient administration of the land use.

The problem statement, results from the incompatibility between the problems the city confronts and its vision. According to the local government, Batam is to become “the City with rapid growth of development, and be parallel with other metropolis in the future” economically, administratively and socially (Regional City Planning Department of Batam, 2010, p. xxx-i).

The problem statement can be hence formulated:

Batam was design to become an industrial hub and a competition center in the region, but after a strong start in the early 90’s under the influence of Singapore, its aspirations have been restrained by the 1997 (the Asian Crisis) and 2008 (global) financial crises. Currently the city is not only losing its regional competitiveness, but its inefficient two bodies’ administration, combined with an overall low living quality caused by poor housing conditions, reduced mobility and environmental problems, are weighing heavy on its long-term development goals.

The objective of this graduation project is:

A combined strategy that can tackle Batam’s urban and economic – administrative problems, in order to create conditions for personal development and private investment to happen and improve the living quality and investment opportunities in the city on the long-term

By ‘conditions for personal development’ is meant creating space for higher education facilities, vocational schools and other similar venues, where residents can train and improve themselves in order to purchase a long-term professional career. This means also providing additional services such as career advice, employment offices and special accommodation (e.g. student dorms), in order to facilitate the choice for a career path for the students or trainees.
By ‘conditions for private investment’ is meant creating spaces attractive for companies and developers to invest and develop. This means also providing professional assistance services (e.g. governmental, legal counseling, etc.) or cooperation incentives and

The main question of this project can be formulated as:

**What could be the best strategy for Batam to improve the living conditions and development chances of its residents, while also creating new investment opportunities to benefit both the city and the industry?**

By ‘living conditions’ it is meant the affordability, availability and quality of the housing, especially for the low and middle income residents, the availability and affordability of public transportation system and the presence of an open, attractive, safe and life sustaining natural environment. The term refers also to the social balance and personal development opportunities existing in the communities around the island.

The final proposal is based on the Transit Oriented Development (TOD) strategy and the competitive cluster concept. Specifically the TOD implies the densification of development along the main public transportation lines which consists of a Bus Rapid Transit (BRT) system of a trunk and feeders type. Essential for the TOD strategy are the new transfer stations, which work as new sub‐centers of the city and offer a mix of commercial and social services and different affordable housing solutions.

In addition, the TOD strategy creates further investment opportunities which might attract private investors and addressing the competitiveness decline. Specifically in addressing this issue, the final proposal recommends the creation of a competitive cluster centered on the shipyard and oil & gas industries with the help of a new harbor infrastructure and specific, cluster oriented education and research facilities.

In answering to the main question, several secondary questions will be researched on the way:

1. **How industry contributes to the development of cities and what motivates private corporations to develop within a city?** What models can illustrate the industry – city relation?

2. **How did private corporations contributed to Batam SEZ until now and where Batam case can be located among other industrial cities examples, from the past (i.e. Eindhoven) and more recent development (i.e. Shenzhen SEZ)?**

3. **How is the city currently organized, its main activity centers, strengths, challenges and determinants?**

4. **Which lessons from foreign experiences with similar problems can be used for developing a strategy for Batam?**

In brief the research results following these questions are described below.

The first sub-question is based on the study of the Eindhoven and Shenzhen cases and the theory research. These resulted in two models describing the development of an industrial city from the side of the public authorities – the ‘tree model’ – and from the private corporations’ position – the ‘onion model’. The ‘onion model’ indicates three factors that motivate the private corporations develop a city: these are ‘legitimation’, ‘social commitment’ and ‘competitive advantage’. The final proposal addresses the ‘competitive advantage’ factor in particular.

For the second sub-question the literature and in-situ research showed that SEZ areas, Batam included, are preferred by multinational companies that outsource the workforce from third parties, such as industrial parks’ operators. As such their responsibility to the workers and the city itself where they operate, is very little. Given this fact, Batam cannot be compared directly with the Eindhoven case, where Philips played a crucial role in the
Development of the city through their social commitment to the workers. Likewise, it is neither similar to Shenzhen, where local authorities with the support of the central government, replace the responsibility of the private companies with respect the living conditions of the workers, outside the industrial parks at least, and the development of the city as a whole. For this reason Batam lies in between these two cases which describe two distinct systems.

The city grew from a couple of thousands inhabitants in the beginning of the 70’s to over 1 million in 2012. The growth intensified after 1990, when multinational companies from Singapore, began relocating in Batam their production facilities. This caused a surge in the immigration for which the city was not prepared. This caused many spatial problems to spread, most common being the squatting settlements or ‘ruli’. In part this was determined because of the lack of affordable housing and an inefficient public transportation. Currently the new social housing development areas, such as those located in the Sagulung district, are located far away from the main activity and production centers of the city. This cause more problems arise because of the poor roads infrastructure and the lack of an efficient public transportation system, this determining the further isolation of their residents and the creation of vicious that affects the communities. As a result of this the human capital remains insufficiently developed, affecting the labor market and the overall development potential of the whole city.

Important lessons over the nature of the industrial city can be drawn from the Shenzhen and Eindhoven cases that describe the different approach to the administration of such cities and the private companies. For the final proposal, also the example of Curitiba and the experiences resulted from the Chinese industrial clusters, are used as reference for addressing the spatial, social and economic problems. These examples and experiences also give some good governance recommendations that can address the administrative issues Batam currently experiences.

### 1.4 RESEARCH APPROACH

The project was developed over the span of two years roughly following six stages (fig. 3). From a research point of view, the final proposal of this project results from a combination of case studies, theory, context analysis and design (fig. 4). Important in the process was the feedback and evaluation after each step, which revised and refined the final proposal.

![Figure 3: Research steps.](image)

At the base of the research stays data collected from the local authorities, businessman and residents in a research period spanning over two months in situ. Though there are no transcripts of the interviews conducted because the laptop and backup drive have been lost, part of this data have been recorded and it is available on an on-line blog that describes the main observations and conclusions resulted from the in-situ research.

The theoretical framework deals with the relation between the industry and the city, and it is considered to be the common ground for both the urbanism and real estate approaches of this graduation project. By industry is understood both the activity per se but also the private corporations in general, while the city represents both the spatial context where the project takes place but also the public at large including the local authorities and its residents.

The exploration of the city – industry relation is done by studying two industrial cities cases that are seen as successful considering their present spatial organization and socio-economic achievements. These cases have
been chosen to illustrate two different city development models and two different private corporations’ strategies. The cases have also been selected to illustrate past but also current examples, as follows: the cases of Eindhoven and Philips, in the socio-economic conditions from the beginning of the last century; and the case of Shenzhen SEZ and Foxconn City industrial park, as a more recent example, also similar to the central case of this project.

Figure 4: The schematic overview of the thesis.

In addition to the Eindhoven and Shenzhen SEZ cases, two theoretical studies, one over the knowledge regions (by van Winden and van den Berg, 2004) and the other over the environmental friendly response of the companies (by Bansal and Roth, 2000), have been used to draw two theoretical models the ‘tree model’ – which explains the relation between the city growth and the public authorities; and the ‘onion model’ – which explains the relation between the city development and the private corporations.

From these models it results a set of six factors each having a direct impact on the problems identified in Batam SEZ. For the final proposal this project will address the spatial factors from an urbanism perspective using a Transport Oriented Development strategy (TOD), while the economic – administrative factors will be approached from the real estate perspective using the concept of industrial clusters and competitive advantage.

In order to design and plan the interventions, this thesis uses additional examples arriving from the example of Curitiba, Bogota and Guangzhou, for the TOD strategy and the Bus Rapid Transit (BRT) system details, and the lessons from the China’s SEZs and industrial clusters, together with the example of the Dutch Maritime Cluster (DMC), for the maritime cluster proposal and the administration improvement.

A schematic overview of the thesis development and approach to the final proposal is presented in figure 4 above.
Street vendors are common in Batam. Here is a typical street scene close to the tourist and leisure area in the district of Jodoh (photo by the author)
In order to understand better the nature of such industrial cities such as Batam, this part of the report will study the relation between industry and the city. Under the dual framework of the project - urbanism and real estate, this relation can be interpreted from the point of view of the private corporations and from the point of view of the city authorities.

2.1 DEFINITIONS

According to Encyclopædia Britannica ‘industry’ is:

“(a) a systematic labour especially for some useful purpose or the creation of something of value; (b) a department or branch of a craft, art, business, or manufacture; especially one that employs a large personnel and capital like in manufacturing; (c) a distinct group of productive or profit-making enterprises (the banking; (d) manufacturing activity as a whole […]” (Encyclopædia Britannica, 2011)

Industry can be classified as primary, secondary and tertiary function of the main activity it is based on, which can be genetic and extraction industry, heavy and light industry and services respectively (fig. 5). Some experts, for example Kenesey, 1987, consider a fourth type and even a fifth type of industry, which are based on innovation and knowledge².

![Figure 5: Industries' classification (after Encyclopædia Britannica Student and Home Edition, 2011)](image)

The distinction between these generalizations could be: (1) the type of inputs and outputs they use or produce; (2) the type of labor employed; (3) the type of consumers or clients each has; (4) the type of producers or capital owners (governmental or non-governmental owners or a combination of these) and size.

According to Clark’s sector model (1950), in time a nation would develop from a primary and secondary industry, in principle agriculture and manufacturing, to a tertiary and quaternary industry, in essence services. The turning point between these economic profiles marks the ‘deindustrialization phase’ - i.e. when the tertiary activities begin employing a larger number of population than the secondary industry (manufacturing or industrial sector) (fig 6.).

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A robust economy would have a good proportion of jobs in all the various sectors of the industry in order to be able to adapt more easily to the market changes and provide sufficient innovation potential for new economic activities to be created (van Winden and van den Berg, 2004). Despite this, it can be observed that in the past centuries, as the population grew more urbanized and moved to the city, the percent of the people working in the primary - agriculture, and secondary - industry, activities, has been constantly diminishing, this trend being predicted to continue as well in the future (UN-HABITAT, 2010).

According to UN-HABITAT:

“Cities are the centers of knowledge, innovation and specialization of production and services. Cities facilitate creative thinking and innovation. High concentration of people in cities generates more opportunities for interaction and communication, promotes creative thinking, creates knowledge spillovers and develops new ideas and technologies. Cities provide more opportunities for learning and sharing. Cities facilitate trade and commerce by providing super market places. Cities serve as production and services centers because the production of many goods and services is more efficient in a high-density urban environment. Cities provide consumers with more choices of goods and services. Cities are the agents of social, cultural, economic, technologic and political changes and advancement” (UN-HABITAT, 2010).

Scholars such as Richard Sennett (1996), Hannah Arendt (1958), Jane Jacobs (1992) and others, are defining the city through its ‘public life’, the presence or lack of it creating the conditions for the city to be more or less attractive, or more or less of a city. Lewis Mumford, in his famous essay ‘What is a City?’ (1937), writes that the city is “a theatre of social action”, where arts, politics, education, commerce and everything else that can define a city, contributes to the enrichment of the social life.

UN-HABITAT remarks that cities are, “vehicles of social change”, promoting rights and opportunities for all members of the society. In the end a city promoting the concept of ‘inclusiveness’, is standing better chances for upgrading and developing both the social and economic conditions (UN-HABITAT, 2010).

The high urban densities makes cities more efficient, by reducing transaction costs, making public spending on infrastructure and services more economically viable, and facilitating generation and diffusion of knowledge, resulting in “unprecedented gains in productivity and competitiveness” (UN-HABITAT, 2011).

Experts agree that from the earliest examples, around 5,000 years ago, the evolution of cities and industry has been closely related (Amzallag, 2009; Smith, 2009). But the overdeveloping of only one type of industry, without innovating, is putting the development of the city at risk. In ‘The economy of the cities’ Jacobs argues that the growth of the city essentially depends on its innovation capacity, in creating new products and economic activities (Jacobs, 1969, p. 120). She gives as example the city of Detroit, which, becoming too dependent on the auto industry it started declining after the large car manufacturer companies closed the factories in the city.

2.2 THE CASE OF EINDHOVEN: THE BOTTOM-UP CITY DEVELOPMENT

The present project started from the case of Philips and Eindhoven, which in the view of this theoretical research illustrate a win-win situation between the industry and the city, or between the private and the public parties.

The establishment of the Philips factory in Eindhoven in 1891 marked a turning point in the evolution of the city, which until then counted only 4,500 inhabitants, without considering the population of the surrounding
villages, merely a town. In 1920 the city marks more than ten times the amount of inhabitants, reaching 46,000.

But the influx of workers made for the housing conditions in Eindhoven to worsen. Not only that the majority of the housing conditions were deemed poor, but there was also an acute lack of it, most of the residents having to live in overcrowded, unhygienic and unsafe conditions. (Otten and Kleijn, 1991, p.38)

The authorities responded to this situation initially by inaugurating in 1897 the first steam-powered tramline, which connected the municipalities of Veghel, Eindhoven and Reusel, to Liege in present day Belgium. This way Philips could easily use workers from the region of Eindhoven, without being necessary to provide additional housing inside the city itself. (Otten and Kleijn, 1991, p.27)

Despite opening a second line, the efficiency of the solution is short lived, in part because of the fast expansion rate of the Philips company. By 1910 it employed more than 2,000 people, becoming the largest employer of the Netherlands\(^3\) at that time.

But finding better skilled workers, such as metalworkers and glassblowers, became more difficult, determining Philips to look for skilled labor, outside the Brabant province such as in Drenthe, Overijssel and Gelderland. In these provinces, the company began recruiting skilled workers directly from the competition (Otten and Kleijn, 1991, p.40; Kalb, 1997, p.115).

But in this situation only a better salary would be insufficient to convince these skilled workers to relocate in Eindhoven, where already an animosity climate against outsiders have been created by some high political and religious public figures. Other incentives had to be found. This is how, after several attempts of initiating several social housing projects, the Philips founders decide in 1909 to start building, at their own expenses, a residential neighborhood for their own workers (idem, p.43). The first units will be ready before Christmas 1910 forming the core of the 21 ha ‘Philipsdorp’\(^4\), parts of which exists even today. Soon this project would set a new growth paradigm for Eindhoven, both spatially and socially (see text box 2 below).

**TEXT BOX 2: PHILIPSDORP AND ITS IMPACT ON EINDHOVEN**

Eindhoven of today has developed from a medieval city and its five surrounding villages: Woensel, Gestel, Stratum, Strijp and Tongelre. From early 13th century until late 19th century the city had a slow growth but it is

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\(^3\) Source philips.com (link: http://www.philips.com/about/company/history/ourheritage/index.page) [accessed 09-09-2012]

\(^4\) Meaning ‘Philips’ Village’ in Dutch in original.
accelerated by the arrival of Philips and the attraction of new workers.

In 1909 “Eindhoven Vooruit”, the social housing association established by Philips, buys a piece of land in the Strijp village, west of the Philips’ factory. This would become the core of the Philipsdorp. From 1910 to 1923, the ‘village’ will develop in three phases, in total reaching a surface of 43ha. The first houses will be ready in 1910 before Christmas.

The initial plans of the village will be drawn by the urban planner G.J de Jongh and Rotterdam’s director of public works. De Jongh’s design is based on the ‘garden city’ principles, with large green open spaces and tree lined streets. The plan was conceived as a stand-alone, self-contained neighborhood, nearby the production areas of Philips, yet outside their premises. It is also well integrated with the rest of Eindhoven via Frederiklaan, which forms the ‘backbone’ of the development and connects the Strijp village with city.

Between the houses and the train lines a large park with various public amenities is located (such as a football field which will become Philips stadium of today, a playground for kids and a school). By 1912 other basic amenities can be found in the rest of the development, such as shops, but also a bathhouse and a community centre where music and theatre associations were meeting and different cultural activities were taking place. (idem, p.47)

The houses are close to the city centre, but they have a backside garden and a modern and spacious layout, considered way ahead of their time (with bathrooms and kitchens inside the same premises and with ceramic tiles and parquet finishes). They are being leased out at price levels established function of the position of the worker in the company, in the end the worker arriving to own them, via a finance scheme guaranteed by the company and run by Stichting Philipsdorp. Philips was not drawing any profits from their renting or selling, the only objective being to improve the overall living quality of the residents and incentivizing them to remain working in the same company.

As an example of the quality of the plan are the streets, which were planted with elm trees and had paved sidewalks in front of the houses. The main road (Frederiklaan) had in the middle a green strip planted with trees, and the company was trying to organize competitions and celebration events for all their workers and residents alike, in the end Philipsdorp being not only about living and working, but also about creating a community and building up social relations.

In time, more and more public amenities and services, which began serving the whole city, were created under the multiple public associations the Philips company helped established. Such as the Philips Stadium (the sport club established in 1913), the Etos chain shops (established in 1918 which included all sort of shops, not only the present drugstores but also groceries, bakeries and even fuel pumps), the Philips Bedrijfschool (established in 1929 and providing vocational training and education) and many others. This paternalistic attitude to people lead to the saying “Philips is Eindhoven and Eindhoven is Philips”.

The commitment of Philips goes beyond Philipsdorp and providing good housing to the workers. The company builds roads, its own electricity plant and other important infrastructure objectives meant to secure the progress of the company and through that of the whole city.

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In parallel with the expansion of Philipsdorp, in 1920 Eindhoven annexes the surrounding villages creating the city of today.

Figure 10: The elevation and plan of two typical houses built between 1910 - 1912 (source: Otten and Kleijn, 1991)

Figure 11: Main street view from around 1911 (Frederikslaan). All the houses have back garden. (source: www.eindhoven-in-beeld.nl)

In 1997, the company decided to relocate its headquarters in Amsterdam and the process is finalized in 2001. Apart of some research facilities, in Eindhoven remains the housing, the communities and the human capital built by the company along the years. Nowadays Eindhoven enjoys an international reputation as an innovation and technology center, having its own university and design academy, its own international airport and continues to attract many companies in the hi-tech field. For this reason the relation between Philips and Eindhoven can be considered a win-win case.

Though partially started from pragmatic reasons, it can be concluded that Philipsdorp went a long way from providing only good living conditions, to creating the conditions for the socio – economic development of Eindhoven of today. The project contributed to the improvement of the living conditions and the rising of the human capital, for the whole city, since the spatial quality of the plan, the amenities and the spin-offs resulted from them (such as the various associations) were available to everyone in the city, and not only Philips’ workers. As one of the later founders stated, about Philipsdorp:

“[…] rarely is the minimum good enough. Always, it is necessary, in order to increase the prosperity and wellbeing, to think ahead. Therefore we must set the standard higher and higher and step ahead of our time.”

This was also stated in the mission of the “Eindhoven Vooruit”\(^7\), the association which developed the Philipsdorp, as “promoting the interests of trade, industry, popular welfare, health and leisure” (Kalb, 1997, p.114). Hence, not only a mono-functional project meant to fulfill basic housing needs, but a multi-functional program that would contribute to the enjoyment and development of the residents and the city as a whole.

It is nevertheless true that this social commitment can be well explained by the specific moment in the European history of the second half of the 19\(^{th}\) century, when the Industrial Revolution initiated in England started spreading in the rest of the continent. This paternalistic approach was also determined by the publishing of ‘The condition of the working class in England’ by Friedrich Engels in 1844. This book stayed at the popularisation of the negative effects of capitalism system and lead to the formation of several strong liberal and socialist currents all over the continent from east to west and from south to north (Kalb, 1997).

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\(^7\) In translation ‘Eindhoven forward’ or ‘Eindhoven progressing’ after other authors such as Kalb Kalb, D., 1997. 

towards social reforms — notably aiming at improving the lot of the working class and the weakest in the society”, than promoting the interests of industrialists (Heirding, 1988a, p. 241).

Step-by-step, the evolution of Eindhoven from just a small provincial town in 1891 to the current situation has been influenced by Philips’ social vision and paternalistic approach to growth and development, which. Nowadays Eindhoven is marketed as a ‘Brainport’ accounting for 40% of the total research and design investments in the Netherlands⁹, while Philips is a multi-billion electronics ‘business, operating worldwide and employing over 125 thousand people⁹.

But the present socio-economic conditions have changed dramatically. Can the industrialists of the 21st century lead to similar urban developments as it did in Eindhoven at the beginning of the last century? To answer this question this research looks into the example of Special Economic Zone SEZ cities, in particular Shenzhen, located in the south – east part of China, at the border with the global financial and trade hub Hong Kong.

2.3 THE CASE OF SHENZHEN SEZ: THE TOP-DOWN CITY DEVELOPMENT

Similar to Eindhoven, more than a century ago, the city of Shenzhen is also the result of a fast industrialization process. Like most other cities in the Pearl River Delta (PRD) region, Shenzhen is a Special Economic Zone (SEZ) similar to Batam, the central case of this proposal. In addition this city is taken as a case study because it is considered as a successful case, being able to retain important manufacturing companies even when its initial competitive advantages (i.e. the characteristics that make the city more attractive than other similar locations, such as low production costs) began to wore-out.

Shenzhen is China’s first SEZ area, set up in 1978 by Deng Xiaoping. It was meant to be a model for the industrialization of other Chinese cities following Hong Kong example. Apart of its strategic location, near Hong Kong, the city developed from a fishermen village in 1979, to the most connected production center of the world¹⁰, with a population of over 15 million, including migrant workers, and ranked no. 1 as best living quality city in China (according to Liu Junde, after Wuttke and Waibel 2008, p.233). However, in stark contrast to Eindhoven, Shenzhen is the result of the direct influence of the authorities, and continues to be so.

According to Bruton et al. (2003), Shenzhen experienced three development phases. In the first phase (1980 – 1991) the authorities focused on the attraction of the FDI and the development of the industry. In the second phase (1992 – 2001) attention was given to the improving of the land use and solving the spatial problems. In

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⁹ According to the official internet page of the cit: www.brainport.nl.


¹⁰ In 2011 according to UNCTAD – United Nations Conference on Trade and Development.
the third and current phase that started in 2001, the city focused on developing new economic activities, aside of manufacturing. During this last period, the city authorities actively worked to improve the living conditions and create an international image of the city in order to attract better skilled personnel and new investors (Liauw, 2012).

![Figure 13: View of Shenzhen from 1970, before being declared a SEZ when the city was considered a fishing village. (source: http://encounteringurbanization.wordpress.com/)](http://encounteringurbanization.wordpress.com/)

![Figure 14: Present view of the Futian district of Shenzhen SEZ, known as ‘The hub of living in Shenzhen’. (source: http://encounteringurbanization.wordpress.com/)](http://encounteringurbanization.wordpress.com/)

Especially with respect the living and working conditions, many reports from journalists (such as Bradsher, 2012) but also scholars (such as Liauw, Al, 2012), point to the precarious situation inside the industrial parks, the main manufacturing production areas of the city. These appear to be a good example of the conditions in SEZ areas case in general, as described in subchapter 1.2 of this report. Most of the time the living quarters lacks green spaces, better quality design and the dorms are small, overcrowded and unhygienic. Similarly the working conditions can be dangerous, unhealthy and overtime shifts are frequent (see text box 3 below).

**TEXT BOX 3: THE INDUSTRIAL PARK AND SEZ CITIES**

The conventional industrial buildings (e.g. factories, dorms, warehouses, etc.) in SEZ are organized in large complexes called ‘industrial parks’. These buildings are supposed to provide the basic requirements to suit the needs of the most common industries and providing a basic range of materials to keep the construction cost low. (Lin, 2012) Aside of the production buildings industrial parks also offers dormitories for the workers, canteens and other amenities restricted to the use of the factories’ personnel.

A good example is ‘Foxconn City’, an industrial park run by the same name Taiwanese operator that offers third party services, in general manufacturing, to Apple and other similar global companies such as Hewlett Packard, Dell, Samsung, etc.11 Al (2012) describes it as “a self-contained city with its own fire brigade, hospital, bank, television broadcasting station and even Foxconn-stamped manhole covers” and “420,000 people live and work”. According to the New York Times, in total Foxconn employs 1.1 million workers in factories around China.12

The severe working and living conditions in the industrial parks of Foxconn came under the western media spotlight after a series of accidents related in particular with the workers contracted to Apple. These consisted of a number of suicides, which took place over 2010 in various Foxconn operated factories. According to employees inside those plants, problems can vary from onerous work environments to serious, even deadly safety problems.

Employees work excessive overtime, in some cases seven days a week, and live in crowded dorms. Some say they stand so long that their legs swell until they can hardly walk. Under-age workers have helped build Apple’s

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products, and the company’s suppliers have improperly disposed of hazardous waste and falsified records, according to company reports and advocacy groups that, within China, are often considered reliable, independent monitors. (Mail Online, 2006; Duhigg and Barboza, 2012)

One could conclude from this example that the working and living conditions in Foxconn City are not far from the general case of SEZ cities, as described in the previous chapter of this report. For this reason they can be taken as an exponent of the working – living relation in the SEZ cities in general.

Nevertheless, the situation began changing in the last few years under the influence of the more intense scrutiny of the press and scarcer workforce. Lin (2012), giving the example of the Adwin Dongguan Factory, a textile factory nearby Shenzhen SEZ, describes how the owners improved its working and living environment in order to attract and retain their workers.

Apart from salary, the factories in the region need to provide a “comfortable environment to attract and retain their staff” including providing landscaped open spaces that are richly planted with shrubs and trees; creating higher ceilings and good ventilated and lighted working spaces; allowing garden views and coffee corners; and equipping dormitories with roof top terraces with gardens for the enjoyment of the workers. The improvement comes also under a more intense scrutiny and stricter application of working laws by the public authorities. (idem.)

Other positive examples are coming from Shenzhen SEZ itself, where some industrial complexes or districts upgraded from manufacturing activities to more hi-tech or service oriented functions. According to Liauw (2012) districts like Shangbu, became today’s ‘Huaqiangbei Electronics Center’ and the Overseas Chinese Town district evolved from manufacturing to tourism and creative industries. Similarly, Guangming District started developing sustainable high-tech industries and Bao’an plans to transform itself from a polluting industries district to an ecological CBD ‘water city’ with a population of 1.5 million.
Under this aspect, despite the poor working and living conditions which appears to persist inside the industrial parks, the case of Shenzhen SEZ city is consider a success, its evolution path appearing to be following Milberg and Amengual’s recommendation of “transforming industrial upgrading into social upgrading.” (2008, p.62).

Currently three strategies can be noticed in the Shenzhen’s authority’s approach. At the socio-economic level the city is focused on attracting more hi-tech, higher value industry, and is looking for diversifying its economic activities and its markets (Yang, 2012). At the international and regional level the city tries to be better integrated at the spatial level by improving and upgrading its public transportation network and having a better and more easily recognizable image. Finally, at the city level the authorities are more strictly observing the working and living conditions, and actively addressing the illegal housing areas or ‘urban villages’ (fig. 17). In addition, in order to improve the quality of life, they are also focusing on providing greener, healthier and more attractive public spaces.

### 2.4 COMPARING EINDHOVEN AND SHENZHEN CASES

Though both Eindhoven and Shenzhen cities started developing from their industries and are considered under this project as success cases, there are three important observations that can be made.

1st. About the factors that lead the development of the city

In the case of Eindhoven these were the Philips’ founders and hence one can call this development ‘bottom-up’ since it started from among the users / residents of the city. They began developing Philipsdorp initially having in mind the interest of the company and that of their workers. As the company grew bigger and Philipsdorp spanned in other initiatives at the city level, the company began directing the city growth. From here also the association between the image of Philips and the image of Eindhoven well reflected in the saying “Philips is Eindhoven en Eindhoven is Philips”. In part, this was done unintentionally, through the spin-offs resulted from the community projects initiated by Philips, such as the football team and stadium, the ETOS shops chain, the technical university, and others. In this situation the city’s authorities having more the role of facilitators than that of initiators.

In the case of Shenzhen, the situation is the opposite, the city appearing as a result of a ‘top-down’ process. In here, it was the authorities that initiated the development of the city, right from the start. This has happened also because in the beginning the city was no more than a fishermen village with little or no infrastructure at all and without a more rich trading or cultural history, such as its neighboring city Guangzhou was. Nevertheless, through this approach, Shenzhen is in a favorable position with respect to other cities in the PRD region, since the central government continues to support its development with public funds.

2nd. About the working and living relation

In the case of the Philips, one can notice a ‘paternalistic’ (i.e. that shows special care and attention) approach to the workers and their families. For example the housing and living conditions in Philipsdorp, considered above the minimum standard at that time. Outside the factories the workers were dedicating their time to social activities, in the parks, the playing grounds and various clubs founded by the company. Living and working were two separate things and were performed as such.

In the case of the industrial parks of Shenzhen this distinction disappears: workers sleep, eat, shop and spend time inside the same production grounds where they are supposed to work. The whole life of the factory.

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workers in a SEZ area takes place on the premises of the factory as long as their contract lasts. This is true especially if it is about migrant workers, coming from the rural side of the country, having little life experience, few or no relations in the rest of the city and having no other place to sleep than the dorm provided by the company. (Chang, 2008; Lindquist, 2009)

3rd. About the position of the private companies with respect the city development

One can notice that in the case of Eindhoven, Philips continued to develop in the city for a long time until it moved its headquarters and production facilities in the late ‘90s. This commitment and responsibility from the corporation made for the Philipsdorp alongside with its leisure amenities and the factory premises to develop in the same city contributing to Eindhoven’s own growth. By the time Philips have closed the factories and moved its headquarters in Amsterdam the city becoming sufficiently developed to continue progressing on its own.

Not the same thing can be said with regards the companies in SEZ areas in general. As in the case of Apple (see text box 3 above) most of the companies activating in SEZ areas, are using third parties to deliver their products. This means that, the premises and the working conditions do not concern the company itself, but a third party. Without having a direct responsibility for the workers, and not owning the premises themselves, companies found much easier to relocate when faced with increased hardship conditions. Such companies are referred as ‘footloose’ (FIAS, 2008, p.33), and unlike last century’s Philips these are unlikely partners for the long-term development of the cities where they are located in.

2.5 TWO MODELS FOR INTERPRETING THE INDUSTRY - CITY RELATION

Based on the cases described above, two models for interpreting the relation city – industry can be deducted: (a) the ‘onion’ model – which explain the relation from the perspective of the private corporations; and (b) the ‘tree’ model - explaining the city development from the authorities’ point of view.

(A) THE ‘ONION’ MODEL – EXPLAINING THE CITY DEVELOPMENT FROM THE PRIVATE CORPORATIONS’ POINT OF VIEW

In order to explain the city development from the private corporation (or industry) point of view, this proposal used Bansal and Roth (2000) research that explains private corporations’ relation to natural environment. The researchers conclude that there are three major factors namely competitiveness, legitimacy and environmental responsibility, that would determine companies to act in an environmentally friendly way.

By ‘competitiveness’ is understood the potential for the ecological response from the company to improve its long-term profitability of the company, such as, for example, reducing the fossil fuel consumption. By ‘legitimation’ is understood the desire of a firm “to improve the appropriateness of its actions within the guidelines of an established set of regulations, norms, values, or beliefs” (Suchman, 1995, after Bansal and Roth, 2000). The ‘environmental responsibility’ was linked to the corporate values with regards the environment, for example if the company considered itself as a ‘green’ company then it is most likely that this company will act in an environmentally friendly way. The same model that explains the attitude of a company to the natural environment can also explain the relation between a company and a city, the specific factors influencing the company being very similar.

If one compares a private company to an onion (the onion layers representing the various chain value activities such as R&D, production and operation, logistics, etc.) (fig.18), it can be imagined that the more care would be given to it (i.e. the more factors are acting on it) the more it will help it to grow (i.e. starting performing activities outside the core value chain activities) deeper and broader into the soil (which would represent the city). (fig. 19) A more city integrated company would find it more hard to relocate in case problems arrives, this
making it a more reliable development factor for the city. This concept is also supported by scholars such as Daems (1990).  

Following the ‘onion’ model a typical company in the SEZ area can be described as a ‘spring onion’ because it has only a part of the value chain activities in the city (it grows fast by slim and it is easy to be removed from the soil), while a company such as Philips a century ago, can be described as an ‘autumn onion’ because all the key value chain activities are located in the same place (it grows slow but broad, making it harder to be removed from the soil). One can also remark in the case of Philips all the three drivers, pointed out by the Bansal & Roth research, but in the case of the city development.

A ‘spring onion’ company, such as the companies acting in the industrial parks in Shenzhen, would bring little contribution to the city on the long-term, for them being easy to relocate if the need arrives. An ‘autumn onion’ type of company would bring more significant contributions to the city and would be less inclined to relocate from city even in hardship (fig. 20).

The danger is however, in the case of the ‘autumn onion’ companies, that if indeed such a company will leave the city and the city itself have not developed enough to be able to innovate and continue new economic activities, then this might have negative effects on the rest of the city. This was the case of Detroit and the car companies as described by Jacobs (1969).

**B) THE ‘TREE’ MODEL – EXPLAINING THE CITY DEVELOPMENT FROM THE PUBLIC AUTHORITIES’ POINT OF VIEW**

Van Winden and van den Berg (2004) propose eight spatial and policy factors that the public authorities can use in order to help a city develop and grow on the long term. If one can imagine the development of a city as a tree, than these drivers would stay at its roots, below the soil line where the authorities have full control, while the city with all its “theatre for social interaction” (Mumford, 1937) will be the crown, that grows under the influence of the market conditions (hard to be controlled by anyone) (fig. 21).

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We can remark especially certain factors coming from the Eindhoven and Shenzhen cases. ‘Accessibility’ is one of these factors that have been from the start addressed by the authorities from both cities in order to address the spatial problems. Eindhoven initiated a steam-powered tramline in order to connect the surrounding villages with the center of the city. Currently the planning authorities of the Gunagdong province where Shenzhen is located, plan a train system to unite the whole Pearl River Delta cities in one mega-urban city (see text box 6 under sub-chapter 3.5). Also the ‘living quality’, represented by the housing quality especially, and the ‘public amenities’ appear to be especially addressed in both the cases presented in the theoretical framework.

What the ‘tree model’ shows specifically is that the role of the authorities is to help creating the conditions for the city to grow and develop, for example by improving the living quality or the accessibility. The actual growth and development itself will depend on the broader socio-economic context in which the city is located. For this reason the implementation strategy of the intervention should monitor and evaluate the effect of the interventions in order to tune them for best performance.

Initially the factors described by van Winden and van den Berg were meant for the knowledge regions but it can be easily appropriated to the particular case of SEZ cities, or industrial cities in general. The main distinction being that instead of ‘knowledge base’ the ‘industrial base’ will be used and instead of ‘economic base’ the ‘policy environment’ will be considered in order to capture the spatial-economic considerations necessary in planning (table 2). These factors can also be used to evaluate the current and planned situation of an industrial city, as well as different future scenarios.
Table 2: Factors that authorities can use in order to influence the development of a SEZ area (adapted after van Winden and van den Berg, 2004)

<table>
<thead>
<tr>
<th>THE DRIVERS THAT AUTHORITIES CAN USE TO INFLUENCE THE LONG-TERM SEZ CITY GROWTH &amp; DEVELOPMENT</th>
</tr>
</thead>
<tbody>
<tr>
<td>Living quality</td>
</tr>
<tr>
<td>Good to very good housing and working conditions</td>
</tr>
<tr>
<td>- easy access to various cultural, sport and recreational facilities</td>
</tr>
<tr>
<td>- easy access to specialized health care services and higher education facilities – including academic</td>
</tr>
<tr>
<td>- a healthy, safe and green environment</td>
</tr>
</tbody>
</table>

2.6 DISCUSSION: THE FUTURE OF THE SEZ AREAS

In closing this theoretical framework, a discussion is necessary to understand better the future of the industrial cities and the systems in which these work. From the start, a distinction should be made between the economic theories on fostering competitive advantage for the private companies and the organisations or systems were these are applied. History proves that there is a link between these two.

The cases of Shenzhen and Eindhoven illustrate two different systems in which private companies influence the living quality, this encompassing (i) the housing conditions (e.g. quality, availability, etc.), (ii) the surrounding environment conditions (e.g. safety, good quality design, etc.); (iii) the presence of public services and amenities (e.g. public transportation, education and health facilities, etc.); and (iv) the working conditions (e.g. freedom of the workers, quality of the environment, etc.). Through ‘private companies’ it is understood organizations that have as central purpose the creation of profit, based on a certain activity that provides either services or products to the consumers.

One can notice that in the case of Eindhoven the relation between the private company (namely Philips) and the workers is direct, being only partially mediated by the unions or the state / authorities. This is representative for a capitalist system, where the economic deregulation and market liberalization is widely applied. In this system the private companies are supposed to provide for the living quality of the workers, and at times, as we could see in the case of Philips, this was considerably improved.

In the case of Shenzhen, the relation between the workers and the private companies, or employer (such as Apple or other foreign companies that provide work), is mediated through third parties which can be the owners of the industrial parks (which officially employ the workers and have a direct influence on the working and living conditions), the state and, more recently, the worker’s unions or other organizations promoting the rights of the workers. This relation is representative for a social welfare system, which until recently was common for the European societies. In this system the majority of the people, workers or not, are ensured a better living by the state organizations.

We can place these two examples well in the evolution path of the history (fig. 22) and describe a link between the degree of involvement of the private companies and the living quality.

The 18th century and earlier is dominated by a slavery system and a stark separation between the social classes: the landlords or company owners and the rest. In this system there was little to no involvement from third parties to regulate the relation and address the rights of the workers.
In the 19th century the capitalist system began developing after the slavery slowly started to be abolished. A quick look in the leading countries that initiated this system, such as UK at the dawn of the Industrial Revolution, show that living conditions of the workers were still harsh, though there was nevertheless much more freedom of choice, and the workers’ unions did started to play a more important role. Likewise the social class system begins to diversify, a middle class, ‘le bourgeoisie’ in France, began to form in between the workers and the landlords. This was constituted by civil servants, higher educated or skilled workers, intellectuals and artists. Companies such as Philips, which had a paternalistic approach to workers, appeared at the end of the century in mainland Europe, under the influence of a new generation of political and social theorists, thinkers and philosophers such as Karl Marx, Friedrich Engels, John Stuart Mill and others.

The 20th century is marked by the invention of the state, which in the aftermath of the Second World War, proved to be a good strategy to address the necessary reconstruction and development at the level of whole countries not only cities. The nationalization of important infrastructure or industry objects was initiated not only in the east side but also in the west side of the continent. In this system the state becoming responsible for the living quality of all the population, creating a more fair social balance.

Since the late ‘80s one can notice that the welfare systems begin to change, preconfiguring a new system for the 21st century that was initiated by prominent US and UK politicians, such as Ronald Reagan and Margaret Thatcher. The changes aimed, among others, at reducing the public costs but also at empowering the private companies and liberalizing the global financial markets. From here resulting also the ‘globalization’ process, which gave birth to SEZs across the globe.

In Europe, these changes have been marked by the fall of the Iron Curtain and the concomitant transition from the state owned to the private property of major infrastructure, pension and social care systems. This happened in various degrees from east to west side of the European continent. Namely the Eastern European states started abandoning much more and in a far shorter time the state property and welfare systems, as a result of the transition shock after the Iron Curtain fall, when the legislation was still weak and the international pressure was high to do such a transition. The Western European countries, adopted a much slower transition pace, currently still negotiating with the public stakeholders how to better do this transition. Under this aspect one could say that the Eastern European countries served as a testing bed for the application en masse, of the market liberalization policies, in general with negative consequences on the living quality of the majority of the population.

But what is the 21st century system that can continue foster competitive advantage while ensuring a higher living quality standard?
Scholars such as van Kersbergen and van Waarden (2004) notice a transition from the previous government lead systems to a more governance organization involving the civil society and the private companies (fig. 23). However, they cannot determine a new emerging socio-economic system. Observing the recent economic crisis, the present governance system appears to favor the private corporations. For example, in Europe the privatization of the state property appears to have led to dubious results, the private companies taking over large infrastructure networks (such as railways or other public transportation systems), for example, continuing to underperform with negative consequences at the socio-economic level reflected in the unemployment rate and the poorer quality of the services. Likewise, in the banking and insurance systems, the liberalization policies appeared not to work as expected, leading to the defaulting and consequent bail-out by the national governments of many well-known US and European banks and insurance companies that once were seen as reliable and stable.

Similarly at the larger scale, the globalization process has showed many worrying signs. Scholars such as Saskia Sassen and Manuel Castells, doubt the overall success of the globalization. They argue that the process widened the poverty gap between nations and helped certain private companies from the developing countries to become richer and more influential, at times leading to rules bending and democratic ruling challenges (such as the recent tax evasion problems).

In 2003, Goldman Sachs, a renowned US investment bank, named four nations as leading the path of the economic progress. These were the BRIC countries – Brazil, Russia, India and China. In 2011 this set was completed by the MIKT countries – Mexico, Indonesia, South Korea and Turkey – which, according to some economic analysts such as Jim O’Neill, appear to have high potential of becoming the world’s largest economies of the 21st century. Will these countries set the next socio-economic system of the 21st century? The final proposal of this thesis is based on multiple examples coming from the BRIC countries, especially Brazil and China.

Zeng (2011) recommends “a more gradualist approach” toward reform. Economic liberalization should be a means of promoting economic development but not the end in itself. How to proceed effectively with economic liberalization is a question that depends on the situation in a particular economy. The Chinese experience so far seems to suggest, among other things, that a pragmatic, step-by-step approach with a careful examination of the expected results, works better than an attempt to change everything overnight. The key is “to minimize the avoidable economic, social, and political costs.” (p. 34). Bruton et al. (2005) also remarks that in most cases when dealing with uncertainties, the Chinese planning authorities adopted a “pragmatic ‘learn as you go’ and/or ‘experimental learning’ approaches” in order to find a solution that works (p.242).

Nevertheless, it is beyond the scope of this thesis to describe a new possible socio-economic system that would benefit companies and living quality. What would this proposal do is recommend based on the existing literature, such as UN-HABITAT’s ‘Local economic development series’, some general steps that the present administration could take in order to improve their governance in the future.

![Figure 23: The governance triangle (after van Kersbergen and van Waarden, 2004).](image-url)

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NEXT BATAM: Fostering a resilient growth strategy

It worth underlining that in all the three systems described, the presence of a third party (be it the state or labour unions) helped improving the standard of living of the people. Hence, it is important to consider the crucial role the regulatory and controlling bodies plays in the civil society development. Likewise, in the light of the last several crisis, it appears that wide market liberalization, can lead to global economic recession with negative effects on both the civil society and the markets. The new system should present a good balance between the involvement of the third parties such as the state or other regulatory bodies and the amount of freedom the private companies can have. This should be enough for the companies to continue exploring and remain competitive but restrictive enough in order to prevent unsustainable profits.

Keeping in mind the real estate and urbanism tasks of this thesis, the above question has to be reformulated to ‘under which infrastructure conditions the new industrial cities such as SEZ cities, can ensure the competitiveness of the private companies?’ The working premises of this thesis being that through infrastructural interventions, new opportunities can be created for the increased competitiveness of the companies and for the development and advancement of the city and the living quality standard. However, the administration system under which these infrastructural changes are supposed to happen will be a pre-requisite for the final proposal and it will be addressed accordingly.

In both of the cases explained above, infrastructure plays an essential role in maintain the companies’ competitiveness while contributing to the development of the cities. In the case of Eindhoven the building of the steam – powered tramline catalysed the development along its path and inside the city centre. Currently the Shenzhen authorities adopt a similar strategy at the regional level by the implementation of a high-speed train. Their aim being to enable resident to “travel around freely and use the health care and other facilities in the different areas,” in addition, “it will help spread industry and jobs more evenly across the region and public services will also be distributed more fairly.” (Ma Xiangming in interview to the Telegraph 2011)
III. APPROACH METHOD
Public space remains scarce in Batam. In this photo, meditation practitioners are using the parking space near a traditional wet-market located in Baloi district (Pasar Penuin) (photo by the author)
3.1 GENERAL CONSIDERATIONS

In the theoretical framework two models for interpreting the industry – city relation have been presented. These models give a series of spatial and policy factors that can contribute to the city’s long-term development. The factors coming from the ‘tree model’ stay in the power of the public authorities to work with, while the factors coming from the ‘onion model’ stay in the power of private corporations.

Under the present dual master track framework and the initial problems identified in Batam SEZ, the central case of this proposal, only part of these factors will be directly addressed function of the problem analysis. Hence, under the urbanism track the proposal will directly address (1) ‘living quality’, (2) ‘public amenities’ and (3) ‘accessibility’ – spatial factors resulting from the ‘tree model’; and under the real estate and housing, the proposal will directly address (4) ‘policy environment’ and (5) ‘industrial base’ – economic-administrative factors resulting from the ‘tree model’, and (6) ‘competitive advantage’ – an economic driver resulting from the ‘onion model’ (fig. 24).

In order to approach the spatial factors (factors 1 to 3) the Transit Oriented Development (TOD) strategy will be used, while in order to approach the economic factors (factors 5 and 6) the competitive cluster concept will be used. The approach of the planning / administrative driver (driver 4), will result from the knowledge stemming from both methodologies. At the base of each approach stay a main example that shows how these factors are addressed. For the TOD the example of Curitiba will be described alongside with an research in several separate cases studies (in addition to Curitiba case these are the cases of Guangzhou and Bogota). For the clusters the Dutch maritime Cluster (DMC) example will be described and analyzed in more depth to understand how it works. These examples and cases will be used for the final proposal in the case of Batam SEZ.

The ‘living quality’ and ‘public amenities’ will directly address the problems of ‘poor housing conditions’ and ‘degrading ecological balance’. Similarly, ‘accessibility’ will have a direct influence on the problems of ‘reduced mobility’ but also ‘housing conditions’. These problems being approached, as already mentioned, through the TOD strategy. (fig. 25)

The ‘policy environment driver will have a direct effect on the ‘inefficient administration’ and ‘declining competitiveness’. In addition, the ‘declining competitiveness’ problem will be directly influenced by the ‘industrial base’ and competitive advantage’ factors, that will be addressed separately using the industrial clusters’ concept.
PART A. URBANISM APPROACH: THE TRANSIT ORIENTED DEVELOPMENT STRATEGY

This part of the report explains the tool used to solve Batam’s spatial problems in particular. In essence this is based on the Transit Oriented Development strategy, or TOD.

3.2 INTRODUCING THE TOD STRATEGY

A transit oriented development, or TOD, is generally defined as:

“A high density, mixed-use development designed to maximize access to, and promote use of, public transportation, with an emphasis on pedestrian circulation and accessibility” (Greater Cleveland Regional Transit Authority, 2007)

According to the Greater Cleveland Regional Transit Authority the typical elements of TOD design strategy include:

- Elevated densities – Increased population and employment densities place more potential riders within walking distance of transit stations/stops, in general in the range of 400 to 800m, corresponding to 5 to 10min walking;
- Mixed-uses – Retail, office / work, residential, and public space promote concentrations of public activity around transit station/stops, increasing the physical and cultural prominence of transit in the community, as well as facilitating trip chaining linked to transit (i.e., stopping at a day care facility on the way to the bus during a morning commute to work, instead of making separate trips); and
- Pedestrian orientation – Placing daily goods and services, as well as recreational destinations, within walking distance of residents and orienting building entrances toward transit stops.

According to the same source, the TOD strategy can bring many benefits for the communities, public authorities, citizens, private enterprises (developers or employers alike) and environment (table 3).

Among these benefits several appears to be particularly important for the central case of this project, such as: reduced transportation costs, better opportunities for personal development, increased homeownership rates especially among lower income groups, enhanced community environment, reduced spending on roads’ infrastructure, higher returns on investment for developers, preservation of farmland and open spaces, and enhanced regional identity.

Table 3: Benefits of the TOD strategy (after Greater Cleveland Regional Transit Authority, 2007)

<table>
<thead>
<tr>
<th>Benefits to citizens of the region</th>
<th>Benefits to employees</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Reduced household transportation costs, and increased mobility choices, including walking;</td>
<td>• Increased transit ridership and reduced auto use and auto ownership, resulting in lower demand</td>
</tr>
<tr>
<td>• Improved access to various amenities and social services (such as shopping, services, and recreational, educational and cultural opportunities) and creating better the opportunities for personal development;</td>
<td></td>
</tr>
<tr>
<td>• Increased homeownership rates or more adequate housing, especially among lower income groups;</td>
<td></td>
</tr>
<tr>
<td>• Better public health and safety, including reduced pollution-related illnesses, increased physical activity and reduced traffic accidents;</td>
<td></td>
</tr>
<tr>
<td>• Ability to live, work and shop within the same neighbourhood this increasing the productivity of employees through reduced stress factors and useable commute time.</td>
<td></td>
</tr>
</tbody>
</table>
At the core of a TOD strategy stay the integration of the public transportation system, such as metro, train, or rapid bus transit, that will form the ‘backbone’ of the development, with the land use planning. Key to determining the development pattern of a TOD is the type of transportation system used as the backbone transportation.

Frequent transit services with limited stops, spaced every 1-1.5km, (such as metro, train or BRT – Bus Rapid Transit) tend to have faster journey times but have less convenient local access. Frequent transit services with many local stops, spaced every 250-400m, have more convenient local access but have slower journey times (it can be also BRT, tram or regular bus). (Trans Link, 2011) A more frequent stop transit service will create more of a ‘corridor’ development pattern, while a more sporadic stop transit system, will create more of a nodal development pattern, with the highest concentrations of density focused around the stations (fig.27) (idem.).

According to GTZ (2004a), the concentrating functions and services in the city centres, can lead to various spatial problems, such as urban sprawl on the fringes, high commuting needs, roads congestions and increased maintenance and transportation costs. Their recommendation is to create local sub-centres to serve the needs of the residents (referred to as ‘decentralized concentration’) (fig. 28). This will lead to more homogenous distribution of activities, thus reducing the average trip distances and mitigating the traffic increase, while maintaining a compact city form along the lines of the transit system thus creating a more sustainable development (p.35).

### 3.3 THE EXAMPLE OF CURITIBA: MITIGATING SOCIO-SPATIAL PROBLEMS THROUGH TOD

A good example of such practices is Curitiba, which is considered the first TOD in the world and in general also one of the most successful. (GTZ, 2004, 2005) In part this is because of its high modal share of public transport
(85% of the total population uses its bus system) and in part because the system is financially viable without the support from the government. (World Bank, 2010) Curitiba uses a BRT system integrated with the land-use planning and roads infrastructure in order to control the city growth, mitigate illegal housing and environmental problems, create a better image for the city and authorities, and attract investors. (Lindau et al., 2011)

**THE PLANNING PRINCIPLES**

The present situation is the result of a process that started in 1966, when the city planners developed a master plan to restructure the city’s development and accommodate urban expansion. The Curitiba Master Plan, adopted in 1968, focused on strict controls on urban sprawl, a reduction of downtown traffic, preservation of the city’s historic district and a convenient and affordable public transit system. (World Bank, 2010) In 1974 the first bus line started to operate in the direction north-south, along the south and north structural axes, in time more lines and feeders being added (fig. 29).

The masterplan was developed and implemented by the Curitiba Research and Urban Planning Institute (IPPUC), which still monitors and runs the system even nowadays, ensuring the continuity of the project and its constant improvement (Karis et al., 2006). Currently the land use, public transportation and roads network are integrated together at the level of the city (fig. 30 to 32)

The IPPUC masterplan gave priority to the public transit, instead to vehicles, using a triaxial road system (called structural axis). In the middle the BRT dedicated lines and slow car traffic and parking are located, while on the sides are located fast, one-way roads. In between these axes, are located the high density, mixed use developments (called special sectors), while at the edges are concentrated medium density developments (ZR4), gradually decreasing to low density mainly residential use developments (Z3 to Z1) (fig. 33)
The effects of this strategy can be observed well in practice (i.e. high density and commercial functions located along the special sector corridors) (fig. 30), though the changes did not happen over night and even nowadays there are still high density areas located outside the main development lines (fig. 31). The authorities had to incentivize the developers (e.g. allowing to build higher or giving tax deductions in certain areas to lure the investments) or change the land use coefficients (e.g. reducing or increasing the occupancy rate or utilization coefficient of the land) in order to stir the development. (Smith and Raemaekers, 1998)

Citing IPPUC, the density along the South Structural Zone, will be in between 50 to 70 units/ha by the years 2020 and in the long-term stabilizing to 300 – 400 units/ha (idem. p.239).

Development incentives are also use in order to preserve the green areas in the city and help alleviating the social housing conditions for the lower income groups. For example, if the building plot is in an area that limits the height of the building, the developer is able to build higher if it pays a tax to the social housing fond. Or if the building is located in an area declared a green space than

THE BRT SYSTEM OF CURITIBA

The success of Curitiba is linked to success of the transit system used, the BRT. Curitiba’s transportation system is made up of three complementary levels of service that include feeder lines (alimentador in Portuguese),

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express lines (expresso) and inter-district routes (interbairros) (fig. 36). The feeder lines pass through outlying neighborhoods, making the system easily accessible to lower-density areas. The feeder lines connect with the express system along the structural corridors. The express system operates like a surface subway system, transporting large numbers of passengers to locations along the structural corridors. Finally, the inter-district routes allow passengers to connect to the axis of the express lines without going into the city (Karis et al., 2006) (the principles of a BRT bus system are described in text box 4 below).

Important parts of the system are the transit stations, or ‘integration terminals’, which insures the transfer from the feeder lines to the express BRT lines (fig. 37). Function of their location, these stations can integrate the system at the local (transfer is done from local roads) or regional level (transfer can be done from regionally connecting roads). Apart of ensuring easy and fast transfer from one service to another, these terminals are fitted with diverse amenities for the passengers (such as: mini-markets, post office, public services, libraries, cafes, etc.), providing an enhanced environment attractive to businesses and developers.

In addition, each city district, of which there are twelve, also has a transfer terminal called a “Citizenship Street” (rua da cidadania in Portuguese in original) which provides a range of municipal services in addition to the usual commercial operations, including health centres, vocational training, community centres, legal assistance offices and social service centres (Gustafsson and Kelly, 2012).

A number of smaller bus stops (fig. 38) serve each express bus route. These appear at 500m intervals along the express route and somewhat less frequently in lower-density areas. Most of the bus stops along the express and direct routes are equipped with GPS displays that indicate in real time when the next bus will arrive. The bus stops share a characteristic tubular design and offer protection from outdoor elements. Furthermore, bus stops are raised, so that when boarding a bus, passengers are already at the appropriate level to climb onboard (idem). The bus station on the feeder lines are normal bus stations with access directly from the street level (fig. 39).
FINANCING AND OPERATING THE BRT SYSTEM

In order to help the lower income residents in the city and improve the social equity the transportation system uses only one fare system, i.e. a single fare covers the whole city, on all public transportation means. This measure also helps incentivize the public to use the public transportation (GTZ, 2005).

Curitiba BRT system receives no government subsidy and is completely self-supporting. The services are provided by 16 bus companies which are regulated by a government company named URBS. (Lindau et al., 2011) URBS is also responsible for regulating taxi services and public parking in the city. URBS collects all fares and distributes payment to the bus companies based on the distances they travel. Previously, the companies were paid based on the number of passengers they carried, but this led the companies to all focus their services on the busiest commercial areas, where the greatest passenger demand existed. By paying the companies based on the distances they travel, URBS is able to ensure that the companies have an incentive to provide services in less dense areas as well thus creating a socially fair system (Gustafsson and Kelly, 2012).

The bus companies are responsible for purchasing all of their own vehicles, for which URBS reimburses their capital costs at a rate of 1 percent per month. The guarantee of a twelve percent annual rate of return incentivizes the bus companies to invest in new vehicles, and generally, buses in Curitiba are only used for 3-4 years, in an effort to make sure that the fleet remains clean, safe and comfortable (idem.).

TEXT BOX 4: THE PRINCIPLES OF A BRT SYSTEM

Unable to afford a rail system, and struggling to deal with rapid population growth, Curitiba developed the BRT system in order to offer its citizens high-quality transportation services at a fraction of the cost of rail-based systems, in addition to mitigating the urban sprawl. The BRT system has simply been described as “think rail, use busses” (Gustafsson and Kelly, 2012).

Several features are found in some of the most successful BRT systems around the world (after GTZ, 2005):

• Exclusive right-of-way lanes with median stations
• Pre-board fare collection and fare verification
• Rapid boarding and aligning
• Free transfers between corridors
• High frequency service and low station dwell times
• Enclosed stations that are safe and comfortable
• Clear route maps, signage and real-time information displays
• Automatic vehicle location technology to manage vehicle movement
• Modal integration, at stations and terminals
• Competitively bid concessions for operations
• Effective reform of the existing institutional structure for public transit
• Clean bus technologies;
• Excellence in marketing and customer service

A BRT system can generally be trunk-feeder services or direct services. (GTZ, 2005)

The trunk-feeder services utilises smaller vehicles in the lower density areas and then facilitate passengers to transfer to higher-capacity vehicles at terminal stations. Thus this operates relatively efficiently by matching the vehicles capacity to the demand. The disadvantage of this system is that passengers might need to transfer to other buses in order to reach their destinations, process that can be seen as an undesirable burden for some.

Direct services avoid the need for customers to transfer since the same vehicle serves both the feeder area and the trunk-line corridor. However, direct services incur a substantial cost penalty for operating vehicles that do not closely match the actual demand. Direct services might still necessitate transfer if the destination of the passenger is other than that of the trunk line used.
ENVIRONMENTAL PLANNING

In addition to mitigating the social and economic issues, Curitiba is also a leading city in what concerns environment preservation and creating green spaces to improve the quality of life of its citizens. Nearly one-fits of the city is parkland, by comparison to only 8.1 percent parkland in the average American cities. Besides its obvious aesthetic and recreational value, the park system is vital for controlling increased flooding and protecting Curitiba’s biodiversity and water quality (Gustafsson and Kelly, 2012) (fig. 41).

In creating the park system Curitiba subsequently designated four environmental preservation areas restricted or prohibited development in the respective areas. Currently the Curitiba Environmental Secretariat plans to designate another ten environmental preservation areas in the next decade.

The city also developed a recycling program that combines sustainability, social inclusion, and good fiscal stewardship. Over seventy percent of the Curitiba’s trash is recycled through its recycling programs.

In the favelas, or shantytowns, inaccessible to recycling pickup trucks, Curitiba operates the ‘Ecocitizens’ program. The program encourages homeless and low-income persons to collect and separate recycling from inaccessible neighbourhoods in exchange for bringing recycling to one of 92 sites, the ‘ecocitizens’ receive bus thicket, fresh fruits and vegetables, and children’s school supplies. Ecocitizens remove 500 tons of recyclables a day, for a total of 11,000 tons of garbage since the program’s inception. The program has benefited sixty impoverished neighbourhoods with 31,000 families by improving neighbourhood sanitation conditions and by providing an influx of resources: nearly a million bus tokens and 1200 tons of surplus food as in-kind payment (idem).
PART B. REH APPROACH: THE INDUSTRIAL CLUSTERS

This part of the theoretical research explains the concept of industrial clusters that will be used in addressing the economic and administrative issues identified in Batam SEZ.

3.4 INTRODUCING THE CLUSTER AND COMPETITIVE ADVANTAGE CONCEPTS

As explained in the introduction part of this chapter, the long – term development of an industrial city depends on its capacity to diversify and innovate, Detroit being a good example to illustrate this. Such conditions are met in a cluster. According to Porter (2000) clusters are:

“a geographically proximate group of inter-connected companies and associated institutions in a particular field, linked by commonalities and complementarities” (p.16)

Clusters can include (1) suppliers of specialized inputs (such as components, machinery, and services), (2) providers of specialized infrastructure and (3) governmental and other institutions that provide specialized training, education, information, research, and technical support (such as universities, standards-setting agencies, think tanks, vocational training providers, and trade associations). (idem.)

| Table 4: Cluster advantages function of various factors (after Porter, 2000) |
|---------------------------------|---------------------------------------------|
| Clusters and Productivity      |   • Better access to specialized inputs and employees;  |
|                                 |   • Better access to information;  |
|                                 |   • More complementarities between companies, in terms of products, marketing;  |
|                                 |   • Better alignment of activities among other cluster participants;  |
|                                 |   • Better access to various institutions and public goods;  |
|                                 |   • Improved incentives and performance measurement  |
| Clusters and Innovation        |   • Perceiving faster and better the new buyers’ needs;  |
|                                 |   • Perceiving earlier new technological, operating or delivery possibilities;  |
|                                 |   • Easier to innovate and test new technologies, products and other goods or services.  |
| Clusters and New Business      |   • Better perception of new business opportunities;  |
| Formation                      |   • Lower entry barriers of new businesses;  |
|                                 |   • Lower exit barriers for business that wants to expand outside the clusters.  |
| Clusters and Competition       |   • Cluster interconnectedness amplifies rivalry which has benefits on innovation and productivity;  |
|                                 |   • Information access improves the competitiveness with respect other companies in the same field.  |

Inside clusters companies find essential conditions to compete, produce and, especially, create new businesses and innovate inside a growth cluster companies have a competitive advantage because “competition is dynamic and rests on innovation and the search for strategic differences.” (p.19) Close linkages with buyers, suppliers, and other institutions are important, not only to efficiency but also to the rate of improvement and innovation. Strengthen

Clusters can offer multiple benefits to companies in terms of productivity, innovation, new business formation and competition. Porter states that nowadays generic inputs (such as raw materials) are easy to access but the level of “prosperity depends on the productivity with which factors are used and upgraded in a particular location.” (Porter, 2000, p.18)
According to Markusen (1996) there are several industrial cluster models (fig. 42). “Marshallian district” is predominantly homogenous, made up of with small and medium sized, locally owned companies. The “hub-and-spoke” quite contrary is heterogeneous, made up by several dominant firms, which represent the core of the cluster or the ‘hubs’, and numerous small firms that are linked directly to these and forms the ‘spokes’. The hub firms define the relation inside the cluster and its dynamics, while the small firms trade directly with the large ones and depend on their client strategy. Unlike the other cluster structures, the “satellite platforms” is a larger, geographically speaking, cluster uniting medium and large branch facilities located externally at the international scale, with others located in a particular geographic region to benefit from the governmental facilities, such as it is the case for the Special Economic Zones.

In general, a company has a competitive advantage over its competitors when “it is able to generate a greater value output for its stakeholders, using the same amount of input and/or retain more customers than its competition.” The more sustainable the competitive advantage, the more difficult it is for competitors to neutralize the advantage.

There are two main types of generic competitive advantages (1) comparative advantage and (2) differential advantage (fig. 43). ‘Comparative advantage’, or ‘cost advantage’, is a firm’s ability to produce a good or service at a lower cost than its competitors, which gives the firm the ability sell its goods or services at a lower price than its competition, or to generate a larger margin on sales. A ‘differential advantage’ is created when a firm’s products or services differ from its competitors and are seen as better than a competitor’s products by customers (Porter, 1980).

A case in point to illustrate the distinction between the two advantages is given by Apple Inc. Under the current financial crisis Apple came under intense political pressure in 2012 to move its production facilities from China to USA in order to help the recovery of the American economy and create more jobs. The company declined, claiming that in this moment the supply chain existing in China currently cannot be replicated in US, and hence, if it would move, the production might have to suffer (see text box 5 below).

**TEXT BOX 5: THE COMPETITIVE ADVANTAGE DEVELOPED BY CHINESE SEZ CITIES**

Traditionally SEZs are promoting cost advantages such as tax exemptions and business incentives. In addition, labour and land costs are considerably cheaper. In an open economy, such as in Batam or China, this competitive advantage - named ‘cost advantage’ – wears-off relatively fast, in part because of the inflation. This fact determines the multinational companies to relocate to other cheaper places, from here also the name of ‘footloose companies’ described in the previous chapter.

China and its SEZ cities, such as Shenzhen, makes exception from this rule, being able to retain important hi-tech companies, through an advanced supply chain that currently is one of the largest and most connected production centre in the world (according to UNCTAD in 2011).

One of such companies increasingly dependent on its Chinese production bases, is Apple, which in 2010 was ranked 20th in Fortune’s Global 500 top companies. The company is registered in California USA, but its production facilities are outsourced in industrial parks outside the US, such as the ones run by the Taiwanese Foxconn company in Shenzhen SEZ (see text box 3 under sub-chapter 2.3).

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16 Source: www.investopedia.com/competitive_advantage, access date 15-01-2013
17 Value for 2010, source: Fortune “Global 500”, from July 2011
Despite the continuous rising of the production costs in China and the US politicians’ persuasions for the production to return in US, the Apple products will continue to be manufactured in China because of the operational effectiveness provided by its supply chains. In an article published on January 21st 2012, the New York Times describes how Apple production facilities remained in Asia, not because of the labour costs, which anyway are minimal with respects the expenses of buying new parts, but because of the manufacturing efficiency and supply chain existing there (Duhigg and Bradsher, 2012).

Citing a former executive, the same article reports that Apple relied upon a Chinese factory to finalize iPhone manufacturing “just weeks before the device was due to be on shelves”. Because Apple had redesigned the iPhone’s screen at the last minute, the assembly line was forced to overhaul overnight. 8,000 workers from the factory’s dormitories were waked, and within half an hour began a 12-hour shift to fit the new glass screens. Within 96 hours, the plant was producing over 10,000 iPhones a day. “The speed and flexibility is breath-taking” the executive said, “there’s no American plant that can match that.”

According to sources cited by the same New York Times’ reporters, Chinese manufacturers started also providing essential technical solutions to solve key design issues that originated in the design countries. This is how, over the years an estimated 90% of the iPhone components originates in China nowadays this helping the supply chain expanding and specializing, making it hard for Apple to return production to US.

It can be said that with Apple, the Chinese SEZ cities went a step further than most SEZ areas, providing not only one of the best and largest supply chains in the world but also the crucial, mid to upper-level skilled workforce able to solve highly specific technical issues, outside the original country where the product is first designed. These two elements ultimately helping Apple, transforming design into reality. (after The New York Times’ article “How the U.S. last out on iPhone work” by Duhigg and Bradsher, 2012)

In essence, Apple succeeded to develop a unique competitive advantage that determined the company to remain in China, even if the production costs. In addition to providing technical solutions, Chinese companies are also increasingly designing sophisticated components to Apple’s iPhones and iPads, this contributing even more to its indispensability for the company. According to Duhigg and Bradsher (2012) of The New York Times a former high-ranking Apple executive admitted: “The entire supply chain is in China now. You need a thousand rubber gaskets? That’s the factory next door. You need a million screws? That factory is a block away. You need that screw made a little bit different? It will take three hours.”

Companies focused only on ‘cost advantage’ strategies are most likely to display a ‘footloose’ behavior and hence, these companies rarely commit to the development within the city. If however the city is able to develop together with the company a ‘differentiation advantage’, such as the ‘operational effectiveness’, then the company is compelled to stay, contributing more or less directly to the long-term growth the entire city. Such superior advantages can be developed in a cluster as it will be described below.

### 3.5 THE EXAMPLE OF THE CHINESE INDUSTRIAL CLUSTERS AND THE ROLE OF THE AUTHORITIES

China succeeded in creating several important industrial clusters that creates special competitive advantages for the companies located within. Such a cluster is located in and around Shenzhen SEZ.

#### INDUSTRIAL CLUSTER PRINCIPLES

There are three main factors that are directly influencing the competitive advantage of a company, two factors are internal ‘operational effectiveness’ and the ‘strategies employed’, while the third factor is external and depends on the physical and economic conditions – or “the quality of the microeconomic business

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NEXT BATAM: Fostering a resilient growth strategy

The ‘diamond of national advantage’ (Porter, 2000, p.19). These external factors are detailed by Porter in ‘the diamond of national advantage’ (fig. 44) which stays at the base of a competitive cluster organization. The ‘diamond’ comprises:

- The ‘(input) conditions’ which represent the initial resources put into the cluster from natural and human resources to physical, information and scientific – in general the exterior factors related to the physical conditions described above;
- The ‘demand condition’ depends on the sophistication and demand level of the local customers,
- The ‘related and supporting industries’ refers to the presence and capacity of the local suppliers and related companies,
- The ‘firm strategy, structure and rivalry’ refers to the quality of the business climate.

The spatial and, in particular, the infrastructural conditions that concerns this thesis, are present specifically in the input conditions. However, according to Porter, these cross-cuts all factors and industry. These conditions includes elements such as the availability and quality of the natural resources; availability and quality of the transportation, information, technological and scientific infrastructure; and level of specialization and development of the human resources.

Porter (2000) gives several physical and spatial improvements recommendations, though general, for the authorities that wish to assist the development of clusters in their administration, with respect the factor conditions and related and supporting industries. These are:

- enhance specialized transportation, communications and other physical infrastructure;
- establish local university research efforts in cluster-related technologies; and
- establish cluster-oriented free trade zones, industrial parks, or supplier parks.

THE ROLE OF THE AUTHORITIES

Zeng (2011) remarks that while SEZs are normally constructed through a ‘top-down’ approach by government policies, most clusters are formed in an organic way through a ‘bottom-up’ process. Some clusters, however, have emerged from or within industrial parks or export-processing zones over time but rarely in developing countries. However, according to the same author, this should not necessarily prevent governments from facilitating the formation, growth, or scale-up of emerging clusters, especially through improving the business environment and making appropriate interventions in the public-goods areas of the clusters.
In China, while market forces are usually responsible for initially producing industrial clusters, the government supports or facilitates them in various ways, including setting up an industrial park on the basis of an existing cluster (a process discussed in later sections). Meanwhile, after decades of development, some clusters have begun to grow out of certain SEZs, such as the information and communication technology clusters in Zhongguancun (Beijing) and Shenzhen and the electronics and biotech clusters in Pudong (Shanghai). The emergence of these clusters actually hinges on the success of these SEZs and on market forces over time. Furthermore, in recent years, some cities have begun to set up cluster-type industrial parks, or specialized industrial parks, such as the liquid crystal display (LCD) high-tech park in Kunshan and the Wuxi Wind Power Science and Technology Park and the Photovoltaic Industry Park in Jiangsu Province. In these examples, two different models are tending to converge (idem.).

In Shenzhen, the government was very pragmatic, and its policy innovations were especially successful. Becoming autonomous from the central government in 1992, Shenzhen carried out many institutional innovations that played a central role in its cluster formation. Sklair (1991) mentions, for example, the wage reform, in which compensation was based on three elements: base pay, occupational pay, and a variable allowance. It also adopted a minimum wage and a social insurance package superior to anything previously available in China (after Zeng, 2011). Such a free labor market attracted many skilled workers. Shenzhen was also the first city to establish the system of government approval within 24 hours, which greatly improved administrative efficiency.

**FACILITATING THE CLUSTER DEVELOPMENT**

According to Zeng the success of Chinese industrial clusters was facilitated by elements such as, among others, efficiency gains and lowered entry barriers; effective local government support; knowledge, technology, and skill spillovers through inter-firm links; entrepreneurial spirit and social networks; innovation and technology support from knowledge and public institutions; and support from industrial associations (p.28).

From these elements, the ‘effective local government support’ appears to be the most relevant to the central case of this thesis since it addresses some of the key problems identified in Batam. In Zang’s view, the success of Chinese industrial clusters is inseparable from local governments’ strong support. This often come during the middle or later stages when the clusters have demonstrated their potential. Although the support mechanisms are diverse it tends to focus primarily on building a good business environment including infrastructure development; regulations, quality assurance and standards setting; technology, skills and innovation support; and preferential policies and financial support.

Specifically concerning the infrastructure development, the Chinese government has given high priority to basic infrastructure such as roads, water, electricity, and telephone lines. The local governments have tried to build a specialized market or industrial park to facilitate business activities. Such a market brings suppliers, producers, sellers, and buyers together and helps build the forward and backward linkages, thus greatly facilitating the scaling-up of the clusters (Zeng, 2011).

In the Guangdong province (known also as the Canton Province) a special concern of the planning authorities is to better integrate and increase the public mobility at the metropolitan level. In the planners view, this way people would be able to reach jobs and services easier. In this sense, there are plans to build a train network that will connect all the major cities in the province – Hong Kong, Shenzhen and Guangzhou - in order to create a mega-urban region (see text box 6 below).

**TEXT BOX 6: CONNECTING PEOPLE AND SERVICES: THE PRD MEGA-CITY**

According to an article in The Telegraph (2011), the chief planner of the Guangdong Rural and Urban Planning
Institute Ma Xiangming announces that the nine cities in the Pearl River Delta (PRD) will be merged in one 41,000 km2 urban area cumulating 42 million people. The mega-city will cover a large part of China’s manufacturing heartland stretching from Guangzhou to Shenzhen including Foshan, Dongguan, Zhongshan, Zhuhai, Jiangmen, Huizhou and Zhaoqing (fig. 45).

According to the same source these cities together, account for nearly a tenth of the Chinese economy. Quoting the chief planner “The idea is that when the cities are integrated, the residents can travel around freely and use the health care and other facilities in the different areas,” in addition, “it will help spread industry and jobs more evenly across the region and public services will also be distributed more fairly.” (Ma Xiangming in interview to the Telegraph 2011)

In order to do so twenty-nine rail lines, totalling 3,100 miles, will be added, cutting rail journeys around the urban area to a maximum of one hour between different city centres. Over the next six years around 150 major infrastructure projects will mesh the transport, energy, water and telecommunications networks of the nine cities together, including an express rail line will also connect the hub with nearby Hong Kong. Resident would be able to use universal rail cards and buy annual tickets to allow them to commute around the mega-city. According to planners, phone bills could also fall by 85 % and hospitals and schools will be improved. “Residents will be able to choose where to get their services and will use the internet to find out which hospital, for example, is less busy,”

In concluding its report over the SEZs and industrial clusters of China, Zeng gives several key points resulting from his research that can be used by other developing countries. These are:

- “a strong commitment from the top leadership and high-level pragmatism, flexibility and autonomy” this provides solid assurance and policy stability of the SEZ which provide key factors for foreign investors’ decisions to invest in a challenging environment;
- “a gradualist approach towards reform” treating economic liberalization as a mean of promoting economic development and not an end in itself. The Chinese example, showing that a pragmatic, step-by-step approach works better than an attempt to change everything overnight;
- “proper role of the government”, meaning a strong support and proactive participation of governments, especially in the areas of public goods and externalities;
- “public-private partnership approach” in order to build essential infrastructure necessary for the development of SEZ and industrial clusters, such as joint ventures with private developers, and establishing shareholding firms;
- “foreign direct investment and the diaspora” in order to realize important source of capital, skills, technology and modern management techniques;
- “technology innovation, adaptation and learning”, by developing an R&D infrastructure, and offering special incentives to attract hi-tech firms;
- “clear goals and vigorous benchmarking, monitoring, and competition” Chinese SEZs have all clear goals and development plans that stipulate the expected targets for GDP growth, employment, exports, and FDI, as well as tax revenues and the like. The central government checks these targets almost every year.

Figure 45: The PRD mega-city. (source: The Telegraph, 2011)
PART C: CONCLUDING REMARKS

Through a transit oriented development strategy and an industrial cluster development, it is expected that the main problems identified in Batam will be alleviated. The approach uses part of the drivers that were determined in the theoretical framework and gives several examples that can serve as a model for the future development in Batam.

Curitiba appears to be situated in between the cases presented in the theoretical framework. The development of the city is depending on the political commitment of the public authorities but is not entirely lead by them, at times the planning regulations allowing sufficient flexibility for bottom-up changes to take place. Likewise public-private partnerships are common in order to develop the public infrastructure such as the public transportation. The IPPUC, the main planning institute responsible of the TOD implementation, remains independent from the political structure of the city, realizing a good balance between the public and private interests. A similar administrative path is also observed in the general case of the Chinese SEZ strategies as described by Zeng. The author emphasizes the importance of the political commitment, active public authorities support and autonomy in order to achieve a successful cluster.

In both examples it appears evident the vital role the public transportation plays in addressing a broad range of problems from spatial issues to socio – economic. In the example of Curitiba as well as in the case of the clusters’ development, the public transportation is offering both a sustainable growth strategy but also an catalyst for private investments.

In their report over Curitiba, Fazzano and Weiss¹⁹ remark that convenient transportation is important because it reduces the cost of mobility and trade within the city, thus encouraging economic development. Likewise Guangdong province planning authorities wish to unite all the production centers in the Pearl River Delta, from Shenzhen to Guangzhou, in a mega-urban region through an advanced rail network. The network will be directly connected to Hong Kong via an express rail line. This strategy helping to spread social services, jobs and housing more evenly across the region contributing to the overall competitiveness.

In concluding this chapter, in the table below are presented a collection of important quotes and key interventions and strategies, especially at the spatial level, resulted from the literature review.

<table>
<thead>
<tr>
<th>Source</th>
<th>Quote</th>
<th>Recommended interventions and strategies</th>
</tr>
</thead>
<tbody>
<tr>
<td>Wong and Tang</td>
<td>“Contemporary hi-tech, high value-added production requires a totally different working and living environment than a traditional ‘factory town’.” (Wong and Tang, 2005, p.314)</td>
<td>• providing adequate housing, social security, employment and education</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• providing community building;</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• provision of services in the areas of banking, trading, insurance and other professional services</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• strategic and integrated urban planning and management approach in governing the growth trajectory of the entire city</td>
</tr>
<tr>
<td>Milberg and Amengual</td>
<td>The SEZ cities have to “transform industrial upgrading into social upgrade”</td>
<td>• creating better living and working environments in order to attract higher value industries</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• finding the right balance between the export-only industries and national trade</td>
</tr>
<tr>
<td>Philips</td>
<td>“These houses were carried out on a level that was considered far above what in those days was seen minimal demands and to this was a deliberate policy basis, because rarely is the minimum good enough. Always, it is necessary, in order to increase the prosperity and well being, to think ahead.”</td>
<td>• improving the infrastructure for the factory (e.g. roads, public transportation, electricity, water and sewage) but also for the city in general</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• providing affordable, high quality housing, green spaces, public and recreational amenities</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• providing various public services and amenities with long</td>
</tr>
</tbody>
</table>

### NEXT BATAM: Fostering a resilient growth strategy

<table>
<thead>
<tr>
<th>Authority/Institute</th>
<th>Quotation/Comment</th>
<th>Relevant Points/Implications</th>
</tr>
</thead>
</table>
| Guangzhou city authorities | "Every aspect of development should contribute to the enhancement and quality of life of the people ... but this is not the sole aim, since the core element of new strategies should help in the process of economic restructuring (and to address [the] issues created by the declining role of Guangzhou" (according to Nanfang Daily, 19 May 2002, after Wuttke and Waibel, 2008) | • strategy "a minor change in a year, medium change in three, and major change in 2010"  
• the goal was to transform Guangzhou into a “liveable, ecological, and entrepreneurial city”  
• making it more favorable for business, too  
• shifting the focus from local scale planning to a metropolitan strategy for the city as a whole |
| Curitiba Institute of Urban Planning and Research - IPPUC | “The general philosophy of the Curitiba Preliminary Urban Plan was to improve the quality of urban living in the city.” (from the IPPUC site) | • changing the radial expansion model of the city to a linear one, integrating transportation, street system, and land use  
• freeing the downtown area from heavy traffic and preserving its traditional features  
• containing the city’s population into its territorial boundaries  
• creating economic support to urban development  
• ensuring urban equipment for the whole city |
| Guangdong Rural and Urban Planning Institute | "The idea is that when the cities are integrated, the residents can travel around freely and use the health care and other facilities in the different areas," [in addition], “it will help spread industry and jobs more evenly across the region and public services will also be distributed more fairly.” (Ma Xiangming in interview to Telegraph 2011) | • new rail lines will be built, cutting rail journeys around the urban area to a maximum of one hour between different city centres  
• major infrastructure projects will mesh the transport, energy, water and telecommunications networks of the nine cities together, including an express rail line will also connect the hub with nearby Hong Kong  
• resident would be able to use universal rail cards and buy annual tickets to allow them to commute around the mega-city |
| Porter | “Economic development seeks to achieve long-term sustainable development in a nation’s standard of living” (Porter, 2000, p.19)  
“A nation’s standard of living depends on the capacity of its companies’ to achieve high levels of productivity and to increase productivity over time” (Porter, 1990, p.76) | • specialized transportation, communications and other physical infrastructure  
• establish local university research efforts in cluster-related technologies  
• establish cluster-oriented free trade zones, industrial parks, or supplier parks |
| Wuttke and Waibel | “It was recognized that in order to upgrade the local economy and the city’s overall competitiveness, urban space had to be improved and a more sustainable path of development to be followed.” (Wuttke and Waibel, 2008, p.246) | • improving the cityscape, public safety, hygiene and reduce air pollution  
• creation of open green spaces and other public amenities  
• improving the infrastructure (airport, convention and exhibition centre, office and campus developments)  
• better control over land use  
• mixed-use zoning which combines working (industry) with living and amenities |
| Zeng | “Strong commitment from the top leadership, and high-level pragmatism, flexibility, and autonomy” (Zeng, 2011, p.34)  
“a gradualist approach toward reform [...] essential being to minimize avoidable economic, social, and political costs” (idem.) | • from building better infrastructure—roads, water, electricity, gas, telephone, and so forth—to establishing special marketplaces, technology innovation platforms, R&D centres, and the like  
• creating an efficient regulatory system and a conducive business environment, which make the SEZs attractive to investors  
• "[...] more compact, more mixed-use city neighbourhoods. Denser, more people-friendly and less traffic-dominated neighbourhoods would be more integrated and offer more opportunity. Their energy requirements and environmental impact would be lower, and low income families would not suffer such unequal conditions and their consequences." |
| Power | "More collective transport modes would reduce environmental damage while enhancing social integration. It is costly to introduce new transport infrastructure but essential if we are to equalise conditions and opportunities. (Power, 2012, p.39)  
A vicious circle has emerged around unsustainable traffic patterns for which we pay triple costs: the cost of subsidizing car ownership, [...] the cost of sustaining public transport in the face of perverse incentives which favour car driving [...]; the social costs of dispersal, mobility and traffic which compound each other in a negative spiral, disproportionately affecting low income communities." (Power, 2012, p.39) | • lasting spin-off’s  
• supporting community and workers’ unions building  
• creating pension and health insurance funds |
IV. CASE STUDY ANALYSIS AND PROBLEM STATEMENT
Traffic jams are common in Batam during the high peak hours, though residents are satisfied that the situation is not similar to Jakarta (source: skyscrapercity.com)
4.1 GENERAL DESCRIPTION

Batam Island is the largest, 412 km², and the most developed island from an archipelago of around 400 islands located in the Riau Archipelago province NW Indonesia (fig. 46). Together all these islands form Batam Special Economic Zone or SEZ, total land area of Batam SEZ, is 1,040 km² (Regional City Planning Department of Batam, 2010) (fig. 47)

The city-island is located at about 30 - 45 minutes distance by ferry from the global and regional trading hub Singapore, and in the middle of the busiest sea-trade route of the world, the Asia-Europe shipping corridor, this giving the strongest point to the city. According to the Singapore Port Authority, more than 1,000 vessels are at any time, either passing or at anchor, in the waters between the two islands.

Morphologically the island is predominantly flat in the areas around the coasts, while in the more central parts of the island isolate spots can reach over 150 m height. The island is recognized to have deep water near its shores, making it perfect of marine operations, such as shipyards. The present spatial organization of the island is showed in figure 50 below.

BRIEF HISTORY

Historically, Batam island was part of the powerful Malacca Sultanate and later the Johor sultanate after the Portuguese conquered the Malacca city in early 16th century. The island is first mentioned in the agreement signed on December 18th 1829, between Sir Thomas Stamford Raffles, representing the British East India Company, and the representative of the Dutch VOC, P.J. Elout. Through this agreement, the Johor Sultan, agrees for Batam to remain in the sphere of influence of the Dutch colonial powers, while Sir Raffles can take-over its sister island, where Singapore city will soon start to appear.

![Figure 46: Location of Batam SEZ within the SE Asia region and on the globe. (modified map from Wikimedia Commons, 2010)](source: modified map from Bappeda)  

![Figure 47: Batam SEZ’s within the Singapore Strait context.](source: modified map from Bappeda)

Ever since the island again falls in obscurity, reappearing in the history after more than a century, in 1969 when the second president of Indonesia, General Soeharto, recognizes it as a strategic basis for the oil & gas operations. In the following year, Soeharto becoming the President of Indonesia, decrees Batam as an industrial base and the first free-trade zone of the Indonesia.

In 1990, following the signing of the SUJORI economic cooperation agreement between Singapore and Indonesia, many manufacturing companies started relocating across the strait, from Singapore to Batam. The companies retained their headquarters and other core value chain activities in the city-state, relocating only their production and operation facilities.
In 2007 the free-trade status is extended over the whole archipelago of island, forming Batam SEZ or Batam Municipality. Two other SEZ areas were established east and west of Batam: Bintan SEZ, specialized in tourism, and Karimun, specialized in storing and refining oil and gas (fig. 2).

SOCIO-DEMOGRAPHIC DATA AND MAIN ADMINISTRATIVE UNITS

The total population of the island was 1.12 million, as per September 2011, the overwhelming majority being located in Batam island. Administratively Batam City is included under the Indonesian Riau Archipelago Province and is divided in 12 districts (kecamatan in Indonesian), each having further sub-divisions (kelurahan). Most of the districts are stretching over Batam island, except Belakang Padang, Bulang and Galang Districts which includes the majority of the surrounding islands.

Over the centuries the island was sparsely populated. The population begins to pick up, after its declaration as an industrial and free-trade area, reaching from just several thousand before 1970 to 105,000 in 1990 and over 1 million in 2010 (fig. 48). The majority of the population is located in five development centers across the island, the main one being located on the NW tip of the island (in an area called Jodoh-Nagoya) where initially the actual development has started and where currently most of the main functions of the city are located (fig. 49).

Table 6: Batam Municipality districts and basic facts as per September 2011 (source: The City Government of Batam, 2011)

<table>
<thead>
<tr>
<th>District (kecamatan)</th>
<th>No. sub-districts (kelurahan)</th>
<th>Total population</th>
<th>Total area (km²)</th>
<th>Density (people / km²)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lubuk Baja</td>
<td>7</td>
<td>100,981</td>
<td>11,426</td>
<td>8,838</td>
</tr>
<tr>
<td>Batu Ampar</td>
<td>4</td>
<td>93,593</td>
<td>11,187</td>
<td>8,366</td>
</tr>
<tr>
<td>Bengkong</td>
<td>4</td>
<td>107,126</td>
<td>13,214</td>
<td>8,107</td>
</tr>
<tr>
<td>Batu Aji</td>
<td>4</td>
<td>152,996</td>
<td>41,337</td>
<td>3,701</td>
</tr>
<tr>
<td>Batam Kota</td>
<td>6</td>
<td>107,559</td>
<td>38,964</td>
<td>2,760</td>
</tr>
<tr>
<td>Sagulung</td>
<td>8</td>
<td>130,267</td>
<td>54,780</td>
<td>2,378</td>
</tr>
<tr>
<td>Sekupang</td>
<td>5</td>
<td>124,921</td>
<td>68,302</td>
<td>1,829</td>
</tr>
<tr>
<td>Sei Beduk</td>
<td>6</td>
<td>113,689</td>
<td>106,447</td>
<td>1,068</td>
</tr>
<tr>
<td>Nongsa</td>
<td>6</td>
<td>54,253</td>
<td>114,546</td>
<td>474</td>
</tr>
<tr>
<td>Blk. Padang</td>
<td>4</td>
<td>24,053</td>
<td>69,120</td>
<td>348</td>
</tr>
<tr>
<td>Bulang</td>
<td>6</td>
<td>11,776</td>
<td>158,753</td>
<td>74</td>
</tr>
<tr>
<td>Galang</td>
<td>4</td>
<td>18,638</td>
<td>350,764</td>
<td>53</td>
</tr>
<tr>
<td>TOTAL</td>
<td>64</td>
<td>1,120,574</td>
<td>1,040</td>
<td>3,166 (average)</td>
</tr>
</tbody>
</table>
The most densely populated districts in Batam are Lubuk Baja, Batu Ampar and Benkong, (with a population density on average of around 8,500 people / km²) which are also the centre of the island, while the least dense are the districts stretching over the islands surrounding Bulang and Galang (with a density of around 60 people / km²) (table 6 above).

Ethnically Batam is diverse, given the fact that most of the population migrate here from all over Indonesia. This makes for a segregated development in the island, following the ethnicity groups of the residents. For example, the original Malay population continues to be located in the old fishing villages (kampungs) along the shores, with little contact with the rest of island.

**MAIN ACCESS POINTS AND INFRASTRUCTURE**

As an island the main gates of entry in Batam at the international and regional level, are either via water or air. Batam has a relatively good basic infrastructure for people via its ferry terminals and the airport, but in terms of goods and cargo access, it remains tributary to Singapore, since the present infrastructure cannot accommodate modern cargo carriers. The main cargo terminal is located in Batu Ampar, NW side of the island (fig. 50).

At the local level the transportation is made via roads, mostly using individual motorized means, such as cars or small scooters. The road infrastructure is most dense on the north-west side of the island, focused on the Batu Ampar, Lubuk Baka, Bengkong and Batam Centre districts. Batu Ampar is the original center of development in Batam, accommodating the first industrial activities since the early ‘70s. An important part of the roads, especially those not used for the transportation of goods, remain unpaved. The authorities have in plan to build a new bridge that will connect Batam to Bintan island, located east. Batam is already connected to the islands located south, through a series of 6 bridges and a paved road (fig. 51).
The public transportation consists of microbuses operated by private factors, without a fix route and a reliable schedule, most of the time waiting at the gates of the industrial parks, to pick up workers at the end of their shifts. The authorities plan to build by 2017, two monorail lines, one from Batam Centre to Batu Aji and the other from the airport to Batu Ampar (BIFZA, 2012) (fig. 52).

According to a competitiveness survey report conducted by Kam et al. (2009) among 157 companies in the city, it was revealed that in general the companies are relatively satisfied with the sea transportation, logistics and telecommunications infrastructure. (p.109)

**INDUSTRIAL PROFILE AND ECONOMIC DATA**

Batam has an export-oriented economy based on the manufacturing industry in particular low-tech electronics, such as household appliances, bike components, etc. The main trading partner for Batam is Singapore, which generates about 70% of the FDI in the island, followed by Japan, with 10% and Malaysia with 6%.

These industrial activities are concentrated in 26 industrial parks (as per 2011 see Annex 1), located on or with direct access to the primary road infrastructure. Most of the industrial parks are developed in the north side of the island, nearby the city center and the main road and harbor infrastructure in Batu Ampar (fig. 53).
In addition to the industrial parks there are around 50 shipyards producing primarily tugboats and cargo barges but also specialized equipment for the offshore oil & gas drilling companies, such as drilling platforms, ROVs, special drilling equipment etc. Most of these shipyards are located on the west side of the island, predominantly on the south coast. (fig. 54)

According to the aforementioned competitiveness survey report conducted by Kam et al. (2009) most companies finds “cost effectiveness” as key reason for choosing Batam for their operational facilities, the manufacturing20 companies finding the city most attractive for operational facilities, technical support and logistics but less attractive for group HQ, sales and R&D activities (p.100).

Formal agriculture can be found in the islands surrounding Batam island, in the south in Rempang and Galang - were fruits and staple crops (corn and cassava) are grown, and in Bulang island SW of Batam, where animal farms (in particular pigs, chickens and crocodiles) are producing exclusively for the Singapore market.

4.2 MAIN DEVELOPMENT PHASES OF THE ISLAND

In order to understand the present spatial development of Batam, and the main problem the island confronts nowadays it is important to look into the evolution of the island. The present spatial organization of the island is relatively recent, beginning in the late early ’70s, and can be summarized roughly in three main development phases.


The industrial development started in 1970 through a presidential decree21 issued by the second President of the Republic of Indonesia Soeharto. Batam started as a support base for the oil & gas companies operating offshore in the region (Lueras, 2011, p.258) initially being administrated by the national oil company, Pertamina. After the ’78 oil crisis, the administration passes to a special government body called “Batam Authority for Island Industrial Zone Development” and later on known as “Batam Investment and Development Agency”, in short BIDA). This governing body will continue administrate the use of land and the investments up until today under several laws passed in 1977 by the Ministry of Home Affairs, the Ministry of Trade, the Ministry of Finance and the Ministry of Transportations.

In 1972 the first masterplan laid the current primary road infrastructure, which acts like east-west axis of the island – all the important development areas and functions having direct access to it. In 1973 through a presidential decree22 the industrial developments already located in Batu Ampar, Sekupang and Kabil are decreed as ‘bonded’ - meaning that no taxes were applied to goods stored here, while in 1978, the statute is extended to the surrounding areas, creating the first free trade zone area in Indonesia (Regional City Planning Department of Batam, 2010, p.4).

The initial settlements, in addition to the already existing fishermen kampungs located on the shore of the island, appeared in NE part of the island in an area called Jodoh-Nagoya, currently in the Lubak Baja district, south of the Batu Ampar industrial developments. These settlements were modest and were serving only for the rig workers that temporarily lived on the island. The total population at the start of the development was estimated to 3,000 people, consisting mainly of the natives, in time this beginning to pick-up in such a measure

20 Manufacturing sector includes: electronics, shipbuilding, textiles, chemicals, heavy machinery, minerals and metals, plastics, refined petroleum and gas products and, other (Kam et al., 2009, p.15)
21 PD no. 65 / 1970 about the development of the island of Batam, October 1970
22 PD no. 41 / 1973 about the whole island of Batam declared industrial area
that an act is issued in 1980 to limit the immigration\(^{23}\) (Regional City Planning Department of Batam, 2010, p.5). The act will soon be revoked under the pressure from the central government, however in 1984 a local government body (Pemerintah Kota Batam, or Pemko, in Indonesian) is instituted in order to deal with the social problems that started spreading all over the island (such as illicit economic activities - gambling, prostitution and high criminality rates) (Lueras, 2011).

By the end of this first development phase the initial bounded warehouse area is considered a success and consequently it is enlarged to include the whole Batam and a few other smaller islands, located nearby the coast. But despite the declared ‘success’ the foreign investment, remained modest compared to the expectations of the authorities. Singapore, Batam’s sister-city, by this time an important industrial and tradeing hub in the region, was still not attracted to the prospects of investing in Batam. (Regional City Planning Department of Batam, 2010, p.5).

This will change however in 1990, following an economic agreement signed between Singapore, Malaysia and Indonesia known as the SIJORI agreement (see text box 7 below). After its signing the manufacturing activities, that required large workforce and space, will begin moving from Singapore to Batam. In part this took place also because the labor and land costs in Singapore started to spike high due to the acute land and workforce shortage. The agreement had many implications for Batam, including placing the island back on the world map and the beginning of a new development phase.

**TEXT BOX 7: THE SIJORI ECONOMIC AGREEMENT**

It is important to explain the SIJORI economic agreement between Singapore and Indonesia, because through this Batam arrived to be what it has become today. Experts sees in the agreements both positive as well negative

\(^{23}\) Decree of the Minister of Justice no. M. 01-PW-10-01-83 “concerning the decision that Batam is a special on immigration matters” from June 7th, 1980
implications for the development of the island.

The agreement is signed on 28th of August 1990 between Singapore and Indonesia and has as objectives the "promotion and protection of investments". In essence the agreement opened the doors for direct investments from Singapore and made manufacturing companies to relocate their production and operation facilities, from the more expensive city-state to the much cheaper conditions in Batam.

The agreement would make Batam part of the SIORI Growth Triangle. The ‘triangle’ was supposed to represent the economic cooperation between the three neighboring nations namely: Singapore, Malaysia and Indonesia. According to Sparke the ‘triangle’ is a “discourse of complementarity” (2004, p.490). Following this agreement Singapore would exchange with Johor (the south province of Malaysia) and Riau (the province where Batam is located): capital, skilled labor, advanced technology, access to world markets, advanced telecommunication and physical infrastructures, business contacts and management skills, in return for unskilled or semiskilled labor, natural resources and land (fig. 56).

Various authors, argues that the agreement, though seen equilateral, was advantaging Singapore on top of the rest (Grundy - Warr et al., 1999; Colombijn, 2003; Sparke et al., 2004; Holm, 2011). The agreement would provide easy access to natural resources (such as fresh water, sand used for land reclamations, wood and agricultural space) to Singapore and also allowed for many of the profits to return to Singapore, in the form of finite products and value-added materials that would have the label ‘Made in Singapore’.

Sparke et al. (2004) argues that the major advantage for Singapore stayed in the cost differences between the three nations, Batam being the cheapest location of all. The prices for land and labour in Batam were less than half with respects the prices in Johor and around a third of the prices in Singapore.

Nevertheless, the press hyperbolized the success of the cooperation, the agreement being at that time, one of the most praised examples of the positive effects of the globalization, in 1991 ‘The Economist’ writing that the "the growth triangle can hardly fail to impress" (Parsonian after Sparke, 2004, p.486). (idem)

As a result of this agreement, two major developments can be observed as taking place in Batam.

1. With concern the society development, through the SIORI agreement, Singapore offshored the lowest skill, labor-intensive work, while anchoring the more remunerative, hi-skilled workforce for itself (Royle, 1997; Colombijn, 2003; Sparke et al., 2004)

2. Concerning the spatial development, the investments, which would soon flow in the island because of this agreement, would shape the spatial organization and development of Batam until today, by the perpetuation of the industrial park models, similar to Foxconn City in Shenzhen SEZ, this ‘dictating’ more or less the spatial development in the island (Cairns et al., 2010).


With the signing of the SIORI agreement in 1990 Batam enters in a fast industrialization and development process marked by the foreign investors that started entering the island.

By this development phase the island is already recognized as an area of strategic importance and a center of trade, industry and tourism, which allowed for state money to finance the basic essential infrastructure: an asphalted roads network, power stations, water reservoirs, ferry terminals and the international airport following the presidential approval in 1983. (Holm, 2011, p.277).

The free trade zone status is expanded to the other islands around Batam - Karimun and Bintan islands - where Singapore was offered the opportunity to choose what and where to invest precisely. A series of six bridges and
an asphalted road, is now connecting Batam to the southern islands, Rempang, Galang and Galang Baru, the most southern lying island in the municipality.

Figure 42: The expected development during the second development phase of the island. (various sources)

According to the Agrarian Law from 1960 foreign companies cannot operate in Indonesia without an Indonesian partner or without being registered under the Indonesian law as Indonesian companies. For this reason the industrial parks in Batam started providing third party services to foreign companies, in general leasing the space for a pre-determined period (30 years initially) and providing workforce hired under the industrial park administration much in the same way as the case of Foxconn and Apple in Shenzhen SEZ. One of the earliest industrial parks in the island “Batamindo” will open its gates in 1991 and it was meant to be a model for the other industrial parks to follow (Sparke et al, 2004) (see text box 8 below).

TEXT BOX 8: BATAMINDO INDUSTRIAL PARK: THE FLAGSHIP OF INDUSTRIAL DEVELOPMENT OF BATAM

Batamindo is one of the earliest industrial parks to open and one of the most developed in the island currently. The park started as a joint project between Singapore Economic Development Board and Indonesian Ministry of Trade represented by the Salim Group, following the SUORI agreement signed in 1990. According to Sparke et al, it was meant, to be the flagship of the economic cooperation between the two nations and the model for other industrial parks in the island to follow. (2004)

The advantages of the park are described in an article of “The Economist” in 1991:

“The Batam Industrial Corporation (Batamindo), 40% owned by Singaporean interests and 60% by the Salim Group, is transforming the island of Batam into a floating factory, two-thirds the size of Singapore and only a 30-minute boat trip from its financial district. [...] Batamindo will supply custom-built factories on 30-year leases. The Salim group can supply unskilled but nimble-fingered workers (mostly young girls) at S$92.50 ($54) a

24 According to the official site Singapore Economic Development Board has as a mission to sustain Singapore as a leading global hub for business and investment (link: www.edb.gov.sg/content/edb/en/about-edb.html) [accessed 11-05-2013]
The Singapore partner made the initial design of the park and ensured the entrance of the multinational companies, while Salim Group took care for the labor recruitment and the other legislative tasks necessary for the companies to be able to operate in Batam. (Grundy-Warr, 1999).

The park covers 320ha of land and it is restricted to the use of the personnel and visitors only. It contains a total number of 200 security personnel (in addition to the park maintenance) and around 60,000 workers (in 2012 according to the head of Batamindo Industrial Park)

Various goods are produced in Batamindo from low-tech electronics to contact lenses and plastic moldings for household appliances. Around 80 companies, some of them well known international brands such as Varta, Siemens, Shimano, Sumitomo, are located in the park. (PT Batamindo Investment Cakrawala, 2011).

Batamindo is conceived as "a-city-within-a-city", being a self-contained, self-sufficient, development where working and living are inseparable. The workers are living, eating, going to shop and to the doctor, etc., on the premises of the park. The park contains production spaces (5 different types of standard factories), public amenities (canteens, shops, health care center, community area), utilities (it produces its own electricity, has its own telecommunication network, etc) and dormitories for the workers (fig. 57).

Kristyne Peter, from the International Metalworkers’ Federation recounts her visit to the place:

"The massive industrial complex is protected by heavy iron bars with razor wire running along the top. To enter and leave you must pass a guarded security check point and provide identification. [...] Many workers never leave the industrial park. They live in company housing, go to the company shops, visit the company clinic and pray at the company mosque. It is a caged existence." 25

There are several dormitory types in the park, the most common being under the form of 4 floors blocks of flats, where more people are fitted to sleep together, sometimes even as much as 15, in one room. According to

The head of PT Batamindo, only around half of the current number of workers are housed in the dormitories, the other part providing their own accommodation, in most cases in the squatting settlements around the industrial park. The squatting settlements or ‘ruil’, as they are called in Indonesian, lack access to even the most basic amenities such as running water, sewage or electricity (fig. 59).

The workers are hired on yearly contracts that can be renewed once or twice at most. According to the HR manager from one of the companies in the park, around 80% of the total employment in the park is made by young girls, age 18 – 24, because they are easier to work with and pay more attention to work than boys. Most of the companies in the park operate in three shifts (7am to 3pm; 3pm to 11pm; and 11pm to 7am), depending on the period of the year and the amount of production necessary.

(after PT Batamindo Investment Cakrawala, 2011)

The lower production costs and the location would start being the main competitive advantages of Batam in the region, attracting more and more investors, both from outside but also from inside Indonesia. (Colombijn, 2003; Sparke et al., 2004; Lueras, 2011) Similar to Shenzhen, land speculation begins to intensify in the island, helped by the relative easiness and low price to secure the land. Many private residential complexes, tourist resorts, shopping centers and other real estate objectives, appears in the island, without following a coherent land-use plan.

In this period the island’s population will start growing more intense than before, the population tripling by 1998 causing the apparition of a lot of illegal settlements. Authorities tried to deal with these problems, partially because it was affecting the image of the island and its investment potential. However the authorities’ intention of creating more of “a Singapore-like environment of security, public order and good management begins to fade over the land clearance conflicts, residential uncertainty and illicit commercial activities, which become main sources of revenue for employed but poorly paid or totally unemployed residents.” (Grundy - Warr et al., 1999)

The investment frenzy begins to fade after the Asian Crisis from 1997. Executive housing areas, marketed as “Orchid Park” and “Shangri La Gardens” are abandoned to dust, like many other commercial projects, because of the lack of buyers (idem.) In this year, the Indonesian Rupiah would suffer a great drop in value and the assets in banks would be seriously devalued. This would set the stage for one of the largest social uprising, in May 1998, since the end of the Dutch colonial period, which would lead to the abdication of the President and its replacement (Lueras, 2011).

In the years post the Asian crisis the initial competitive advantage of Batam, the cheap land and labor costs, begins eroding, international companies starting to look for other cheaper locations in the area such as Vietnam or Bangladesh. This process continues even nowadays, stimulated also by the 2008 crisis. Similarly, the local government beings assuming more and more autonomy in the end this process leading to the present administrative dichotomy.


In 2000 Batam officially become known as the Autonomous City of Batam 26 and together with the southern islands - Rempang, Galang and Galang-Baru – which are now included in one administrative unit called “Municipality of Batam” - is declared “Free-Trade Zone” and “Free-Trade Port”, basically reinstating once more the free-trade nature of Batam.

26 State law no. 53 / 1999 and completed with the law no. 13 / 2000 Batam Municipality is changed to the Autonomous City of Batam
In 2004, the local government, Pemko, is invested with more autonomy and no longer has to answer to BIDA, traditionally the only administration body of Batam until then\(^27\) (Regional City Planning Department of Batam, 2010). This makes for the land administration in the island to become more cumbersome, since, according to the 1960 Agrarian Law, BIDA still retains the right of administrating the land. Currently the investors in the island, will no longer have to deal only with one administration body, BIDA, but with two BIDA and Pemko. This caused a series of problems which influences negatively the competitiveness and the development of the island (Kam et al., 2009).

Nevertheless, the autonomy for Pemko marks a change in the direction of the development of the island. If so far the development was seen from the point of view of the industrial needs, now social problems started to be more often on the agenda.

![Figure 60: The present development of the island. (various sources)](image)

As such the authorities started again dealing with the housing problems in the island. Several social housing projects, of the type ‘ready-to-build’ plots (known as KSB) are being implemented in the island in Sagulung, Sei Beduk and Nongsa districts in particular. Until now the social housing attempts have been few and by far insufficient. Other residential complexes begins to spread in the island, following the main road infrastructure, and without an apparent systematization plan which controls the development, most of the time resulting in urban sprawl and reduction of the ecologically preserved areas, by the side activities of the residents (such as informal agriculture)

In 2007 the area is renamed from Free Trade Zone and Free Port\(^28\) to Special Economic Zone or SEZ, declaring once again the global aspirations of the authorities.

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\(^{27}\) Law Act no. 32 / 2004 regarding Local Government.

\(^{28}\) Law no. 36 and 44 / 2007
The spatial problems that Batam currently faces are harder to address because of the insufficiency of public funds. Following the independence law and the autonomy of the local government, the public funds from the central government have been drastically reduced or even dried out, leaving the local authorities to manage on themselves. The more recent masterplans that appeared indicates development even in areas where previously protected habitats were located (e.g. the islands in the south of Batam currently are dedicated to industrial development). It looks like the local authorities, instead of improving the present situation are willing to redevelop new land areas.

4.3 PROBLEM ANALYSIS

There are five major problems identified in Batam that can be roughly divided in two categories: (i) spatial problems – consisting of poor housing conditions for the majority, mobility problems and environmental issues; and, (ii) economic – institutional problems – related to the declining competitiveness of the island and to the land use administration, respectively.

POOR HOUSING CONDITIONS

From the development phases described previously, one can understand that at first the island was developed sufficiently good for the industry, underestimating the number of migrant workers and the social implications this would attract. The problems began surfacing in the ‘80s, when the authorities unsuccessfully tried to curb down the immigration following high criminality, illicit economic activities and other social issues that were affecting the image of the island.

At a spatial level these problems translated most of the time in the form of illegal settlements or ‘ruli’ (rumah liar, literally meaning ‘wild houses,’ in Indonesian). In a research mentioned by Grundy-Warr et al., around...
112,500 people were living in illegal settlements in 1997 (Naim, 1997, according to Grundy-Warr et al., 1997), while the official data from 2001 mentions more than 47,000 houses as illegal29 (fig. 61). According to some authors (Grundy - Warr et al., 1999; Lindquist, 2009), at the base of this problem, stays a combination of factors: lack of affordable housing, under- or unemployment and scarcity of affordable, public transportation.

The living conditions in a ruli are basic. Almost all houses missing sewage and direct connection to running water. Few of them are connected to the power grid.

So far, the efforts of the authorities in providing affordable housing have been focused in three directions: (i) improving the living conditions and legalizing the ownership for some of the well-run squatting settlements (such as Kampung Tiban in Sekupang area); (ii) worker’s dormitories, rented out to migrant workers located near industrial areas (known as rusun); and (iii) ready-to-build plots, sold at subsidized prices for people to build their own houses, (knows as KSB). These efforts remain insufficient in part because of the lack of available land for the authorities to develop new affordable housing projects30, and in part because of the legal and financial barriers in the acquisition process by the average residents (Pemko, 2010).

Table 7: Comparison between the main affordable housing types

<table>
<thead>
<tr>
<th>RULI illegal settlements</th>
<th>KSB ready-to-build plots</th>
<th>RUSUN workers’ dormitories</th>
</tr>
</thead>
<tbody>
<tr>
<td>Type: privately built / unregulated</td>
<td>Type: state subsidized / regulated</td>
<td>Type: public funds / regulated</td>
</tr>
<tr>
<td>Density: 50 units or 270 people / ha</td>
<td>Density: 100 units or 380 people / ha</td>
<td>Density: 288 units or 1,000 people / ha</td>
</tr>
<tr>
<td>+ strong communities based on ethnic background;</td>
<td>+ promotes ownership;</td>
<td>+ adjacent to the main production areas;</td>
</tr>
<tr>
<td>+ close to main activity and production areas or near the main road network;</td>
<td>+ reduces the environmental impact;</td>
<td>+ clean, safe and attractive;</td>
</tr>
<tr>
<td>+ there are small economic activities within the better established ruli’s</td>
<td>+ it positively contributes to the human capital development and social balance within the island</td>
<td>+ reduces the environmental impact</td>
</tr>
<tr>
<td>- basic living conditions;</td>
<td>- far from main road network and production areas;</td>
<td>+ better integrated within the city</td>
</tr>
<tr>
<td>- negative environmental impact such deforestation and land wasteful;</td>
<td>- poor infrastructure and living conditions;</td>
<td>than the alternatives in the industrial parks</td>
</tr>
<tr>
<td>- ownership is problematic</td>
<td>- difficult to acquire</td>
<td>- insufficient and small (24m² per unit);</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- difficult to acquire (long waiting lists)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- restricted to the renting for active workers only</td>
</tr>
</tbody>
</table>

Aside of the insufficiency of legal affordable housing, there are also other important caveats to bear in mind when it comes to the quality (such as size) and access to amenities and social services. (Cairns et al., 2012) This is most obvious in the case of the KSB, the ready-to-build plots, which are only 6m x 8m in size, most of the time built far away from the main road infrastructure in areas where mobility is limited, and the basic infrastructure leaves much to be desired (such as unpaved roads). Nevertheless, this type of affordable housing

29 Source: “This year 40 thousands ruli will be disciplined” Batam Pos. 2011. 40 thousand ruli will be disciplined [online]. [Accessed 17-08-2011]. [Accessed 31-10-2012].
remains the most spread in the island and one of the most successful so far, because it promotes ownership, positively contributes to the social balance within the city and it is better regulated.

**REduced Public Mobility**

Apart from the central areas of the city (Batu Ampar -Lubuk Baja - Batam Centre districts), where the development first started and densified over time, this allowing for the distances between main functions to be walkable, the city is primarily car focused. About 60% of the population live at more than half an hour distance from the main city functions located in the NW part of the island, in the aforementioned districts (fig. 62).

![Figure 62: The road network in Batam, with main development typologies, population densities and main road profiles. The letters on the map represent: (a) class I, (b) class II, (c) class III and (d) class IV. Class I to III are paved roads. (source modified map and data from Pemko, 2010, Google Maps)](image)

Despite this a large part of the roads inside the districts, are only partially paved or totally unpaved, making it difficult for the cars or busses to reach the residents. This restrains travelling especially for those financially disadvantaged, such as those living in illegal settlements or social housing areas. Most of the KSB type social housing areas in the Sagulung, Sekupang, Sei Beduk and Nongsia districts, are affected by this situation because these areas are located far away from the primary road network (class I and II roads) that connects the whole city. The majority of the roads in the KSB areas are unpaved, class IV roads.

The regulated public transportation in the island is made up of small to medium-size buses with one door, run by the local authorities. However, these have a limited reachability, are scarce and unreliable.

Currently, the most used transportation means for the middle to low income residents are: (i) for the public use - the paratransit31, using micro-buses; and (ii) for the private use ojek (small scooters or motorcycles) (see table 8 for more details). These means are unsafe, polluting and unreliable, if we speak about the public transportation, because they do not follow any fixed route or schedule. In addition, at times there is a

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31 Paratransit is defined as alternative mode of flexible passenger transportation that does not follow fixed routes or schedules. (from Wikipedia)
competition between the private factors to pick-up and drop-off passengers, which can lead to increased chances of road accidents.

Table B: The comparison between the most frequent transportation means for the low and middle-income residents

<table>
<thead>
<tr>
<th>Ojek or scooters (private use or unregulated)</th>
<th>Paratransit (unregulated)</th>
<th>Medium-size busses (regulated)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Type: privately owned / for private or public use (as taxi)</td>
<td>Type: privately owned / for public use</td>
<td>Type: government owned / for public use</td>
</tr>
<tr>
<td>+ flexible, fast and can reach difficult accessible areas; + occupies little road surface; + can provide an additional revenue if used for transporting other people (as a taxi) or for work in general</td>
<td>+ flexible, works like a taxi; + cheaper and safer than an ojek; + more environmentally friendly (consume less gas per passenger)</td>
<td>+ more comfortable and safer than the microbuses + follows a fix route + cheaper and more reliable than the rest + more environmentally friendly</td>
</tr>
<tr>
<td>- noise and air polluting; - unsafe; - can become a nuisance in the traffic; - relatively expensive</td>
<td>- unreliable – doesn’t have a fix route or schedule; - relatively unsafe; - has limited reachability (mostly only on paved roads)</td>
<td>- insufficient number of cars and unreliable schedule; - limited reachability (only on paved roads)</td>
</tr>
</tbody>
</table>

According to Power (2012) following a research into the housing estates in Britain and US, transport deprivation is resented especially in the subsidized housing estates, leading to many socio-spatial problems such as high criminality, low education levels and segregation of low-income households. Aside of the ‘ghettoization process’ that affects the social balance of the city, the author argues that this situation leads to the creation of a ‘vicious circle’ for which both the residents of these areas and the city as a whole has to pay, either via transport or fuel subsidies, environmental damage through higher fuel consumption and reduced human capital potential (p.44).

DEGRADING ECOLOGICAL BALANCE

Following photo evidence from the Google satellite imaging service, one can notice many signs of informal (or illegal) agriculture activity, soil erosion (either by sand quarrying or industrial activity such as shipyards) and (possible) soil pollution. These problems for which there is no other hard facts, aside of some testimonies from the locals with regards the quality of the water, appear especially at the fringes of the urban or industrial development (fig. 63)

This evidence becomes a problem especially when it starts affecting the ecological protection areas around the fresh water reservoirs (by deforestation for example) and the quality of the surrounding waters, affecting the quantity of catch.

In the past the authorities conducted several initiatives of removing the illegal settlements from the protection area of the Sei Beduk reservoir (the largest water reservoir in the island) however the signs of illegal agriculture are still noticeable from the satellite maps from Google.
Figure 63: The environmental conditions in Batam, with major ecological structures and problems. The letters on the map represents: (a) and (d) informal agriculture in protected areas; (b) sand quarry in a protected area; and (c) soil erosion due to shipyard activity. There is no hard evidence, except the Google satellite images and the testimonies of the locals in what concerns the quality of the water. (source modified map and data from Pemko, 2010, Google Maps)

**DECLINING COMPETITIVENESS AND INEFFECTIVE ADMINISTRATION**

Aside of the above spatial problems, one can remark an abrupt loss of competitiveness and several administration issues. According to the economic data evidence, between the 2008 and 2010, the tax revenue have been reduced with about 17% while the FDI dropped with about 60% in the same period (fig. 64). This shows also in the overall economic growth, which slumped from a peak of 7.65% in 2005 to 4.65% in 2009 (Regional City Planning Department of Batam, 2010; Batam Indonesia Free Zone Authority, 2011) (fig. 65).

These economic data are supported by various experts in the island, such as the director of the Batamindo Industrial Park, John Sulistiawan, who explained that the 2008 financial crisis affected the number of investors and companies willing to continue working in the park. From around 100 companies in the period before 2008, the total number of companies in Batamindo decreased to 74 in 2011 and from over 90,000 workers to 60,000, over the same period, data confirmed also from the Batamindo’s presentation materials.
As explained in the 2nd development phase of the island, the signs of a wearing investment climate and negative image of the island appeared in 1998. This happened in part because of the Asian crisis, which left Indonesia particularly weak because of a sudden currency devaluation, and in part because of the social problems that started spreading due to mass immigration. This made companies beginning to relocate again, in search of cheaper production costs (e.g. the ‘footloose’ behavior typical of companies in SEZ areas in general).

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Kam et al. (2009), in their survey report over the SEZ competitiveness conducted among 157 companies from Batam, concludes that “the overall level of satisfaction with the various competitiveness factors is relatively low”, in particular with what concerns the labor and governance conditions factors32. (p.109)

With regards labor factors, the companies declared less satisfied with regards regulation (min. wage, layoff and retrenchment) and the weak bargaining power of the unions. (p.110) In particular concerning the minimum salary in Batam, in 2012 this was more than double as compared to Vietnam - one of the main competitors in the region on manufacturing services33. The last rise of the minimum salary took place at the end of 2011, following a series of labor demonstrations extended over several days and which lead to factories shutdown and violence in several cases.

With regards governance, the companies declared less satisfied with regards corruption, coordination between the various administration bodies and the interpretation and consistency of the regulations. (idem) As explained in the 3rd development phase, administration problems started to occur after the Indonesian provinces were declared autonomy, the local governments gaining more independence from the central government located in Jakarta. This made the administration situation in Batam particularly difficult, because until then the island was under the administration of a special agency, BIDA, responsible for the development since the late ‘70s.

After 2004, when the local government, Pemko, officially becomes independent from BIDA, the island started to be lead from two sides. The most problems and the biggest element of contend being the administration of the land, which, according to the Home Affairs decree no. 43/1977, remains with BIDA. This administrative dichotomy was described by a local businessman “as a boat with two captains”.

4.4 CONCLUSIONS AND PROBLEM STATEMENT

Two important concluding points can be drawn from the above analysis.

With regards the spatial development in general the city is characterized by poor housing conditions for the lower and middle income residents and urban sprawl. These are in short the main evidence:

- Social housing in the city is insufficient, (for example it is estimated that around 700 workers’ dormitories RUSUN are needed when the current supply is only of 120 blocks34) and there is little or no space for new projects35;
- New housing developments, such as the KSB social housing area, in Sagulung, Sekupang, Sei Beduk and Nongsa districts, are located far from the main transportation infrastructure disadvantage their residents who are in the lower – middle income group;

32 Both scored average scores below 3, on a scale from 1 to 5 where 1 represented 'not satisfied' and 5 represented 'very satisfied' (idem.)
34 Batam Pos. 2011. ‘40 thousand ruli will be disciplined’. In Indonesian in original [online]. [Accessed 17-08-2011].
• The city is car focused and the public transportation is insufficiently developed in part due to the condition of the roads and in part due to the management;
• At the urban fringes of the urban developments, satellite images indicates various signs of human activity (such as forest deforestation to leave place for agriculture or sand quarry activities) which can have a negative impact on the ecological balance of the island (such as the fish catch in the surrounding waters and the fresh water reserves).

With regards the economic – administrative situation, we remark that the city is located in between the Eindhoven and Shenzhen SEZ example, making it closer to the Curitiba case with regards self-administrating and self-funding. This is because:

• The city resulted from a top-down planning and development, such as Shenzhen SEZ but currently is lacking the financial support from the central government in order to address its problems;
• In addition, the private companies in the island are typical ‘footloose’, (i.e. that they are likely to relocate, if the conditions degrade, and they are unlikely to invest in the developing of the city) and hence Batam cannot benefit from a bottom-up development either, like in the case of Eindhoven.

Based on the data presented in this chapter, the problem statement of this thesis is:

Batam was design to become an industrial hub and a competition center in the region, but after a strong start in the early 90’s under the influence of Singapore, its aspirations have been restrained by the 1997 (the Asian Crisis) and 2008 (global) financial crises. Currently the city is not only losing its regional competitiveness, but its inefficient two bodies’ administration, combined with an overall low living quality caused by poor housing conditions, reduced mobility and environmental problems are weighting heavy on its long-term development goals.
V. STRATEGY AND PROPOSED INTERVENTIONS
Panoramic view over the Baloi district, the majority of the buildings in Batam are low, 2 - 3 floors high, or even less in the informal and social housing areas (except for the RUSUN, the workers' dorms) (photo by the author)
5.1 OBJECTIVE

In the case of Curitiba, the city made use of a transport and land use integrated planning, i.e. a Transit Oriented Development (TOD) strategy, to mitigate its spatial problems. Central in this strategy stays a competitive administration and an efficient Bus Rapid Transit (BRT) system that has both the role of securing the mobility of the residents and also to attract along its path the development of the city, in corroboration with the land use regulation.

![Figure 66: A vision for Batam.](image)

In the light of the conclusions drawn from the problem analysis (see subchapter 3.4) we can imagine a similar strategy for Batam, and the corresponding objective for the city could be:

**To develop a combined strategy that can tackle Batam’s urban and economic – administrative problems, in order to improve on the long-term the living quality and investment opportunities of the city by creating conditions for personal development and private investment to happen.**

![Figure 67: The current situation, function of the ‘tree model’ factors.](image)

![Figure 68: The target situation of Batam SEZ function of the ‘tree model’ factors.](image)
**NEXT BATAM: Fostering a resilient growth strategy**

Using the same factors that stay at the base of the ‘tree model’ determined in the literature research, we can also evaluate more precisely the future targets of the city of Batam (fig.67 and 68) or in more details this is presented in table 9.

**Table 9: The envisioned future, in 30 years’ time, for Batam using the ‘tree model’**.

<table>
<thead>
<tr>
<th>BATAM SEZ VISION FOR THE NEXT 30 YEARS</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Living quality</strong></td>
</tr>
<tr>
<td>people can afford better or improved housing conditions because they have jobs;</td>
</tr>
<tr>
<td>people can pursue more easily their dreams;</td>
</tr>
<tr>
<td>- parts of island preserved their natural habitat that people can enjoy;</td>
</tr>
</tbody>
</table>

**5.2 REGIONAL LEVEL STRATEGY AND FINAL PRODUCT**

At the regional level Batam will make better use of its strategic position, in order to become a leading innovation center, able to compete at the global level in terms of shipbuilding, oil & gas supporting services and equipment, and light industry. Batam will improve its policies and administration consistent, transparent and reliable, in order to improve its image and continue attracting capital, innovation, and people on long-term in the future (fig.69).

![Figure 69: The strategy at the regional level.](image-url)

In order to realize this, at the local level a number of strategic competition centers will be assisted to develop into a cluster, underpinned and supplied by a tight network of local centers and sub-centers, all hold together
by a public transportation system integrated with the land use and connected at regional and global level via the ferry and airport terminals (fig. 70).

![Figure 70: The strategy concept at the local level.](image)

The centers and sub-centers will be located on the same public transportation route in places where transit stations are located. These will include affordable housing, public services and other amenities (such as retail, offices, factories) attractive for people and investors, to develop. The public transportation will consist of a BRT service because, similar to the case of Curitiba, it is cheaper and relatively easier to upgrade and maintain.

As such, the final product of this project will be

A combined transport oriented development and industrial clustering strategy for the next 30 years using a bus rapid transport system, which aims at improving the housing conditions and mobility within the city; restoring the ecological balance of the island and creating the conditions for private investment to happen.

### 5.3 Island Level Strategies

The strategies are put in practice in order to realize the vision proposed. These strategies addresses the problems identified in the island and makes the final product of the project together with the interventions proposed. A strategy combines a series of spatial and policy level recommendations.

## Improving the Housing Conditions

Housing is one of the most basic factors contributing directly to the living quality. This strategy targets the migrant workers and the lower and middle income citizens, because these social groups that forms the majority of the population in the island and also are the most likely to live in poor housing conditions (such as illegal settlements).
NEXT BATAM: Fostering a resilient growth strategy

It’s not just its availability but also its quality that influences the life of the people. As it was showed in the case of Philipsdorp, it takes a commitment “beyond the minimum standard” in order to ensure a long-term positive impact on the development and advancement of the people, factory and Eindhoven as a whole.

In essence the objective of this strategy is increasing the density and diversity, along the main public transportation routes and at the BRT transfers stations’ locations, which will specifically include affordable housing for special target groups such as workers or students. This way the BRT lines would become the lines of sustainable development (fig. 71).

This strategy proposes:

- Creating a mix-use development and increasing the land use coefficient along the main public transportation corridors - the minimum height recommended is GF + 4F;
- Creating a mix-use development, combined with affordable housing and public services at the bus transfer stations locations – the minimum height recommended is GF + 1 + 8 F;
- Improving the infrastructure in the areas located away from the main public transportation line (such as the KSB social housing areas) – at minimum asphalting and providing basic utilities (water, sewerage and electricity) of the strategic collector roads.

Figure 71: Improving the housing conditions strategy

In order to make this strategy to work the authorities, have two options to ensure the space for development and to self-finance the project. Each option starts from the general case of a piece of empty land, located near the future BRT line (fig 72 and 73).

Step 1. **Land acquisitioning.** The public authorities purchase the empty land for a sum $X$ of money. The land can also be re-appropriated, in the situation that the land hasn’t been used for more than 5 years, case in which the authorities will pay no initial money for the land.
Step 2. **Land development.** The authorities will develop the land (including: creating secondary access roads and parking, planting green areas, providing pedestrian infrastructure and street furniture and signage) and build the public transportation line. Following this improvements they will re-sell the land to a private developer in order to recover their land and development costs.

**Figure 72: Option 1 to secure land and self-finance the project**

**Step 3. Project development.** The investor will take over the land and develop a high density (min. 4 floors), mixed-use project, with retail, and commercial spaces at the ground floor and offices or housing at the upper floors.

In the case of the second option, the same 3 steps are used, with the only difference being that in the initial land acquisition and development, step 2 and 3, the public authorities can work in a PPP (public-private partnership) with the owner of the land in order to secure the land and finance the project. (fig. 73) This option is preferable because it will involve more the local community and the residents and it will save the authorities from too much public spending in the initial phase of the project, making it easier for other projects to be carried out in parallel with this process.

In the case of the transfer stations, where affordable housing will have to be provided, the strategy recommends that the authorities will develop the land and the building together, either by themselves or in PPP, following that the exploitation of the commercial levels will be leased or sold to companies and developers in order to recover the costs. Over this point however, more will be detailed in a next strategy.

**Figure 73: Option 2 to secure land and self-finance the project**

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**IMPROVING THE MOBILITY**

This strategy stays at the base of the proposed TOD for this project, and at minimum, if all else will fail because of various factors (e.g. market conditions, inefficient management, etc.), it is expected for this strategy to still work and provide the city with a transportation system.

Scholars, such as Power (2012), conclude that transport deprivation can lead to a ‘vicious circle’ for which both the disadvantaged (such as the social housing residents) and the city, as a whole, has to pay. As in the case of Curitiba, the public transportation, plays an crucial role in creating an ‘virtuous circle’ of development. Public transportation brings more equal opportunities for the residents and improves the social balance, it help improving the quality of the environment by using less fuel and cars, and can also create new investment opportunities.

In essence this strategy objective is to develop a BRT system of the ‘trunk and feeders’ type, with transfer stations integrated at the local and regional level, via a network of improved collector roads, ferry and airport terminal. The operation of the trunk system will be done by the public authorities through a special body, while the ‘feeders’ will be used by the present paratransit (fig. 74).
This strategy proposes:

- Connecting the major functions and centers (such as the airport, CBD, new harbor, maritime academy, administration center, etc.);
- Separating the public from the goods traffic in between the major harbors in the island in order to improve the traffic flow;
- Creating new-sub centers by the location of transfer stations in places that already attracts people, so that it continues and enhances the functions in the respective areas;
- Creating a mix-use development, combined with affordable housing and public services at the transfer stations to allow easier access for the disadvantaged residents to the services;
- Place new major activities (e.g. maritime academy, industrial parks, shopping centers, etc.) in the radius of 400m, or 5 minutes walking from the transfer stations;
- Creating a one-fare thicket for the whole island in order to incentivize public to use the public transportation and making it equitable for the lower and middle income residents to use the system.

Key to the integration of this BRT system will be the transfer stations. These will be serving both as destinations as well as easy and fast connecting spaces to various services (e.g. ferry, airport, paratransit) and functions in the city (e.g. industrial parks, higher education facilities, offices, shopping, etc.). If successful a BRT transfer station will stay at the core of a new-sub center in the city, as this will be located where already some clear defined functions exist in present, the new station extending their use.

There are 5 principles used to build a successful BRT transfer station in Batam (fig. 76):
1st  **It has to improve the mobility**: it is pedestrian friendly, it offers fast and safe transfers to other public transportation means, it has good road connection that serves it (i.e. the collector roads used by the paratransit);

2nd  **It has to be socially committed**: it provides affordable housing for targeted groups (e.g. social housing, student or worker’s dorms) and creates spaces for the interaction and meeting between people;

3rd  **It has to be multifunctional**: the station has an enhanced environment meaning that there are various services (such as: post office, public office, general practitioner, post office, library, employment office, etc.) in addition to shops and commercial spaces;

4th  **It has to be demand driven**: as much as possible the station is located in areas where it can boost the already existing activities and it is convinely located (preferably max. 5 minutes walking distance) from main functions in the city (e.g. industrial parks, higher education facilities, harbor, etc.); and

5th  **It has to stimulate investments**: in itself it offers excellent development locations but it has also to give a better image for the whole island and introduce potential investors to more opportunities of development in Batam.

### RESTORING THE ECOLOGICAL BALANCE

This strategy concerns in particular the protection areas surrounding the fresh water reservoirs in the city. These areas are vital in maintaining the quality and quantity of fresh water in the island and also have the potential to increase the attractiveness of the living areas for the benefit of the city as a whole.

To a point, it can be allowed for the human activity to intervene (either intentionally or not) against the natural settings (e.g. modifying the shores to allow shipyards’ activity). If this point is crossed than on the long-term both the natural habitat of the island and the human activity will have to suffer, as it appears to happening now in Batam.

In essence the objective of this strategy is creating an environment where human activity and nature can co-exist and, moreover, profit from each other. On the long term it is expected that the restored areas will bring the improvement of life conditions (e.g. clean environment, attractive living, recreational facilities, etc.) and secure vital natural resources for the development of the island for years to come (fig. 77).

This strategy proposes (fig. 78):

- Removing the illegal activities in the natural protected areas and restoring to the initial ecological conditions;
- Creating parks for recreation and leisure in parts of the protected areas that are near major human activities;
NEXT BATAM: Fostering a resilient growth strategy

- Creating temporary or permanent agricultural spaces in the island – like for example on unused land outside the ecological areas, or inside the protection area of the airport.

Figure 78: Restoring the ecological balance strategy.

CREATING THE CONDITIONS FOR INVESTMENT AND INNOVATION – THE INDUSTRIAL CLUSTER IDENTIFICATION AND DEVELOPMENT SUPPORT

This policy objectives deals in particular with the loss of competitiveness, problem. As explained in the literature research, cities are vulnerable should they are not innovating and diversifying their economic basis (see the case of Detroit) even in such situations.

Looking at Shenzhen, the city succeeded to maintain ‘footloose’ companies by developing new advantages’. An option for this problem might be the creation of an economic cluster, Porter (1990, 2000), based on the shipbuilding and oil & gas industry in the city, which appears to be the most advantaged industry in the city according to the research (see text box 9 below).

TEXT BOX 9: DETERMINING THE COMPETITIVE ADVANTAGE OF BATAM

Shenzhen managed to retain the ‘footloose’ companies even when the production costs started to rise. It managed to do this by developing other competitive advantages, such as operational effectiveness. Using Porter’s ‘diamond of national advantage’ (fig.40), which analyses the competition environment, one can conclude that the strategic location (i.e. on one of the busiest trading routes of the world) and the island morphology (i.e. deep waters near the shores) of Batam can offers the best advantages for the city yet. (see table 10) These natural characteristics are unique and hence cannot be found in other locations around the world, nor can they be replicated.

Such advantages can benefit the shipbuilding industry, which according to the economic data from June 2011, ‘ship, boats and floating structures’ were the second most valuable category of products made for export in Batam, totalizing 14% of the total exports.(Batam Indonesia Free Zone Authority, 2011).

In this situation one could suppose that shipbuilding and oil & gas industry, might represent the seeds of the next economic cluster of Batam, in addition to the light industry.
This type of industry will advantage Batam also because it is less likely to be of a ‘footloose’ type. First because it is a more capital intensive activity than the manufacturing industry and second because companies operating in this sector are less likely to relocate easily to their in-built infrastructure.

But in order to help this industry turn into a cluster, there is more to do than natural conditions.

Also from Porter’s diamond analysis, we can conclude that there is still room to develop:

- the harbors infrastructure – Batam still depends on Singapore’s harbors;
- the public transportation – in order to closely connect the various centers and services in the city; and
- the human capital in the activities necessary for the cluster (for example by providing an maritime higher education facility or other specialized R&D facilities).

As it will be showed later on in the text, in the case of the Dutch Maritime Cluster the harbor is one of the most integrated element with the rest of the cluster, staying at the center of all other activities. This fact might prove also strategic for Batam authorities to try and implement in order to support the cluster development.

**Table 10: Analysis of the competitive advantages of Batam using the ‘diamond of national advantage’ by Porter.**

<table>
<thead>
<tr>
<th>Factors</th>
<th>Assessment in the case of Batam</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Factor conditions (input)</strong></td>
<td></td>
</tr>
<tr>
<td>Natural resources:</td>
<td>- strategic global position, nearby the busiest shipping line of the world;</td>
</tr>
<tr>
<td></td>
<td>- immediate access to deep sea waters (suitable for shipbuilding, and large boats operations);</td>
</tr>
<tr>
<td></td>
<td>- land access (the southern islands the future connection to Bintan); fresh water, sand, access to fishing</td>
</tr>
<tr>
<td></td>
<td>- no mineral resources in the island, but can access them from the rest of the country</td>
</tr>
<tr>
<td>Human capital</td>
<td>- around 0.5 mil unemployed the majority having a middle school education;</td>
</tr>
<tr>
<td></td>
<td>- a quarter of the population young to very young (under 15 years old)</td>
</tr>
<tr>
<td>Capital resources:</td>
<td>- few (only 20% of the investments in the city are made from public money);</td>
</tr>
<tr>
<td>Physical infrastructure:</td>
<td>- good with respects primary infrastructure;</td>
</tr>
<tr>
<td></td>
<td>- lack of a globally connecting harbor hub (still depending on Singapore for most of the global connectivity);</td>
</tr>
<tr>
<td></td>
<td>- poor public transportation</td>
</tr>
<tr>
<td>Information infrastructure:</td>
<td>- good partially provided by Singapore</td>
</tr>
<tr>
<td>Scientific and technological infrastructure:</td>
<td>- limited, partially supported by Singapore</td>
</tr>
<tr>
<td><strong>Demand conditions (input)</strong></td>
<td></td>
</tr>
<tr>
<td>Local customers:</td>
<td>- none or very few – especially for the manufacturing products (electronics and such) – low purchasing power is an issue;</td>
</tr>
<tr>
<td></td>
<td>- in general not very demanding nor very sophisticated at a global scale level comparison;</td>
</tr>
<tr>
<td></td>
<td>- it is possible their demands might anticipate the demand in other parts in Indonesia, as Batam locates a large number of different ethnicities from all over the country (it can act as a testing bed for various products and services</td>
</tr>
<tr>
<td>Regional / international customers:</td>
<td>- Batam has an export oriented economy hence its manufacturing is directly influenced mostly by the international demand</td>
</tr>
<tr>
<td></td>
<td>- In terms of heavy industry (shipbuilding, oil &amp; gas) Batam is influenced by a regional demand, which can be more specialized</td>
</tr>
<tr>
<td><strong>Related and supporting industries</strong></td>
<td></td>
</tr>
<tr>
<td>Concerning light industry (such as electronics, garments and footwear, etc.):</td>
<td>- there are a limited number of suppliers located in Batam, most of the time the specialized components being imported via Singapore, or, in some cases, being entirely produced in-house</td>
</tr>
<tr>
<td>Concerning heavy industry (shipbuilding and the related oil and gas supporting services, etc.):</td>
<td>- there are some specialized suppliers (such as Mc Dermott) which appeared ever since the island started to be developed in the early ’70s and there are related industries (like maintenance, repair, oil and gas, etc.) which appears to develop</td>
</tr>
</tbody>
</table>

V. STRATEGY AND PROPOSED INTERVENTIONS
But in order to help this cluster develop further, the natural conditions only (i.e. strategic location and sea access) are not sufficient. As we could see in the Chinese clusters’ example, the authorities needs to strongly support the cluster development through various means including, among others, lowered entry barriers for new businesses, production specialization; innovation and technology support from knowledge and public institutions; and support from industrial associations. However, Zeng remarks that the local governments’ support come during the middle or later stages, when the clusters have demonstrated their potential.

In the case of Batam the research revealed 79 companies activating in the shipbuilding industry of Batam, the majority having relations with the offshore oil and gas market. These companies include six of the largest nine Indonesian shipyards, registered in the 2012 Clarkson Research’s World Fleet Register (see Annex 1 for the complete research data). It appears hence that the cluster might be half-way on the path to establish itself better and for a longer period of time.

In essence this strategy objective is to stimulate the development of a cluster, by building a modern harbor infrastructure and R&D amenities (such as a maritime academy). Ultimately the BRT system will act as a binding element between the various activity centers in the island, realizing a flow of people, services and capital at the island, regional and international level (fig. 80).
In more details this strategy proposes (fig. 81):

- Developing a new harbor and maritime academy and connect these together at the local and regional and international level, via the BRT system and its transfer stations;
- Integrate investment promotion facilities in regional and international integrated BRT transfer stations (at the ferries and airport terminals);
- Integrate higher education, research and affordable housing facilities (e.g. students’ dorms) in some of the transfer stations.

IMPROVING THE ADMINISTRATION

This is one of the prerequisites for this proposal to function. Essential for addressing this issue is to create an efficient, one body, administration that control the use of land (fig. 82). Currently this measure is not applied in Batam leading to many problems in connection to the space planning, but also, competitiveness and investors’ attraction. In the example of Curitiba and the Chinese clusters the role of the authorities is paramount to the planning and implementation of the strategies. Zeng (2011) stresses the necessity of a strong commitment from the top leadership, pragmatism and flexibility in order to appropriate the solution to the real needs coming from the markets.

Looking at the Curitiba example, it is important for the same land planning body to continue its work across election cycles, controlling both land planning and public transportation development, independently from the political power. Until the land-transport integration was accomplished IPPUC (the Institute for Research and Urban Planning of Curitiba) developed and implemented the BRT network and the triaxial system of development. Only in 1990 a new company, URBS (Urban Development Authority of Curitiba), is now planning and controlling of the transit in the metropolitan area and conceives permissions to bus transit operators. Nevertheless, both IPPUC and URBS guarantee continuity in terms of transit and traffic alleviation as well as urban planning. (Lindau et al., 2011)

The same principles should be applied as well in Batam for the success of the strategies detailed above.

In essence this strategy objective is to change from an administrative dichotomy to a unique, autonomous, body or institution that controls both the land development and the public transportation implementation.

Such a change would benefit the investment climate and the city as a whole, since, as it was described in the previous chapter, private companies find the governance of the island as one of the least desirable factors. It is important to keep in mind however that the governance should offer a good balance between the three pillars the state, the civil society and the market.
5.4 PHASING

Phasing is meant to control when and how much is developed at one time, so to be able to direct the strategies function the market conditions. Zeng (2011) recommends, based on the Chinese authorities’ example a “pragmatic ‘learn as you go’ and / or ‘experimental learning’ approaches” in order to find a solution that works (p.242) key is “to minimize the avoidable economic, social, and political costs.”(p. 34).

In the present case, the entire strategies are thought to be carried out over ±30 years, in three major phases. The time frame can be shorter or longer, in the end depending on how the city / market reacted to the interventions.

At the end of each phase, there will be an evaluation period for the authorities to measure the achieved success of the previous phase and function of the market conditions, decide what next steps needs to be carried out in the following phase. The BRT lines path can change, following the market needs, however it is is expected they will continue to connect the same major activity centers.

PHASE 1

An essential preparatory intervention in this phase, which has to be carried out at the beginning of each of the phases, is securing the land space. (see the above ‘improving the land conditions’). Ideally the authorities would be able to secure the land before the transportation line will be laid out in order to avoid land speculation and unreasonable price increase.

The other interventions and expected changes in this phase are the following (fig. 83):

- The first BRT line will be build connecting the Batu Aji and Sagulung district area to the Batam Centre; first securing the land along the main transportation corridor, improving the collector roads (e.g paving the roads, and placing the utilities infrastructure) and building the transfer stations;
• The natural protected areas will be restored by removing the illegal activity and then replanting trees and securing the areas.
• Rehabilitating ha
• Agriculture land will be appointed in the island, either on temporary locations (if the land is in private property but unused) or permanent (such as in the protection areas of the airport).

Following this first phase, it is expected that in certain parts, along the BRT line trajectory, new higher density development will appear. At first near the transfer stations where the flow of passengers would be the most intense, this generating new attraction poles and possibly the creation of new sub centers.

If the market conditions are favorable and the first BRT line achieved its objectives, it can be passed in the second phase.

**PHASE 2**

In this phase it is important to secure the land along the bus corridor before anything else, because part of the BRT line does not goes on the primary road network would normally would and hence sufficient space needs to be secured to carry on the intervention.

The essential interventions and expected changes in this phase are (fig. 84):

• At first the new harbor and bridge connecting to Bintan islands, are supposed to be built;
• The collector roads used by the paratransit as feeder services will be improved;
• The second BRT line connecting the airport to the new harbor, and passing through Batam Centre will be constructed, after first the land along the line has been secured as explained above.
After this phase, the BRT line can play an strategic role in creating a new image for the city and opening new opportunities for investment, because it will connect some of the most important activity centers and entry gates in Batam.

### PHASE 3

By this time it is expected for the industry and development in the island to cover more land.

![Figure 85: The spatial interventions recommended in the third phase.](image)

The essential interventions and expected changes in this phase are (fig. 85):

- At first the land will be secured and the collector roads used by the paratransit as feeder services will be improved;
- Several natural protected areas, which now are near the developments are supposed to transform in parks for the public use;
- The third BRT line connecting the industrial area of Sekupang with the new harbor in Batu Ampar will be constructed.

After this phase, the city is supposed to have completed all the strategies, hopefully being closely to the intended vision.

### 5.5 INTERVENTIONS PROPOSED AND LOCATION SELECTION

The role of the interventions is to give an indication of how the main strategy can work. These are supposed to be strategic meaning that they can be realized at a smaller scale and with minimum public funds, but it has the potential to create positive changes at the larger scale.

The underlying principle is that these will create the conditions for larger, private, investment to happen, which is expected to recover the initial investment made by the authorities (e.g. through property tax for example).
To illustrate the land development intended for Batam, these interventions are proposed:

1. At the sub-district scale – the bus stations – illustrating the basic design of the three station types (the transfer, the normal and the feeder bus station).
2. At the district level – the land use principles and the program;
3. At the island level – the BRT system (explaining how the trunk and feeder lines work) and the new harbor intervention;

The interventions will be carried out in Sagulung district because in here the problems identified at the island level are found to be the most critical. The area is located in the SW part of the island and it contains about 28% of the total population of the island (about 280,000) making it the second most populated area in the city (fig. 86).

The area is considerably far from the main activity centers of the island at around half an hour, or 45 minutes distance by car (fig. 87). Yet, this area holds the largest social housing development in the city, of the KSB type (fig. 88).
Typologically the area is presented as a patchy development, made up of a collection cul-de-sac or gated communities, each with a direct connection to the main road that ensure the only connection to the rest of the city. At the edges of the district, are located the social housing areas, of the KSB or ‘ready-to-build’ plots type, more compactly built and with a considerably poorer infrastructure (fig. 89). At the fringes of the development, bordering the social housing areas, clear signs of agricultural activity (i.e. uniform, parallel stripes of earth), most likely informal, and illegal housing can be noticed from the satellite images. The whole development appears to push the borders protecting the mangrove forest, located in the south - east part of the district (fig. 88).

According to the land-use plans (fig. 90) the public amenities and services are located around the primary road that ensures the connection to the rest of the island. However, given the poor roads conditions and the distances, at more than 10 minutes’ walk distance see figure 89, these remain out of reach for many of the residents of the social housing areas (fig. 91).

From a planning point of view, the whole area, except for the area along the main connecting road, is dedicated to high density residential use, meaning > 100 units/ha. This point in particular contradicts the TOD basic principles, which recommends higher densities along the main public transportation lines in order to prevent urban sprawl.
VI. IMPLEMENTATION
View over the main public square in Batam, towards the local government building. These are located in Batam Centre where all main governmental buildings are concentrated (photo by the author).
6.1 DISTRICT LEVEL INTERVENTIONS: THE LAND–USE PRINCIPLES

From the brief analysis of the Sagulung district one can conclude that the area is marked by a centrifugal growth (i.e. pushes the development outside) creating border conflicts with the surrounding areas (such as the protected forest). In applying the TOD principles (fig. 26), the development has to have a centripetal growth, towards the main public transportation lines and the transfer stations of the BRT (fig. 92).

Figure 92: Illustrating an centrifugal and centripetal growth (Rodrigue, 2002, after GTZ, 2004a)

Figure 93: The concept for Sagulung – creating destinations and densification areas along the public transport system.

Applying the strategy for mobility and housing, the interventions would have to create destination points - in the locations of the future transfer stations – and high density, mixed developments along the main public transportation line, i.e. the BRT line (fig. 93). In order to realize this centripetal motion to the BRT lines, the road network (fig. 94) and the land-use densities (fig. 95) in the area would have to be adapted.

In a first phase, only the roads that are considered strategic for directing the traffic flow to the BRT transfer stations will be improved (these roads being collector roads) because these are expected to be used by the feeder services (i.e. the paratransit) and hence they are more important. In a later stage other class IV roads can be upgraded as well.

Figure 94: The proposed new collector roads infrastructure that will be improved and the transfer BRT stations.

Figure 95: The proposed densities along the main road infrastructure.

The densities and the commercial or public functions would be developed in the buffer of 2 – 5 minutes walking (150 – 400m) from the main public transportation lines. The recommended height along the BRT lines is GF + 4F (plot use ratio 4) while near the transfer stations this is doubled (plot use ratio 8). This way one can create a critical mass of purchasing power and a pool of labor which can easily travel in the city to reach functions and activities.

The new transfer stations would be located in the places where already some public functions started attracting the residents, such as existing market and shops - magenta on the figures above, schools or other
education facilities - blue and industrial parks – dark brown. This way it will ensure that the development is demand driven and facilitates and perpetuates the human activity.

In order to help even more the creation of a character and community around these transfer stations, there will be four different programs around which these stations will develop. This way it is hoped that in the future these transfer stations, will stay at the core of new, sub-centers in the city, each with its own character and strong community (fig. 96).

### 6.2 SUB-DISTRICT INTERVENTIONS: THE STATIONS

There are three types of stations that build-up the BRT trunk and feeder system (fig. 97):

1. transfer stations, where passengers can change from one public transportation system to another and can access affordable housing and other public services;
2. normal BRT stations; and
3. feeder stations.

All stations will be built and controlled by the special authority in charge with the land use planning and public transportation. Their maintenance will be shared with private operators based on a competitive contract as it will be the case for the busses operation as well.

At the base of the design of the stations and the BRT system stays a comparison between three cities that implemented BRT systems and are currently are considered successful: these are Curitiba, Bogota and
Guangzhou (GTZ, 2004). The spatial analysis, with the bus lines and stations profiles and plans, is presented in Annex 3 of this report, while the lessons learned are presented in text box 10 below.

**TEXT BOX 10: COMPARING THREE SUCCESSFUL BRT EXAMPLES**

For the actual design of the BRT system, this thesis takes as inspiration three BRT examples considered successful. These are: Curitiba, Bogota and Guangzhou. Specifically, the research looks into the way the BRT express lines are integrated with urban avenues that support large car traffic model. This is because the proposed interventions operate also in a similar context.

In general the average distance between the BRT stations in the given examples varies in between 0.6 to 0.8km, for Curitiba and Guangzhou systems. The trunk width, were the BRT busses run, is usually in the range of 7m wide for a two ways system, 3.5m per lane.

**Curitiba**

As described as well in chapter two of this report, Curitiba is widely accepted as the first and most successful application of the TOD strategy. Currently its BRT system, based on a feeder-and-trunk type with transfer stations, has become an example to many other cities in both developing and developed countries. Being designed as such from the early development of the city, Curitiba remains one of the best transport integrated development. As previously described the system is controlled by an independent institution URBS (see chapter 3.3) but it gives operation licenses to private operators that are awarded by distance.

For this comparison the Linha Verde has been taken as a reference. This is a relatively new BRT express line which occupies the middle part of a regional road that connects Curitiba at the metropolitan level. Despite the large volume of traffic, the stations are connected at the street level through pedestrian crossings. The line wants to set an ecological model for other BRT lines and hence the buses operate on bio fuels reducing the carbon footprint. In addition, generous green areas are located along the BRT path and around the stations, serving both to separate the car traffic from the trunk lines and also to create a pleasant and welcoming environment for the bus riders.

**Bogota**

The BRT system of Bogota, called TransMilenio, entered in use in the year 2000 after several failed attempts of the authorities to implement an efficient BRT system. Before this year, the public transportation was operated by many private operators without control from the authorities, resulting in a bad performance of the system. Currently however, TransMilenio is considered one of the most successful BRT intervention post city development, being praised both by GTZ and ITDP (Institute for Transportation and Development Policy).

The system was built in a public – private partnership under the responsibility of an independent institution (Instituto de Desarrollo Urban the Urban Development Institute). For the planning, management and control of the service another company is being put in place called TRANSMILENIO S.A.

Characteristic for the Bogota BRT system are the double trunk lines in each direction, which offer a large passenger transfer, in June 2011 realizing the highest peak throughput in the world (34,000 passengers/h/direction)\(^\text{36}\). Because of the space limitations the station is of ‘island type’, located in between the trunk lines. The width of the trunk lines is 17m and in total, from each side of the street from building-to-building, including the sidewalks and the traffic lanes, it measures only 43m, almost half as for Curitiba’s Linha Verde, though it contains a similar large volume of cars’ flow.

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\(^{36}\) Source: Fjellstrom, K. 2012, for ITDP.
Characteristic for the system are the pedestrian bridges that connects the lateral stations and the double trunk lines, similar to Bogota. Another special thing is the integration bike parking and metro system within the BRT station’s environment, the passengers making an easy and fast transfer between the various transportation means. The width of the trunk lines is 19m and of the whole street profile, including the sidewalks and the car lanes, is 90m, similar to Curitiba’s Linha Verde.

**THE TRANSFER STATIONS**

The transfer stations are the building blocks of the BRT system and the whole strategy, because these are supposed to be the main vectors for positive changes in the island. As explained in the ‘Improving mobility strategy’ there are five principles that stay at the base of a transfer station: (1) improves mobility; (2) socially committed; (3) stimulates investments; (4) demand driven; and (5) multi-functional.

Function of their location there will be 4 different programs for the transfer stations each having a clear objective. These are:

1. **The innovation impulse** – Stimulating the diversification and innovation of the economy, by training and educating its residents. These stations will be located near, higher education facilities (such as universities, academies, vocational schools, etc.) and will inside their premises cultural – educative facilities (libraries, musea, theatres, etc.)

2. **The core of the community** – Creating a dynamic sub-center with a strong identity and community in order to improve the social balance and the opportunities in Batam. These stations will offer community services (such as day care, community centre) and easy access to already established public facilities in the city: (e.g. shopping centers, religious venues, etc.)

3. **The productivity spur** – Increasing the productivity and connecting better the main economic activities in the island. These stations will be located near important industrial objectives (e.g. industrial parks) and will offer employment agencies and career advisors.

4. **The investment promoter** – Creating an image of excellence and professionalism for the city and stimulating the private investments in the island. These stations will be located near international gateways in the island and will offer legal assistance, government support.

In addition to providing specialized services, the transfer stations will provide affordable housing, except for the ‘investment promoter station which would provide hotels and convention centers, for the target groups (workers, students and other low income residents).

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Below, in Table 11 are described in more details the program of each transfer station type.

**Table 11: The various transfer stations typologies.**

<table>
<thead>
<tr>
<th>Objective</th>
<th>THE INNOVATION IMPULSE</th>
<th>THE CORE OF THE COMMUNITY</th>
<th>THE PRODUCTIVITY SPUR</th>
<th>INVESTMENT PROMOTER</th>
</tr>
</thead>
<tbody>
<tr>
<td>Stimulating the diversification and innovation of economic basis, by training and educating its residents.</td>
<td>Creating a dynamic sub-center, with a strong identity and community, in order to improve the social balance in Batam</td>
<td>Increasing the productivity and bringing closer the main economic activities and the workers</td>
<td>Creating an image of excellence and professionalism for Batam and stimulating the private investments in the island</td>
<td></td>
</tr>
<tr>
<td>Connectivity</td>
<td>Walking, paratransit, private transportation</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Built-in amenities</td>
<td>Student dorms</td>
<td>Social housing</td>
<td>Worker’s dorms</td>
<td>Hotels or airplane</td>
</tr>
<tr>
<td>Public services offered</td>
<td>Library, musea, theatre</td>
<td>Day care, community center, health care</td>
<td>Employment agency, career advisor, general practitioner</td>
<td>Government office, professional assistance, tourism agency</td>
</tr>
<tr>
<td>Main linked locations</td>
<td>Universities, vocational schools, academies</td>
<td>Markets and shopping venues, main religious venues</td>
<td>Industrial parks, harbor</td>
<td>Various, possible investment locations all over the island</td>
</tr>
<tr>
<td>Stakeholders</td>
<td>Local authorities, int’ development agencies, private corporations, NGO’s</td>
<td>Local authorities, central government, local communities, private corporations.</td>
<td>Local authorities, central government, private corporations.</td>
<td>Local authorities, central government, private corporations.</td>
</tr>
</tbody>
</table>

To illustrate how a transfer station works, the ‘core of the community’ type has been implemented in Sagulung west (marked with 1 in fig. 97). This location was chosen because there are already some public facilities (a market and other shopping amenities) that attract the local residents. Hence the station will continue and enhance the existing roles in the area, in the hope that this will determine the formation of a new sub-centre at the city scale.

![Figure 101: The present situation – the magenta buildings will be preserved.](image1)

![Figure 102: The situation after the station has been built.](image2)

These buildings have been integrated in the new plan (colored in magenta in the fig. 101 and 102), the new buildings (colored grey) being located in the empty space between the existing buildings and the road (fig. 103).
Essentially for this type of station is to safely and quickly transfer passengers from the feeder buses, or other transportation means such as cars, ferry) to the BRT buses located at the center of the street. This is realized through an overpass bridge connected to a multifunctional building (fig. 104 and 105).

The building contains the program of the station which is of the type ‘the core of the community’. At the ground floor and first floor – where the passengers are transiting between the paratransit and the BRT station platform are located the retail services and the rest of the program which characterizes this station (i.e. day care, community center, health care, etc.). At the upper levels are located the affordable housing amenities which can be of various types function the most likely users of the stations (see table 11 for more details). The plan and cross – section of this station are presented in fig. 106.

The buildings at the transfer stations are recommended to be of GF+8F in order to offer more space for the affordable housing. Involving the height, there is discussion over how these upper floors can be reached, in the context that elevators adds considerably to the cost of the project and they require maintenance. In order to take a decision, it is first recommended to create the space for an elevator without installing one, evaluate how the building comports over time (i.e. how the residents are reacting) and install one if necessary. This way it is hopped additional funds will be easily available for such facilities (fig. 106).

Around the station the area will contain attractive pedestrian facilities (i.e. sidewalks and streets lined with trees, street furniture such as benches, lighting, etc.) easy loading and unloading platform for the passengers and parking spaces. The traffic around the station is organized ‘one-way’ to prevent car jams and accidents.
Concerning finance, this particular station is supposed to be built initially at the cost of the local authorities, in order to realize its program. However the retail space, at the ground floor can be leased for the recovery of the costs. For this reason the retail spaces have prime locations in the commercial floors of the station (fig. 107). Learning from the Chinese authorities experience, public-private partnerships (PPP) with interested companies might also be an option in order to recover the costs.
THE NORMAL (SMALL) BRT STATIONS

For a normal BRT station a place it has been selected location marked with 2 in fig. 91. This location is interesting because it illustrates well the situation along the primary road network in Batam. The spaces on each side of the road, in a buffer of around 150 meters, are most of the time left empty even if it is privately owned (fig. 108 and 109).

![Figure 108: The present situation – the orange areas represent the gated communities.](image)

![Figure 109: The land use plan envisioned and the station location.](image)

Unlike the previous case, in this situation only the station itself will be built by the public authorities. However, it is recommended for the authorities to secure the empty land along the BRT lines (fig. 110) before the construction of the BRT line starts, in order to be able to catch-in the land value increase (see fig. 125). This way they can recover a large part of the costs. At minimum however, it is expected that this BRT bus plan will attract the private investors to开发 along the main transportation lines, this staying at the base of ‘creating new investment opportunities’.

![Figure 110: Cross section and plan of the present situation.](image)

The height recommended along the BRT line is minimum GF + 4F in order to allow a proper use of the space. In practice this might not be realized unless the authorities will incentivize the developers, or they will themselves involve in the development (for example through a PPP). This can be done by promoting the ground floors of the buildings as commercial spaces that will have an easy access to the public (fig 111)
The access to this station will be at the street level, the BRT station being located in between the bus lines (an island station). This will be realized by providing appropriate safety facilities (i.e. pedestrian crossings, traffic lights, etc.) and other means for the traffic to slow down and allow the passing of the pedestrians (fig. 112 and 113).

In addition the area has to be attractively designed, for example by planting high trees to provide shadow, grass and shrubs, in order to create an inviting environment for the people to use the public transportation services.

**THE FEEDER STATION**

The proposed feeder station is located in the social housing area south of Sagulung, on one of the collector roads selected to carry the paratransit buses, marked with 3 on the map from fig. 91. The paratransit has no flexible route or schedule, hence only few strategic stations will be built where most likely these feeder buses will stop. Such locations are in the vicinity of existing public spaces such as schools, musholas or other religious facilities, or markets, etc. (fig. 114).

The present conditions of these roads are poor. Most of the time the surface is either unpaved or bad maintained. In addition, they also have a relatively narrow profile, which makes difficult for the station to be placed on each side of the road in the same area (fig. 115).
In the area where the stations will be built it is important to provide the pedestrian facilities to allow a safe mobility around these places. It might be necessary for some houses to be re-appropriated by the authorities and compensations given out to the residents in order to create these safe conditions (fig. 116). Provided that the station will prove successful it is expected that the built environment around it will change. The land use plan proposed along the collector roads allows a higher plot use ratio, not more than three, and at minimum 5m distance from the side of the road with the bus station, or 3m.

It is not certain that this development will take place. There are good chances however for this bus station to catalyze more public activity in the area and will generate spin-offs that will upgrade the spatial conditions around (see for more details Part A of the evaluation chapter).

### 6.3 ISLAND LEVEL INTERVENTIONS (A): THE BRT SYSTEM

Currently there are already plans for a public transportation network to be implemented in the island by 2017 using a monorail system (see fig. 51). These plans are part of the central government strategy to increase the use of public transportation in the next several years. The present proposal of the authorities is to build a monorail system however the proposal hereby is providing more advantages. First it is a more cost effective solution, needing less money to implement it (it needs stations at the street level most of the time) and to maintain it to work properly. Secondly it is more flexible and can adapt more easily to system changes such as bus upgrades. In addition, the example of the Curitiba shows that a BRT system integrates better, and contributes more to the spatial quality of the city than an elevated monorail which might look modern but has less impact to the spatial quality.
If the strategies proposed in this project will be implemented than the BRT system not only that will alleviate the mobility and create more space for housing, but it will also better contribute to the spatial quality of the city, has more potential to attract private investments and create a better image for the city as a whole.

**THE CONCEPT**

The BRT system proposed hereby is a trunk and feeders type of the one used in Curitiba (see text box 4 under sub-chapter 3.3 for more general details over the BRT systems). At the base of it, stays a comparative research between the BRT systems implemented in Curitiba, Bogota and Guangzhou – considered as some of the most successful cases to date.38 This research is presented in the Annex 3.

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**Figure 117: The principles of the BRT trunk and feeder system.**

The basic principles of the system are laid out in figure 117 while the entire proposed system is shown in figure 118. In essence:

- The trunk lines consist of dedicated bus lines located in the middle of the roads, in most of the cases the primary road structure and are serviced by regulated, high quality bus services.
- The feeder lines consist of a network of good quality collector roads (at minimum paved) and are serviced by paratransit vehicles.
- The transfer between the two lines is realized at the transfer stations, of the type described previously.

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38 According to GTZ among other sources.
The proposal, including trunk and feeder lines, stations and main public amenities, services and main activities, and functions, have also been placed in Google Earth for much easier visualization (fig. 119).

THE TRUNK LINES

The trunk lines are serviced by regular, high quality and safe BRT buses. These are supposed to connect easily the passengers to the main centers, activities and other transportation means in the city. In addition from being connected to the feeder lines, the trunk lines are directly connected to the ferry and airport terminals, ensuring their integration at the regional and international levels.

39 The link to the data can be accessed here in Google Earth: https://gec-member-centric-locations-a-googleproductforums-com.googlegroups.com/attach/1761f854bd0ad417/b5dd571a-3598-4068-9ebf-0c039492576a.kmz?gda=71t5UYAAABCOOd7mGLZDIT2ocKdiKBH5nc9sDAFz2JGA//dx2d4ObESSfweF3DnnkMpcL3QZx40jamwa1UU9qDcgHarKEE-Ea7GxYMt06nY0uV5Fiq&pli=1&view=1&part=4

Figure 118: The entire BRT system with the trunk feeders and stations.

Figure 119: The BRT system in Google Earth (see footnote).
The trunk lines are located in the central part of the primary roads, and will serve stations located in between the lines (island type) such as in Bogota case (fig. 120). This way the system can save space and costs, as compared with the variant of stations on each side of the bus lines (like in Curitiba case).

![Figure 120: The proposed cross section and plan of the BRT trunk line. The grayd out buildings are not part of the proposal.](image)

There are three BRT lines which are proposed through this project, each connecting distinct functions and parts of the city. The technical details of each of the three lines can be found in table 12.

<table>
<thead>
<tr>
<th>Table 12: the BRT lines details.</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>BRT line 1</strong> (blue line)</td>
</tr>
<tr>
<td><strong>Main stations</strong></td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td><strong>No. of stations</strong></td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td><strong>Total length</strong></td>
</tr>
<tr>
<td><strong>Total travel time</strong></td>
</tr>
<tr>
<td><strong>Average distance between stations:</strong></td>
</tr>
<tr>
<td></td>
</tr>
</tbody>
</table>

The BRT line 1 is the first proposed to be built, and it will connect Sagulung to the rest of the city and the main production areas. It is meant especially for people to more easily reach main production areas and work opportunities, as well as connecting to the main services the city center has to offer.

Very important for this line is to provide through its transfer stations the following amenities and services (fig. 121):

(i) additional social housing and community spaces in the Sagulung Centre TS, where a new sub-centre is envisioned;

(ii) worker’s dorms, employment facilities and easy access to the industrial park in Batu Aji, Sentosa, Batamindo and Cammo stations; and

(iii) student dorms and easy access to the higher education facilities at the Batam Maritime Academy and Politechnic of Batam

(iv) fast transfer and investment promotion services in Batam Centre, where it connects to the international ferry to Singapore.
The line intersects with BRT line 2, direction Batam International Airport and New Batam Harbour, in Cammo Industrial Park TS.

![Figure 121: The BRT line 1 connects workers and residents from Sagulung district to the main industrial parks in the island and the rest of the city.](image)

The BRT line 2 is the ‘investors’ line’ as it will connect the International Airport to the New Batam Harbor, passing through the financial center of the city located in Nagoya Hill. This line is supposed to introduce and facilitate the potential investors towards the main investment opportunities in the island. This line also connects with the other two BRT lines and hence it provides easy access in all parts of the island using the BRT buses (fig. 122).

Very important for this line is to provide through its transfer stations the following amenities and services:

(i) fast transfers, high quality tourism facilities and investment promotion services in the International Batam Airport and Harbor Bay TS, where it connects to the airport and the international ferry to Singapore respectively;

(ii) additional social housing and community spaces in Ruko Menalagi and Pasar Botania, where new sub-centers are envisioned;

(iii) worker’s dorms, employment facilities and easy access to the industrial park in Tunas, and New Batam Harbour TS.

![Figure 122: The BRT line 2 connects the airport to the new harbor and it is the line of investment promotion in the city.](image)

The BRT line 3 is the ‘oil & gas line’ as it will connect two of the most oil & gas activity centers in the city: the Sekupang and the Batu Ampar area. By this it is supposed that new synergies will appear through the transfer between the two (fig. 123).

This line is supposed to be implemented the last, at a time when the development will start squeezing even more the outside boundaries and the green spaces in Sekupang. Through this line it is hopped also that the natural protection areas in the district will be spared, by pulling in the development towards the transportation line.

Very important for this line is to provide through its transfer stations the following amenities and services:
(i) additional social housing and community spaces in Sekupang Centre and Tiban Centre, where new sub-centers are envisioned;

(ii) fast transfer services to the ferry, worker’s dorms, employment facilities and easy access to the Sekupang Ferry terminal, located near the Sekupang Oil & Gas Industrial Park;

(iii) student dorms and easy access to the higher education facilities at the UIB station.

**THE FEEDER LINES**

The feeders connect with the trunk lines at the transfer stations. These are operated, in an initial phase, by paratransit operators in time, function of the market response, the authorities could consider regulating the services on some of the collector roads.

There are two essential roles that the feeders fulfill in this project (fig. 124):

(i) it helps integrating the BRT trunk network at the sub-district level; and

(ii) it provides basic improvements in the areas where these reach.

At minimum, even if the paratransit might not follow the collector roads, the improvement of these roads (e.g. the paving, the utilities’ installations underground, the pedestrian facilities) will bring a positive impact to the living conditions in these remote, but relatively densely populated areas, such as it is the case in the Sagulung social housing areas.

**OPERATION AND FINANCING**

Both the trunk lines and the feeders infrastructure will be built, controlled and managed by the public authorities through a special administration body (see the ‘improving administration strategy’ above), in the limits described previously. The service operation on the feeder lines is provided by the paratransit operators that will not be controlled by the authorities. For the trunk services, the project proposes that the authorities will organize a public bidding for conceding the BRT buses operations, after which they will close through a
competitive contract with more than one private bus operator. Several options are suggested by GTZ in table 13. (GTZ, 2004b)

Table 13: Competitive arrangements for bus services (after GTZ, 2004)

<table>
<thead>
<tr>
<th>Arrangement</th>
<th>Characteristics</th>
</tr>
</thead>
<tbody>
<tr>
<td>Public monopoly</td>
<td>Authority owns and operates the system</td>
</tr>
<tr>
<td>Management contracting</td>
<td>Authority owns the system, hires management</td>
</tr>
<tr>
<td>Service contracting - gross</td>
<td>Revenue goes to authority, bidders compete for production cost</td>
</tr>
<tr>
<td>Service contracting - net</td>
<td>Revenue goes to operator, bidders compete for cost and revenue</td>
</tr>
<tr>
<td>Franchising</td>
<td>Authority may specify some parameters of the services</td>
</tr>
<tr>
<td>Quantity licensing</td>
<td>Limit on number, enough to generate competition</td>
</tr>
<tr>
<td>Quality licensing</td>
<td>Any operator who meets quality criteria can operate</td>
</tr>
<tr>
<td>Open market</td>
<td>Free entry, with a few basic rules</td>
</tr>
</tbody>
</table>

As regards finance, in Curitiba the system is self-paying itself, though at the beginning they did used subsidies from the central government to implement it. Among the approaches they used was also capturing the land value increase. Practice show that the value of the land in the vicinity of a public transportation system will proportionally increase with its location, in time this continuing to increase (fig. 125). Another source to help recover the costs of the system can be drawn from the taxes on the properties and businesses that will develop along the transit line.

Very important for the financing of the system is also the public-private partnership approach, considered one of the key recommendation points from the research done by Zeng overs the Chinese SEZs and industrial clusters. The author states that authorities do not necessarily finance everything with its own resources, even in public infrastructure. For example, in the early stage of Shenzhen, joint ventures and private developers from Hong Kong helped develop some basic infrastructure (Yeung, Lee, and Kee 2009 according to Seng, 2011). In the Puyuan sweater cluster in Zhejiang, the local government formed a shareholding company with 27 private logistics and transport firms to build the cluster’s logistics center (Ruan and Zhang 2008 after Zeng, 2011).

6.4 ISLAND LEVEL INTERVENTIONS (B): THE NEW HARBOUR

Essential for realizing the objectives under the ‘creating the conditions for investment and innovation’ is the building of a new harbor that will support the development of a shipbuilding and the oil & gas industry cluster. The recommendation came from the study of the Dutch Maritime Cluster (DCM) (see text box 11 below). Learning from the Chinese example, the cluster facilitation should take place after a cluster has been identified. In the case of Batam, research shows that there are roughly about 70 companies (such as suppliers, shipyards, design and logistics services, etc.) specialized in this sector (see Annex 2). Some of these are major international companies in the oil & gas sector, such as Mc Dermott, or shipyard sector such as DryDock.

Looking at the present situation, one can conclude that so far Batam did not profit enough from its strategic position, currently the city still depending on the harbor infrastructure located in Singapore. Through this new harbor, the authorities will have a unique opportunity to better establish its position in the region and improve their image in order to balance up its declining competitiveness.
According to Peeters et al, the Dutch Maritime Cluster (DMC) is comprised of eleven maritime sectors, which comprise ports, shipbuilding, maritime suppliers, offshore activities, shipping and others (Nijdam and de Langen, 2003, p.2) (fig. 126).

The port sector is the largest sector in the maritime cluster, providing 29% of the value added and 19% of the total employment, followed by offshore, with 12%, and navy and maritime suppliers on the same place each with 9%. The smallest sector is made by the fishing sector.

Judging from the case of Rotterdam, new harbors require more and more space. From an average plot size of 25,000 m2 as it is Waal – Eemhaven, the new Maasvlakte reaches 800,000 m2. Important is also the way the harbor connects to the city. In the case of Rotterdam there are road connections but also rails providing full options for the logistic companies. For this reason, the BRT system might prove essential to the development of the new harbor as well (fig. 127).

The shipbuilding sector has the largest average company size, aside of the Navy. Both the turnover and number of employees in this sector are twice as high as in any other sector. This is because of the capital intensive nature of the industry and the relatively large ‘minimum efficient scale’ (idem, p.5).

The shipping industry is a capital-intensive sector: it has the highest turnover per employee. Inland shipping and the yacht-industry are characterized by a large number of small firms and the number of large firms in both industries is very small too. Most large firms are active in shipbuilding, shipping and the ports industry. A number of large firms are active in a number of sectors included in the cluster. Large firms, over 100 personnel, in the cluster are Vopak, P&O-Nedlloyd, Boskalis, IHC-Caland, Fugro, Smit-Internationale, Damen, ECT and others.

Shipbuilding is the most embedded sector in the cluster, having connections with all the other sectors. Ports, maritime suppliers and inland shipping are following. Almost 50% of the shipbuilding sector’s output is supplied to other firms in the cluster, just as much as the Maritime Suppliers. The shipping industry is a capital-intensive sector, meaning that it has the highest turnover per employee. Inland shipping and the yacht-industry are characterized by a large number of small firms. The number of large firms in both industries is very small.

In the case of the DMC, most leader firms are in between ordinary small and medium sized firms and multinationals. Compared with multinationals, the DMC leader firms are much more embedded in their ‘home nation’ having a large number of local partners that assist them in their innovation and production networks. Because of this situation it can be assumed that the DMC is more of an hub-and-spoke cluster type.
The new harbor location it is proposed in Batu Ampar, extending and creating new areas around this original core of shipping activity in the island. In a similar way to the BRT transfer stations, which continues and boosts the current activities where they are located. It is also possible, for matters concerning space and accessibility that the new harbor could also be built on the east side of the island, in the Kabil area in Nongsa district, where currently there is still plenty of land available. This depends however on the market or the private companies that would want to participate in the project (fig. 128).

It is important however that the harbor will have space enough to develop and remain competitive over a long period of time. For this reason it might expected that new reclamation areas around this core will appear.

In the best case scenario, the new harbor will partially complement, if not replace at the national level, Singapore’s harbor activity.
It is important in order to facilitate the cluster development, to create a good flow of people and goods between the new harbor and the rest of the island. Hence, at the district level the intervention proposes the upgrading of several strategic roads that better connects the two sides of the Batu Ampar / Bengkong area.

At the island and regional level, the new harbor will be connected by the BRT system which ensures fast connections at the regional and international level, through the integration of the ferry and port terminals to the transportation system. In addition the BRT system will connect the harbor with the rest of activity centers in the island including the industrial parks, R&D institutions and the CBD and the administration centers. This way the harbor can stay at the center of the economic activity of the city, even if is located in the NW corner of the island.

Important for the cluster formation is the BRT line 2 and 3 (red and green in fig. 129) Line 2 will connect the harbor to the airport and the CBD center of the city. Line 3 connects the harbor with the oil & gas industrial activities located in the Sekupang area.

**6.5 CONSIDERATIONS FOR IMPROVING THE ADMINISTRATION**

As mentioned already the strategy in addressing the administrative issues, is to create a unique one administrative body, such as an institution, independent from the political structures of the city which can plan and implement the interventions.

The Curitiba’s example and the Shenzhen case, the local authorities play an important role in the development of the cities. Similarly, Zeng (2011), Porter (1998, 2000) and other scholars, emphasize the crucial role the local authorities plays in creating the conditions and fostering development for the cities. Zeng gives seven essential points for other governments or authorities that wish to learn from China’s industrial experiences. These include, among others, ‘a strong commitment from the top leadership’ and a ‘proper role of the government’ (see subchapter 3.5). But, as Bhagwati (2004) put it in discussing growth, “growth was not a passive, trickle-down strategy for helping the poor. It was an active, pull-up strategy instead. It required a government that would energetically take steps to accelerate growth through a variety of policies including building infrastructure such as roads and ports and attracting foreign funds.” (after Zeng, 2011)
UN-HABITAT is recommending a Local Economic Development or LED approach, which is “a process-oriented and non-prescriptive endeavor” that takes into consideration (i) the local values (such as poverty reduction, basic needs, local jobs, integrating social and environmental values); (ii) economic drivers (value-added resource use, local skills training, local income retention, regional co-operation); and (iii) development (the role of structural change, quality of development). 40 In addition, as discussed in the theoretical framework, the administration (i.e. the local authorities) needs to balance both the public / civil society as well the private needs / market of the city and intervene when the market fails to achieve the desired objectives. (fig. 130)

As indicated in theoretical framework, the public authorities need to address a broad range of issues within the city from environmental protection to urban, society and economic development and growth (see the tree model explanation in subchapter 2.5). The role of the governance is twofold. On one side creating the conditions for the growth to happen – for example by building better infrastructure, establishing special marketplaces, technology innovation platforms, R&D centers – and on the other side it regulates and controls the development. Zeng emphasizes the importance of a consistent and efficient legislation, conducive to business and social environment.

In doing so, a comprehensive set of clear benchmarks (addressing among others the economic, technological and social objectives) needs to be defined and evaluated periodically to give a reference to the position of the city with regards the progress made. Function of the evaluation the administration will either continue applying the same development strategy or will improve it. Such benchmarks can be set targets for the GDP growth, employment percentage, volume of exports and FDI, number of civic associations, number of patents registered, number of higher education and research institutions, number of specialized companies, etc. These steps are explained in the strategic planning recommendation from UN-HABITAT and EcoPlan International (fig 131).

Specifically in order to help the economic growth development, Zeng recommends four areas that an effective local government support should offer: the infrastructure building; the regulation, quality assurance and standards setting; technology, skills and innovation support; and, preferential policies and financial support (p. 29) (fig. 132).

VII. EVALUATION
Shipbuilding is strongly represented in Batam. Here a large ship is being repaired in a floating dock (photo by Bobbie Arch)
This chapter deals with the evaluation of the final results. It consists of two parts, one assessing the spatial intervention results and the other assessing the shipbuilding industry in the SE Asia region and worldwide, in order to evaluate the success of the cluster proposed for Batam.

PART A: ASSESSING THE BRT SYSTEM

As already mentioned in the presentation of the island, the local authorities already have in plans to implement a public transportation system by the year 2017. This is part of the national strategy to expand the railway network. The plans take into consideration a monorail system with two lines (see fig. 51) which have a similar layout as for the BRT lines 1 and 2 proposed in this project. The financial estimation was done both for the monorail, estimated at IDR 2.39 bil (€200 mil.), and railbus option (a system similar to a tram) estimated at IDR 2.11 bil (€175 mil.).

Compared with the BRT bus system, these authorities’ proposal is less flexible, takes more time to implement and is more expensive to implement and insure maintenance (such as improving the runway system or the carriages). A rail system comports more complex technical solutions that needs more time, materials and labor to implement. In addition, if we speak about the monorail system, the built of the overhead stations, can add much to the costs of project. A bus system practically uses the same road surface as normal cars, though in the case of BRT some specific changes should ensure the separation between the car traffic and the bus lanes. In terms of costs, a study by the United States Government Accountability Office found that the average capital cost per mile for bus ways was $13.5 million while light rail average costs were $34.8 million, meaning less than half of the rail version.

Table 14: Comparison between the monorail and the BRT system.

<table>
<thead>
<tr>
<th>Monorail System</th>
<th>BRT System</th>
</tr>
</thead>
<tbody>
<tr>
<td>+ occupies less soil surface creating more room for activity at its base</td>
<td>+ less expensive to implement, maintain and upgrade</td>
</tr>
<tr>
<td>+ more environmentally friendly if it operates on electricity</td>
<td>+ it is easier to maintain and upgrade;</td>
</tr>
<tr>
<td>- an expensive solution to implement, upgrade and maintain;</td>
<td>+ requires less technical skills to operate;</td>
</tr>
<tr>
<td>- less flexible in terms of layout modification;</td>
<td>+ contributes more to the spatial quality of the city by allowing the passenger to drop-in and –out at the street level</td>
</tr>
<tr>
<td>- less appealing effect at the spatial level;</td>
<td>- occupies more street space;</td>
</tr>
<tr>
<td>- requires more training to operate and maintain it</td>
<td>- it can be more polluting if it operates on fossil fuels</td>
</tr>
</tbody>
</table>

Source: the Ministry of Transportation – Directorate General of Railways presentation from February 2012.

From a spatial point of view it is expected that the introduction of public transportation, especially in the poorer areas of the city, such as the social housing areas, will create a virtuous circle of growth (i.e. the living conditions will improve, one improvement drawing another and so forth). Power (2012) suggests that more collective transportation means can lead to multiple benefits for the people and the society and the city as a whole. Also according to the land value curve theory, (i.e. the concomitant increase of the land value along the transportation lines) it is very likely that spatial upgrades in terms of functions and quality will take place in the close proximity of the stations and public buses path.

It can be expected that in a first phase the houses near the stations will change their function allowing more commercial or mixed functions. In time, with an increased power of purchasing, the residents are expected to buy neighboring plots and add to their own house creating larger and better houses. Possibly green spaces (such as gardens) might appear after some residents will leave, positively influencing the atmosphere of the neighborhood. In time, as the transit increases it might lead to the enlarging and opening of a second public transportation line along an adjacent street. This again might attract new functions, probably different than retail and commercial, such as schools, day care, general practitioner, etc. (fig. 133)

These changes will ultimately depend on the market and local conditions. Nevertheless, in the light of the above observations these changes are likely to occur, if not in detail, at least in more general lines.

An interesting discussion is related to the recommended plot use ratio, or the number of floors of the building. Along the trunk lines it is recommended for minimum four floors to be built while near the transfer stations, in a radius of 400m or 5minutes walk following the TOD strategy, this ratio doubles. In the present conditions it is however hard to believe that these plot use ratios will be achieved. A possible way to address this issue is following the Chinese planning authorities way of ‘learn as you go’ and/or ‘experimental learning’ (Bruton et al., 2005). For example, at first the authorities can apply a more strict application of the height regulation and function the results they can take other approaches (such as using incentives to reach the height, adjusting the height, working in public – private partnership to realize certain key projects, etc.). Here the role of an active administration, engaging both with the public and private parties (such as communities, developers, companies, etc.) plays a crucial role in realizing the proposed plan and taking advantage of the transportation system and the land use.
PART B: ASSESSING THE MARTIME CLUSTER

Currently, the shipbuilding industry in Batam is facing the competition from other hubs in the South-Asia / Pacific region. According to a 2009 comprehensive report on the European competitiveness in shipbuilding industry, Japan, South Korea and China are the most important players in the region even at a global scale level (ECORYS, 2009).

According to Clarkson Research’s World Fleet Register China is the largest shipbuilding nation of the world and it will continue to be so, in this moment fulfilling almost half of the total global demand. Six nations out of the top ten are located in the SE Asia. These nations are China (#1), South Korea (#2), Japan (#3), Philippines (#5), Taiwan (#8) and Vietnam (#9) (fig. 134).

Nevertheless Batam has more chances to directly compete with the newly emerging shipbuilding nations in the region, Vietnam, Taiwan and Philippines, which are competing on the low cost advantage\(^1\)

The Philippine’s’ case appears interesting because in the recent years, it gain a lot of momentum given the fact that Japan and South Korea made this nation as their preferred destination of FDI. A study by Japan International Cooperation Agency (JICA) and Nomura Research Institute (NRI) from 2011 show that the Philippines has the potential to become a shipbuilding and repair center for oceangoing merchant and fishing vessels in Asia-Pacific, because of its location and natural conditions, abundant labor and fiscal incentives.

The country hosts some of the world’s leading shipbuilders: Japan’s Tsuneishi, South Korea’s Hanjin and Singapore’s Keppel. These companies build ships such as bulk carriers, container ships and passenger ferries. In the past, industry output was limited to small ships, tankers, barges, and fishing vessels, but with the entry of big shipbuilders, like Tsuneishi Heavy Industries of Japan and Hanjin Shipyard of Korea, ships with large tonnage capacities are being built. Marina data shows that the shipbuilding industry employs about 39,000 workers, including over 50,000 engineers and architects.

The Philippine’s Board of Investments approved incentives in favor to Filipino-owned ship repair facilities in order to improve and enlarge their shipyards. Today there are 121 shipbuilding and repair facilities in the country. According to the same research by JICA and Nomura, Philippines is in the position of becoming a ship repair hub in the Asia-Pacific region for oceangoing merchant and fishing vessels, taking advantage of its strategic location to the region’s shipping routes

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\(^{1}\) From OECD presentation ‘Activities of World Shipbuilding FDI’s in recent years’ (link: http://www.oecd.org/industry/industryandglobalisation/41822177.pdf)
THREE SHIPBUILDING SCENARIOS FOR THE NEXT 30 YEARS

In order to evaluate the final result of the interventions proposed, we can run a sensitive analysis using the scenario planning. Each scenario will be evaluated function of the eight factors resulting from the ‘tree model’. The scenarios consist of three possible futures of the global shipping industry in 30 years’ time and they had been developed by Wärtsilä Corporation.

Two certainties at the core of these scenarios are: (1) shipping will continue to be part of the transportation matrix; and (2) fresh water will become more and more valuable.

The scenarios are based on 5 uncertainties: (1) trade and economic growth, (2) response to climate change and sustainability issues, (3) geopolitical issues and global leadership, (4) solutions to deal with scarcity issues, (5) control of power which can vary as indicated below and which describes further more each scenario (fig. 136). In short the Wärtsilä scenarios are:

1. Rough Seas – the natural resources - water and food especially – are becoming more scarce, the security of the world is under threat, sea-transportation needs advance security and natural resources are more often than not traded between countries;

2. Yellow River - China is becoming the world leader, in terms of trading now it become and import and consumer country and not anymore an exporter; it is also the largest sea trader, being concentrated on shipping efficiency and energy conservation;

3. Open Oceans – the world is truly globalized, there are trading relation between each country, and much is focused on sustainability and environmentally friendliness; tourists are traveling much more than before, using latest class cruise liners.

More details over the scenarios evaluation in the case of Batam are in table 15.

Table 15: Summary of the Wärtsilä scenarios and their effects on Batam.

<table>
<thead>
<tr>
<th>Rough seas</th>
<th>Yellow river</th>
<th>Open oceans</th>
</tr>
</thead>
</table>

![Figure 136: The five uncertainty variations in Wärtsilä scenarios (after Wärtsilä Corporation, 2010)](image)

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64 The document I used for inspiration for these scenarios can be found at this link: http://www.shippingscenarios.wartsila.com/Wartsila_Shipping_Scenarios_2030.pdf

- Batam begins exporting natural resources mainly to China, Singapore and other rich nations in the region:
  > the shipyard industry is boosted, the new harbor is enlarged and the BRT system is essential in connecting the whole island together.
  > this also boosts the competitiveness of the island and the cluster formation
- Batam also develops more its agriculture, adding to the industrial base of the city, improving the urban diversity and contributing to the living - working integration:
  > the houses with the vegetable gardens, and the urban gardens prove to be a good strategy for people to pass through the crisis;
  - Nevertheless, the human capital remains low, the scarcity of the resources affecting the re-distribution of wealth and worsening the social balance in the city:
  > on the background of the oil crisis not all BRT lines will be built
  > few public amenities are built
- China becomes a major importing nation and an consumption society, Batam overall profit from this through its Chinese minority and by exporting natural resources:
  > the shipyard industry is developing and the harbor activities are intensifying;
  > the BRT system is implemented entirely (all 3 lines) through public-private partnerships with the Chinese investors
  > the industrial basis is developing being stimulated by new investors which introduce new industrial activities in the island
- The social balance is improved and more public amenities are developed by the city but also by private investors, now that more people enjoy an increased prosperity;
  > urban sprawl is better contained in order to use more efficient the land
- The policy environment is partially improving, stimulated by the attraction of new investors
- The trans-shipment increases and Batam benefits from its new, harbor that works together with Singapore in addressing the global trading needs;
- The BRT system proves an useful transportation mean to attract tourists and investors in the island even in the remote corners;
- The more globalized conditions are still influencing companies to act in a ‘footloose’ way;
> all the BRT lines are developed and the working and living relation is improved

**CONCLUDING REMARKS**

The previous scenarios concerned in particular the shipyard and harbor activity and seem to favor the development of these activities further, no matter what the future will bring. Even if it is a resource crisis or China dominating the world, the shipping industry, with its connective activities, appears to survive and develop further. However the competition from the region might pose similar challenges for Batam as it currently does for the manufacturing industry, i.e. the main investors might still chose the cheaper place in Vietnam or Philippines – main competitors for Batam in the same industry profile.

For this reason, the Bus Rapid Transit (BRT) system, which connects the different activity centers of the island and integrates them at the regional level, might prove the ‘make or break’ element in determining the development of the cluster and the continuous support of the city development. In addition, the BRT transfer stations can act as main gateways for investors and businesses, by promoting the development opportunities in the island. These can also create a more professional, competitive and reliable image of the governance and the city as a whole. Of crucial importance is, for the current administration of the city to overhaul and take a more pragmatic, active and flexible approach to the city development, while including in the decision process the public and the private parties.
VIII. FINAL CONCLUSIONS
Photo of an assembly line in a factory in Batam (foto by the author with the permission of the responsible personnel)
8.1 GENERAL CONCLUSIONS FOR THE CASE STUDY

According to the vision of the local government, Batam is to become “the City with rapid growth of development, and be parallel with other metropolis in the future”. The city aspires to become an important regional trade and industrial center and a social and administration model. Yet the city’s ambitions are confronted by important spatial and economic problems that seem to aggravate as time passes due to the current administration issues.

The main question of this project was:

What could be the best strategy for Batam to improve the living conditions and development chances of its residents, while also creating new investment opportunities to benefit both the city and the industry?

and the objective of this graduation project was:

To develop a combined strategy that can tackle Batam’s urban and economic – administrative problems, in order to improve on the long-term the life quality and investment opportunities of the city by creating conditions for personal development and private investment to happen.

In doing so, the final proposal addresses (i) the poor housing conditions; (ii) the reduced public mobility, (iii) the degrading ecological balance and (iv) the competitiveness loss in one strategy. At the base of this proposal stays a Transit Oriented Development (TOD) plan that uses a Bus Rapid Transit (BRT) system as main public transportation means. To address in particular the economic decline and (v) the administration issues, the strategy also looks into the industrial clusters theory and the China’s SEZs governance examples.

In solving these problems, the final proposal created destination activities and along the main BRT trunk lines, based on some already existing activities (such as industrial parks, important commercial, education and religious centers, etc.) that can be identified in the city. Special attention has been given to the transfer stations, where passengers changes between the different transportation and large flows of people are expected. Here additional functions such as affordable housing solutions, social and commercial services, and meeting and interaction spaces have been created in order to profit the residents especially those from the lower and middle income groups. The objective is for the transfer stations to help developing new sub-centers for the city, and prevent the long distance travelling for most of the needs.

For addressing the competitiveness loss, the proposal recommends the development of a new modern harbor infrastructure that is supposed to help developing a maritime cluster. The BRT system will play also an important role in helping this industrial cluster to develop, by connecting closer together the various activity centers in the island and integrating them better at regional and international levels through the special transfer stations located at the airport and ferry terminals. In addition to integrating the cluster functions to the regional and international levels, these transfer stations will also help attracting private investors and new businesses in the island by providing promotion services and special business and tourism oriented amenities (such as conference and meeting facilities, hotels and professional legal and assistance services).

Of crucial importance and paramount for the success of this proposal is the administration improvement. In addressing this issue it is essential first for the double administration government over the land to be replaced by a single, autonomous planning body (such as an urban research and planning institution). This new institution need to actively engage with the public and private actors and act in a pragmatic way in implementing the spatial interventions. A strict system of evaluation and monitoring of the interventions, based on, among others, a set of social, economic and technological benchmarks, needs to be implemented in order to give an indication to the planning authorities of weather their strategies reach its intended objectives, or needs to be adjusted. For this reason a phasing scheme is also included in the final proposal.
In brief the final proposal is:

- for improving the housing conditions, especially for the lower and middle income groups, the project proposes building affordable housing for targeted groups (such as workers, students) on top of the transfer stations of the BRT system, leaving the GF and the 1st floor for mix-use activities and transfer between the BRT buses and other transportation means;

- for improving the public mobility it proposes a trunk and feeder BRT system, that connects the main activity centers, productivity areas and functions in the city, and integrates these at all levels, from sub-district level to the international level, via transfer stations that ensures easy transfer between local roads, ferries and airports;

- for improving the ecological balance, the project proposes a scheme to restore the green areas in the city (by removing the illegal activities and replanting trees for example) and create agricultural land, in areas that are underused, and parks in the areas that come under the pressure of development.

- for improving the competitiveness, the project proposes higher education and research facilities integrated or with direct access to special transfer stations in order to create opportunities for the residents to upgrade themselves, in addition to promoting investment opportunities in the island, by means of other special BRT transfer station located at the airport or the international ferry terminals;

- for improving the administration, the project proposes the creation of a single authority body that will deal both with the land use development and the transportation planning and implementation in a more strategic and pragmatic manner.

The objective of the final proposal is to create the conditions for further development and investment (namely private) to happen. This will help the recovery of the competitiveness and positively influence the growth of the city. But, it is possible that this will not work as such. Nevertheless at the minimum, even if the expected private development and investment will not take place, the living and working conditions in the city will still be improved, by the presence of the public transportation and the increase of the social housing availability.

### 8.2 KEY POINTS AND LESSONS LEARNED

This part is based both on the literature research and the central case study and it includes important observations and lessons that can be used for other industrial cities in the same situation. Similar to Batam there are thousands of other industrial cities that are confronted with poor housing and working conditions, reduced mobility and administration issues. However there is no ‘one size fits all’ approach. Any situation is different and it depends largely on local social and economic factors that can vary in time.

- **The importance of a strong, committed and autonomous planning authority.** In all the examples and cases presented in this thesis the role of the local authorities proved essential in achieving the success of the cities or clusters. Scholars over-emphasize the importance of this point as well. The local authorities must create a reliable and consistent legislation and make sure to implement and monitor it without creating unnecessary bureaucracy, which can detract investors and new business development (Zeng, 2011).

- **Ensuring strategic, pragmatic and flexible governance.** This should balance well between the social and economic needs of the city and take into consideration the specific development needs, the economic drivers and the local values. A set of goals and objectives, defined by clear benchmarks that closely monitored and evaluated considerably helps to put on the right path the development strategy. The example of the Chinese authorities, which applies a ‘learn as you go’ and a ‘step-by-step’ or ‘gradualist’ approach, should be followed by more local authorities that wants or are pressured to adopt new economic reforms (Zeng, 2011, Bruton et al. 2003).
• Use public – private partnerships and a competitive contract concession public projects and services. Local authorities should make better use of these techniques in order to build important city infrastructure (such as roads, harbor, research and education institutes, etc.) and realize competitive public services (such as public transportation). In addition to covering part of the expenses, this strategy helps the authorities to come closer to the private parties and reach a final project that will be more successful on the long term. In addition, this strategy might save money from the public budget that could be more easily used for addressing other needs for the city. Ultimately this is the way to realize a win-win situation in which both the city and the private parties have gains (UN-HABITAT, 2005, Zeng, 2011).

• Determine the potential for growth and help it develop further. In the case of Batam, the city has a strategic position, near Singapore and on the busiest sea trade route of the world. Nevertheless it appears that the authorities are not profiting enough from this. Starting from this unique advantage many other growth potentials can be identified and helped to develop, such as the maritime industry – shipyards, offshore services and technology, harbors, logistic centers and shipping services, etc. Zeng (2011) mention four support roles that an effective local government should offer: the infrastructure building; the regulation, quality assurance and standards setting; technology, skills and innovation support; and, preferential policies and financial support (Porter, 2000, Zeng, 2011).

• There is a link between the living quality and the city’s overall competitiveness. Economists, planners and other scholars and professionals recognize the positive effect a higher standard of living has on the attraction and development of high value-added industry. Wong and Tang write that ‘factory towns’ only cannot develop such industry. Also Philips company realized this when it started developing the Philipsdorp in Eindhoven at the beginning of the last century. Nevertheless, it is not easy to appreciate which factors can improve both the living quality and the economic forecast (Porter, 2000).

8.3 FURTHER RESEARCH

The theoretical research in the beginning of this thesis presents some limitations. The two city cases, Eindhoven and Shenzhen, have not been studied in a methodological manner after a given set of parameters and clear defined benchmarks. Even though it is based on generally available data from various reliable sources (such as scientific articles, official reports, etc.) the research and the conclusions are empirical, reflecting the background and position of the author. To a certain extent such an interpretation of the facts is inherent to any design or planning decision.

Similarly the selection and presentation of the examples and case studies might also present some shortcomings. Though most of these are focused on similar industrial conditions to the central case study, they are spanning over a large geographical area that involves important socio-cultural and economic differences. From the late 19th early 20th century European context, to the present Chinese SEZs and the Latin American cities, to arrive to the current Dutch maritime cluster case and the multinational private corporations’ behavior, the research focused on essential data that could be used in the case of Batam and hence it was relevant for the final proposal.

It is interesting however, and this motivated the broad research involved in this proposal, for more attention to be given to the relation between the spatial interventions and effects on the competitiveness. Cities are recognized to appear, develop and grow on back of an economic activity, such as industry and manufacturing, services, etc. But despite this obvious fact there is still not sufficient theory developed to bridge the gap between the spatial needs of the city and the economic competitiveness it needs to maintain. So far, most research linking the economic competitiveness to the spatial development arrives from the economists’ side, but this does not translate in a concise theory or a model. Van Winden and van den Berg constitute an exception in this discussion, their research providing an applicable model for linking the two.
Apart of this need of more theoretical background, a more specific research should be made in the governance and planning models the SEZs cities apply. There are more than 3,000 SEZs areas around the world most of which having the potential to attract migrant workers and growing into large urban-agglomerations or cities. How do we provide housing for these newcomers the overwhelming majority with low and middle incomes? Or education, training, health and other social services? What spatial interventions are the most effective on the long term?

Most of the good practice lessons in terms of planning and governance appear to arrive from China, given the fact that some of these are among the most successful examples currently. The local authorities there appear to make impressive steps in terms of balancing the economic and social outcomes. Several industrial clusters around Shenzhen, Shanghai and Beijing seem to set new governance trends that foster the needs of both the market and civil society. Considering that 19% of the total number of SEZs worldwide is concentrated in China, one might say that the Chinese authorities are experts in SEZ development. Just over half of these are privately run and operated. According to the data in China there are more than 1,500 industrial parks, concentrated in over 187 SEZ areas.

If one studies the evolution of industrial planning theory in Europe, it will observe that there is a considerable gap in between the late 19th and early 20th century industrial towns, such as Philipsdorp, DSM, Stork and others, and the late 70’s when China began its ‘open doors’ policies and started developing special economic zones such as Shenzhen. Considering this gap in the evolution of the urban planning knowledge and the fact that China have developed more SEZ areas than any other nation, it is expected that a more careful and in-depth research over the spatial strategies and planning policies of the Chinese authorities vis-à-vis industrial planning will provide an important contribution to the current planning theories. And not only in terms of spatial interventions, but also in terms of evaluating and benchmarking the progress of their strategies and in the governance system they apply.

I hope that this thesis will bring more consideration to this fact and that more actions will be taken to help transferring the Chinese industrial city planning expertise to this side of the world.

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66 Source: Zeng, 2011
67 Source: FIAS, 2008
REFLECTION

As part of the graduation programme, a personal reflection on the thesis is required. I can understand the importance of this; because in my opinion it helps me better to evaluate my own progress. The reflection assignment comports the following questions that need to be addressed:

What is the relationship between the project and the wider social context?

What is the relationship between the theme of the studio and the subject/case study chosen for the research?

What is the relationship between the methodical line of approach of the studio and the method chosen for the research?

What is the relationship between research and design?

From motivation to final product

This project started at the end of 2011, initially as an internship assignment under SHAU, a Rotterdam based architecture and urbanism company, for the 5th International Rotterdam Architecture Biennale that took place the following year. However, my attachment to the subject came during an in-situ trip that took place over about three months from November 2011 to February 2012. Coming from an European context there were many things that impressed me at first, even though it was not for the first time I travelled and worked in Asia.

From all of them I was the most impressed of the large difference between Batam and its sister–city, Singapore. The two cities begun developing in the same geographical and cultural context, but they took very different evolutions paths. Of course, the different colonial past – Singapore being colonized by the British and Batam being under the Dutch colonial powers - explains partially the nowadays result. But this was not enough to understand the present situation.

To present situation is much more easily understood through the prism of the globalisation process which lead to the division between the market and production areas. The gains for the private companies were twofold. On one side the profit margins were increasing, while on the other side the working conditions were not anymore under the scrutiny of the buyers. As such, the multinational companies that outsourced work, begun to show little to almost total disinterest to the living and working conditions of the workers. This disinterest from the contractors combined with poor control from the third parties lead to many serious abuse instances, and poor to very poor living quality for the workers.

Though Batam is in a better position than many similar industrial cities, this facts better explains the current differences between itself and Singapore. And this is how nowadays we cannot expect private companies to address the workers’ living and working conditions, such as Philips did in Eindhoven at the beginning of the last century. This is the point were actually my personal interest was hooked on, in part because, from my position from this side of the world, there was not much else to do to help improving the living conditions in Batam or in other similar locations around the world.

But the problem proved more difficult than I expected, because beyond the simple housing and roads improvement, it appeared essential if I was representing the authorities of such a city, that the market requirements and the economic competition should be also, perhaps even in the first place, salvaged. This was necessary because in such cases supporting the industry and the economic development plays a much more important role.

Yet how can one improve the competitiveness and the living quality of the city, through a spatial intervention? Literature researched gave little fruit to build upon. This is because most of the consecrated urban theories,
since Ebenezer Howard, are resting on the social and environmental side of the discussion. To a certain extent it is understandable, since most of these theories coming from this side of the globe, are reflecting the way we see the world around us and are addressing the issues we see as problems nowadays. And since most of the production operations are outsourced on the other side of the globe anyway, the only spatial problems left to deal with are how to better recovers old industrial grounds and factories.

If one studies the evolution of industrial planning theory in Europe, it will observe that there is a considerable gap in between the late 19th century industrial towns, such as Philipsdorp, DSM, Stork and others, and the late 70's when China began its ‘open doors’ policies and started developing special economic zones such as Shenzhen. Currently there is a considerable body of knowledge in China, over the industrial city planning that still needs to reach this side of the globe. Under this aspect, I hope that my thesis will bring more consideration to this fact and that more actions will be taken to transfer the Chinese planning experience also here.

*The studio and the method*

Given the double graduation track, this thesis was not conceived in a normal graduation studio. This fact contributed to the long period it took for the finalisation of this project. Not only that a studio motivates and organise the students better, but being in a studio, I came to realise, is like being in a cluster: it’s easier to pass-on and pick-up knowledge and also to evaluate yourself and be evaluated. Ultimately being part of a normal studio would have inspired and motivated me when I felt like running out of ideas and arguments to defend my choices.

Nevertheless, the project addressed the topics under the Corporations and Cities of the REH and the curricula of the Metropolitan and Regional Planning Chair of the Urbanism department. Under the corporations and cities, this thesis researched for new ways of how to interpret the relation between the private corporations and the city development. What factors acts on the private corporations to develop within a city are explained in the ‘onion model’. And not only that it looked in understanding the city development from the private corporations, but it also gave a model of how to assist city authorities in helping the city to develop. This resulted in the ‘tree model’ that fits better under the Metropolitan and Regional Planning chair. The thesis fits also under the Metropolitan and Regional Planning chair because the case study is mostly treated at the regional level, similar to the case studies research and examples.

The project approached the case studies and the research in an empirical way because of the lack of a more recent theory on the subject. In this case, it can be argued that the analysis and the end conclusions and design decisions might reflect too much of my own personal background and principles. Nevertheless I had tried as much as possible to connect at all times with all my mentors in order to receive feedback and reach a good balance between the required academic approach and my subjective interpretation of facts. In the end I do believe that the final proposal comports a fair contribution from each side and that it can be put in application in the real conditions.

*The ‘black box’ of the design decisions*

This balance between the academic / objective and personal / subjective approach constituted the object of discussion during several individual meetings with my mentors, because this stayed, in my opinion, at the base of the relation between the research and design. How much in a design is the research (the objective side) and how much is intuition and personal approach (the subjective side)? Is there a right balance? Ultimately, can it really be explained such decision?

Unlike architects, city planners need to create an inclusive design that creates new opportunities for interpretation and can easily readapt in the future. As Rem Koolhaas stated urbanism is about the potential creation. Hence, I believe that a more objective, research based, design decision needs to be taken. Also thinking from the real estate point of view, it seems to me that research based design, that evaluates the
current and estimates the future needs, has to be implemented. Nevertheless, the decision that needs to be made for a final design comports an intrinsic subjectivity that cannot always be explained or understood. As Herman puts it, this is the ‘black box’ of the process. After my knowledge, the only attempt to explain these intimate details that stays behind a design decision, was tried by Peter Zumthor in his book ‘Atmospheres’. I read that book and I hold it dear, but not as an explanation manual, in fact I doubt that this was the intention anyway, but as an experimental prose attempt.
NEXT BATAM: Fostering a resilient growth strategy

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NEXT BATAM: Fostering a resilient growth strategy


Trans Link, 2011. Transit-Oriented Communities. A primer on key concepts.


LIST OF INTERVIEWEES:

- **Wan Darussalam** - head of the Regional Development Planning Board, in interview with the author, 2012
- **Rob Fletcher** - President Director PT Philips Indonesia, in interview with the author, 2012
- **Djaja Roeslim** - head of the Real Estate Indonesia association – Batam, in interview with the author, 2012
- **Nada Faza Soraya**, Chairwomen Batam Chamber of Commerce and Industry, in interview with the author, 2012
- **John Sulistiawan** - head of PT Batamindo Investment Cakrawala, 2012
- **Agustia Wulandari** - HR Manager PT Philips Industries Batam, in interview and through correspondence over mail, 2012
- **Muhammad Wildan** - head of the Permitting Department of BIFZA, in interview with the author, 2012
- **Kris Wiluan** - President and CEO Citramas Group, in interview with the author, 2012
ANNEX 2: INDUSTRIAL CLUSTER RESEARCH IN BATAM
Fostering a resilient growth strategy
### Tables:

#### ANNEX 1

<table>
<thead>
<tr>
<th>DISTRICT</th>
<th>LOCALITY</th>
<th>TOWN</th>
<th>AREA (m²)</th>
<th>X-LOCATION</th>
<th>Y-LOCATION</th>
<th>ALTITUDE (m)</th>
<th>COMPANY NAME</th>
<th>INDUSTRIAL AREA</th>
<th>PRODUCT LINK</th>
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**Source:** [http://www.kabilindustrialestate.com/](http://www.kabilindustrialestate.com/)

**Note:** More detailed information can be found on the provided links.
CURITIBA

POPULATION (REGIO): 3.2 MIL. (2010)

TYPE: TRUNK AND FEEDERS
TRUNK WIDTH: 7.5 M
STATION SIZE: 6.5 X 30 M (LATERAL STATIONS)

WHOLE STREET PROFILE WIDTH: 90M

PASSENGERS / DAY: 2.3 MIL. (80% OF TOTAL)
AVERAGE DISTANCE BTW. STATIONS: 0.6 KM
TOTAL BRT SYSTEM LENGTH: 70 KM
AVERAGE SPEED CENTRE: 20 - 32 KM/H

(SOURCE: ITDP)
BOGOTA

POPULATION: 7.6 MIL. (2013)

TYPE: TRUNK AND FEEDERS
TRUNK WIDTH: 17 M (INCLUDING ISLAND)
STATION SIZE: 5 X 40 M (ISLAND STATIONS)

WHOLE STREET PROFILE WIDTH: 43M

PASSENGERS / DAY: 1.6 MIL.
AVERAGE DISTANCE BTW. STATIONS: 0.79 KM
TOTAL BRT SYSTEM LENGTH: 105 KM
AVERAGE SPEED CENTRE: 16 - 30 KM/H

(SOURCE: ITDP)
NEXT BATAM: Fostering a resilient growth strategy

GUANGZHOU

POPULATION: 12 MIL (2010)

TYPE: DIRECT SERVICE
TRUNK WIDTH: 9 M
STATION SIZE: 4 X 55 M (LATERAL STATIONS)

WHOLE STREET PROFILE WIDTH: 90M

PASSENGERS / DAY: 843,000
AVERAGE DISTANCE BTW. STATIONS: 0.88 KM
TOTAL BRT SYSTEM LENGTH: 273 KM
AVERAGE SPEED CENTRE: 17 - 19 KM/H

(SOURCE: ITDP)