FOREIGN INVESTORS IMPROVING THE URBAN QUALITY

The relation between urban planning and the establishment of multinational companies in Singapore 1965 - 2010

Abstract

Singapore is a city-state that experienced very rapid urban and economic growth during the second half of the 20th century. This is the result of the establishment of multinational companies (MNCs) within Singapore, due to the right policymaking by the Singapore government. Various studies have been done on Singapore's economic growth and urban development. However, the literature that looks at the relation between these topics is limited. Therefore, the aim of this paper is to find out how urban design and the establishment of MNC's are interconnected. The research is conducted through existing literature reviews on interest factors that are important for MNC's decision-making. These factors are linked to urban design aspects that are integrated within Singapore's city structure. Aspects that will be taken into consideration are infrastructure and green spaces. Next, the impact of MNC establishment on the urban design aspects of Singapore's CBD will be analysed through the use of primary sources. The main findings are that the quality of urban design is of insignificant importance for the establishment of MNCs in the early development stages. Urban design influence for future investment decisions remains unclear. However, the investments from MNCs were a major factor that shaped the CBD's urban design into what it is today.

Introduction

Today Singapore is referred to as the "Garden city" or "City in a Garden" and is seen as one of the most futuristic cities on earth (Culture Trip, 2020). It has been ranked as the top country in Asia in terms of quality of living according to global human resource consultancy, Mercer. The abundant amount of greenery and futuristic architecture is widely appreciated by both tourists and locals alike. These conditions are the result of the vision and actions of the Singapore government, led by Lee Kuan Yew. He became Singapore's first prime minister in 1959 after the British colonizers granted Singapore its self-government. At that time Singapore consisted mostly out of swampland with no natural resources and barely a domestic market to speak of. Their political break-up with Malaya in 1965 meant that Singapore was now economically self-dependent. Singapore needed a hinterland to survive. Lee's most important solution was to attract multinational companies (MNCs) from the United States, Europe and Japan to base their businesses in Singapore. These companies were looking for an affordable and stable place in Asia to produce and trade their various goods. Lee's government applied policies that made it appealing for these companies to invest in Singapore, which caused the county to rapidly grow its GDP. When Lee's presidentship ended in 1990, the nation was able to increase its GDP by 2800% while tripling the size of its population at the same time. Its economy has been growing until this day, along with the continued investments of various MNCs. These companies are largely clustered in the various business districts around Singapore. As a result, this led to major urban growth and changes in these areas. This paper will focus on the development of the Central Business District (CBD), and how Singapore's urban quality is interconnected with the establishment of MNCs.

Various papers have been written about Singapore's economic growth and urban planning. However, few seem to link these two subjects to one another. Yew (2000) writes about Singapore's development from his perspective in his book 'From third world to first: The Singapore story 1965-2000'. Furthermore, Cahyadi et al. (2004) have done studies on Singapore's economic transformation, explaining the economic policies that were applied to make Singapore an appealing place for MNCs to invest in. A survey done by Oum & Park (2004) rates the interest factors that MNCs consider when they choose a country to invest in. This study can be used to understand the succeeding factors behind Singapore's economic growth. The most interesting factor for this paper will be quality of life because it is influenced by urban design. Hence, it will give more information about how important urban design is when a country wants to attract MNCs to invest. Next, Van Kamp et al. (2003) have done a comparative study that examines the indicators that contribute to quality of life. These indicators

will be studied to get a grip on the urban planning factors that improve the quality of life in a city. Papers that review Singapore's infrastructure, by Ibrahim (2003), and implantation of urban greenery, by Tan et al. (2013), are used to understand the integration of the urban planning factors that improve quality of life. Lastly, the results of the policies and the establishment of the MNCs will be analysed by using old masterplans and photographs of Singapore's CBD. These images will be compared with the current CBD through the use of Google Earth and Google Street Viewer. The research will add to the missing literature by showing the impact that the establishment of MNCs had on the CBD's urban landscape. Likewise, it will show the influence of urban design on the attraction of multinational investors.

The paper focuses on how the establishment of MNCs and urban planning are influenced by each other. The research has three main objectives: First, to understand and review the various actions that were taken by the Singapore government in their attempt to appeal to MNCs. Second, to learn about the influence of urban design in the process of attracting these foreign investors. And last, to analyse the impact from the establishment of the MNCs on the urban landscape of Singapore's CBD. Most of the research will be conducted through extensive literature reviews. The existing literature gives information about the policies that were implemented by the Singapore government in their attempt to appeal to MNCs, as well as determine the effectiveness of these policies. This research will show that quality of life is one of the factors that influence the MNC's decision-making. Next, other literature studies will also reveal which urban design aspects contribute to a better quality of life. These aspects are an efficient infrastructure network and a sufficient amount of vegetation within the city. Therefore Singapore's urban landscape will be reviewed through the quality of these design aspects. Further literature studies will be done to understand how these design aspects are integrated within the city. The impact of the establishment of MNCs in the CBD will be analysed through three topics. The first two are the implementation of infrastructure and green spaces. The first analysis will be conducted through the use of old masterplans from the years 1959, 1980, and 2008, which will show a transition in how the infrastructure is organized. Next, the current distribution of vegetation cover will be examined through the use of Google Earth and Google Street Viewer. The findings will be mapped and reviewed through the use of existing literature. For the third analysis, a look will be taken at the preservation of heritage in the CBD area. Because it is necessary to understand the scale of demolishment that happened in the CBD area before it's possible to appreciate the urban qualities that are there today. A comparison between old aerial photographs from the 1960s and today's sights in Google Street Viewer will make it possible to determine which building survived the CBD's growth. The combined analysis will show the transformation of the urban landscape.

The structure of the paper will follow a thematical approach. The first chapter will start with a broad scope which focuses on the policies that affected the MNC's decision to invest in Singapore. The chapter is split into three parts and will answer why the investment from MNCs is important for Singapore, which policies were taken by the Singapore government in their attempt to attract the MNCs, and which location determinant factors are of significant importance for the MNC's investment decision. The second chapter will be split into two parts and focus on the influence of urban design on the investment decision of MNC's. The first part will examine which urban design aspects improve the quality of life within a city. The second part will review the integration of these design aspects within Singapore. The scope of the third and final chapter is narrowed down to Singapore's CBD and its transformation. Three aspects will be reviewed. Starting with the preservation of heritage, and followed up with the integration of infrastructure and greenery.

Chapter 1: Attracting Multinational Corporations towards Singapore

The importance of getting MNCs to invest in Singapore

Singapore was a colony from the British empire in the 18th and early 19th century. During this period, the city formed one of their main ports within Southeast Asia. Its central location made it a premier location to connect the colonies to the mainland. However, this meant that Singapore was very reliant on its entrepot trade with its colonizers. Singaporean dissatisfaction with the British grew during the Japanese occupation in World War Two since they felt abandoned by the British. On top of that, Britain seemed inadequate to deal with other social and economic problems. The biggest one was the high unemployment rate which affected most Singaporeans. After the war, Lee Kuan Yew went to the University of Cambridge to study law. Being treated there as a colonial subject fuelled his interest in politics and sharpened his anti-colonial sentiments. He formed the People's Action Party (PAP) in 1954 soon after he returned to Singapore. Their goal was to overthrow the British and make Singapore independent. That happened in 1959 when the PAP won the elections and Lee Kuan Yew became Singapore's first prime minister. (Thong, 2017)

Singapore was now a self-governing city-state that faced many challenges. Lee set out his first three goals: First, to get international recognition for Singapore's independence, including membership in the UN. Second, to defend the land by building a capable army. The third and hardest objective was building the economy. Singapore in the '60s was facing high unemployment and was still too dependent on the entrepot trade with Britain. They had no natural recourses and barely a domestic market to speak of. (Yew, 2000) (Cahyadi et al., 2004)

The original plan for growing the economy was to form a common market with Malaya. Singapore joined the Federation of Malaya, Sabah, and Sarawak to form Malaysia in 1963. However, its membership only lasted until 1965 when Singapore separated from Malaysia due to racial conflict. Lee wanted a Malaysian Malaysia where Malays and non-Malays were equal. He would not condone a policy that would support Malay supremacy. The separation meant an end to all prospects of having a common market with Malaysia. Resulting in a Singapore that now had to survive without a hinterland to support it. (Thong, 2017) (Cahyadi et al., 2004)

A few months after the separation, Lee met Dr. Albert Winsemuis, his Dutch economic adviser. He advised the government to seek more favorable entry of Singapore-manufactured goods into the United States, the United Kingdom, Australia, and New Zealand. After grappling with the problem of unemployment for years since they first took office in 1959, the cabinet knew that the only way to survive was to industrialize. Singapore had reached its limits of the entrepot trade. For that, they started focussing on attracting MNCs and building factories, despite their small domestic market of only 2 million. These foreign investors would form a new hinterland for Singapore. (Yew, 2000)

Policies that were applied by the Singapore government

The Economic Development Board (EDB) was formed in 1961 as advised by Dr. Albert Winsemuis. Its purpose was to supervise the economic growth and enhance Singapore's position as a global business center. To achieve this goal they had to focus on boosting the economy with vibrant businesses and good job opportunities. (Pek, 1994)

The first thing the EDB did was lay down infrastructure conducive for industrial development. Its Industrial Facilities Division helped to transform Jurong from swampland into an industrial estate. Next, the EBD put their focus on marketing Singapore as the right low-cost manufacturing hub in Asia. Singapore was politically stable with a great workforce who spoke English fairly. Executives of the EDB would contact and visit major corporations in America, Europe, and Asia to promote the idea of investing in Singapore. They conducted friendly policies towards these companies with the 'pioneer status', that gave tax benefits up to a period of five

years. As a result, most foreign investors found that their production costs were lowered by about 20%. (Pek, 1994) (Cahyadi et al., 2004)

Singapore's biggest and most valuable asset, as a country without natural recourses, was its people. Lee saw them as disciplined and hard-working. By the late 1960s, Singapore was facing new challenges due to the increase of a tight labor market and rising wages. Thus, in the early 70s, the EDB reoriented the focus from labor-intensive industries to training the workforce for capital-intensive and higher-technology industries (Pek, 1994). To meet the skills that are required, the EDB initiated training programs to upgrade the workforce and enhance the proficiency of the English language. The overseas marketing of Singapore shifted towards the promotion of Singapore as a business hub that was supported by a highly-skilled workforce. This upgrade of knowledge went one step further in the 1980s when the focus shifted from skill-based industries to high-tech industries (Pek, 1994). In order to achieve this goal, the Singapore government would form the National Computer Board (NCB) in 1981 to establish good knowledge and training of workers in the IT-related industries. (Cahyadi et al., 2004)

Lee's vision was to transform Singapore into a 'first world' hub in Asia. He describes it as a 'first world' hub in the middle of 'third world' countries that would become the home base for foreigners working in and visiting Asia (Yew, 2000). Singapore's geo-location was the advantage that was the main influence of this decision. Based in the middle of Asia, at the mouth of the Malacca Strait, through which perhaps 40% of world maritime trade passes (The Economist, 2015). The location as one of the world's most dynamic regions provided an opportunity for the government to turn Singapore into a major hub, connecting Asia to the rest of the world. To achieve this Singapore needed an efficient port and terminal. In 1968, the British agreed to hand over the naval dockyard at Sembawang including two valuable floating docks. They were converted from naval dockyards to civilian use (Yew, 2000). In the following decades, the size of the Singapore harbor kept growing, now forming the fourth largest in the world. The same story goes for the origin of Singapore's Changi International Airport. The former British Changi airbase was expanded by land reclamation and developed into Changi International Airport with two runways. The airport now connects customers to over 200 destinations worldwide, with 5000 arrivals and departures a week by 80 international airlines. Changi is consistently voted as 'World's Best Airport' in the World Airport Awards by Skytrax (Skytrax, 2020)

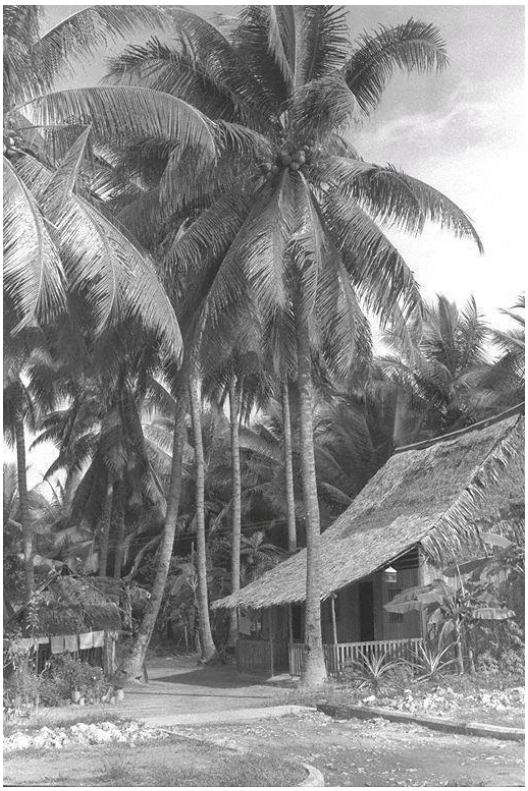


Fig 1. Changi village in 1962 (Wong, 1962)

Fig 2. Main hub of Changi airport 'The Jewel' (Arquitectura Viva, 2019)

Other than making Singapore globally accessible, Singapore had to raise the standard of living to make the city appeal to foreign businessmen and tourists. After independence, Lee was searching for a drastic way to distinguish Singapore from other 'third world' countries in the region. He decided to settle for a green and clean Singapore. Trees were planted at the opening of community centers and along the main roads and roundabouts. A lot of effort was put into maintaining the plants which made Singapore look very sophisticated. Greening raised the morale of the people and gave them pride in their surroundings. However, improving the physical infrastructure turned out to be easier than improving the rough ways of the people. People walked over plants and were still spitting, littering, and making noise nuisance. Perseverance was needed to fight old habits and several measurements were taken. Some examples are the campaigns for planting trees and against spitting which were running in schools and the media. It was explained that spitting was spreading diseases like tuberculosis. The campaigns turned out to be effective. The children would go home and bring the message to their parents. Another policy was the slaughter of stray cows and goats. Owners of these animals would let them graze the Esplanades which also caused car accidents. The owners were warned that every cow or goat in the streets after the 31st of January 1965 would be brought to the slaughterhouses. Very quickly, all cattle and goats were kept within enclosure. In November 1971, the government launched an annual Tree Planting Day and didn't miss one since. Greening transformed Singapore into a tropical garden which gave it its nickname 'City in a Garden' (Yew, 2000).

"Every time I return to Singapore after a few weeks' absence, and see the trees, palms, green grass, and free-flowering shrubs as I drive along East Coast Parkway from the airport into the city, my spirits rise. Greening is the most cost-effective project I have launched" -Lee Kuan Yew

All of the actions listed were made possible by having a stable and honest government. Since his election, Lee was fighting against corruption within the government. Singapore proved itself a reliable and stable trading partner during the oil crisis in October 1973. Lee gave a clear signal to the oil companies that they didn't claim any special privilege over the stocks of oil they held in their Singapore refineries, on the principle of equal misery. This decision increased international confidence in the Singapore government. As a result, by the 1990s Singapore managed to grow into the world's third-largest oil-refining center, the third-largest oil trading center, and the largest fuel oil bunker market in volume. (Yew, 2000)

Factors that are of significance for the investment decision-making of MNCs

A study by Oum & Park (2004) has been used to determine the effectiveness of the policies. The study explores how locational factors influence the MNC's decision for picking a country in Asia to set up one of their business departments. The research was for the most part based on a survey that was sent to 818 companies of different scales and were based in the United States and Europe. The survey got 83 useable responses that were conveyed in the following statistics. (Oum & Park, 2004)

Table 1 shows the current distribution of sample departments over Asia. Singapore is shown to be the most preferred location. About 17% of the sample established their distribution centers in Singapore. (Oum & Park, 2004)

	Number of firms	Percentage in the sample
No DC in Asia	30	36.1
China	8	9.6
Hong Kong	4	4.8
Japan	2	2.4
Korea	5	6.0
Singapore	14	16.9
Several countries	20	24.1
Total	83	100.0

Table 1. Location of sample firm's major Asian distribution centers (DCs) (Oum & Park, 2004)

The next section identifies the relative importance of locational determinant for MNCs choosing consolidated distribution centres. Table 2 shows the deviation between the factors by putting them on a scale and indicating them with a number. 5 indicates the most important factor and 1 the least important. 'Market size and growth potential of catchment region' is considered as the most significant factor with a 4.28, followed by 'Geo-location, transport linkage and market accessibility' (4.27), 'Port, airport and inter-modal transport facilities' (3.80), 'Political stability' (3.70), 'Skilled labor force, labor quality, and labor peace' (3.62), 'Modern logistics service providers and costs' (3.53), 'Pro-business government and officials' (3.48). These locational determinants are more important than the other factors. Therefore, they are referred to as critical determinants (Oum & Park, 2004).

Determinants	Mean[a]	Std. deviation
Geo-location, transport linkage and market accessibility	4.27[b]	0.98
Market size and growth potential of catchment region	4.28	0.98
Port, airport and inter-modal transport facilities	3.80	1.04
Labor and other input costs	3.35	0.97
Skilled labor force, labor quality, and labor peace	3.62	0.87
Flexible immigration	2.47	1.22
Land and availability and price	3.04	1.08
Corporate tax incentives	3.12	1.17
Availability of Free Trade Zones	3.06	1.17
Info-communications tech/e-business infrastructure	3.33	1.12
Modern logistics service providers and costs	3.53	1.19
Competitive financial service sector	2.70	1.05
Personal income taxes for foreign employees	2.23	0.99
Pro-business government and officials	3.48	0.92
Housing, schools, quality of life, environmental amenity	2.86	1.02
Political stability	3.70	0.93

[a] Measured in 5-point scale: 1 = the least important; 5 = the most important.
[b] Shaded are critical determinants.

Table 2. Relative importance of locational determinants for DCs (Oum & Park, 2004)

According to the previous sections, Singapore has applied policies that deal with all of the critical determinants. That would explain why Singapore has attracted the greatest number of MNCs over any other Asian country. Various sources confirm that Singapore's superiority in the policymaking caused its economic success. The Economist claims that Singapore's location, friendly tax policies and stable government are its main success factors (the Economist, 2015). The importance of an honest and stable government is further emphasized by an article from the EHL and a study done by Alesina et al. (1996). They argue that the country's stability comes from the fact that its legal system is clear, secure, and efficient (Blengini & Bianchi, 2020). Lastly, the EHL references a study done by Lucas (1988) that presses the importance of education for economic and societal growth:

"When we invest in education, we consider only our individual benefits. However, once we are finally educated, this education generates also a benefit for the whole society."

Nevertheless, not all measures taken by the Singapore government seem to be of significant importance. According to Table 2, policies that are focused on improving 'Housing, schools, quality of life, and environmental amenity' (2.86) seem to be far less important for the decision-making of the MNCs. However, Singapore's image as the 'city in a garden' is expected to draw the attention of foreign workers and visitors. The next chapter will take a closer look at how quality of life is influenced by urban planning. Hence, how urban planning influenced the attraction of MNCs.

Chapter 2: The influence of urban planning on MNC establishment

Quality of life as an interest factor for foreign investors

The role of urban layout in the process of attracting foreign investors remains uncertain. The study done by Oum & Park (2004) shows the various factors MNCs find important when picking a location for business investment (Table 2). One of these factors has a strong link with the urban layout, which is 'Housing, schools, quality of life and environmental amenity'. However, since its importance value is indicated with a 2.86, this topic seems to be insignificant when compared to the critical determinants, which range between 3.48 and 4.28. Thus according to the study, we can assume that urban planning is of limited influence on the attraction of foreign investors.

Nevertheless, Singapore draws a lot of tourists and foreign workers every year due to its futuristic and green image. Therefore the importance of urban planning shouldn't completely be neglected. This chapter will focus on the actions that were taken by the Singapore government to improve the quality of life through urban planning. This would provide a broader image of what makes Singapore's city landscape so appealing for foreigners.

Urban design aspects that affect quality of life

Over the course of years, there have been many studies developed that try to gain a grip on the term 'quality of life'. A study done by Van Kamp et al. (2003) makes comparisons between various studies which try to identify factors that are supposed to contribute to an improved 'quality of life'. Van Kamp et al. (2003) compiled all these factors within one model which is shown in figure 3.

However, the manifestation of and context in which environmental quality is used in the studies behind the models is seldom uniform. Essential differences are found in:

- Scale-level (individual versus aggregate).
- How the person-environment relation is approached (human ecology, independent entities, transactional approaches).
- Referral to objective attributes and subjective perceptions.
- Determinants or indicators (causality).
- Constant or variable (in place, time, person, and culture).

Furthermore, substantial differences are found in:

- The relative importance given to different environmental exposures in determining the environmental quality.
- Methods to measure the effects of combined exposures on environmental quality.
- The significance given to threshold values in exposures (air-, noise-, external safety) in relation to environmental quality.
- The capacity for counterbalancing environmental exposures: for example financial compensation for exposure to high levels of noise.

Hence, a lot more research is needed to be able to define the influence of urban planning on quality of life.

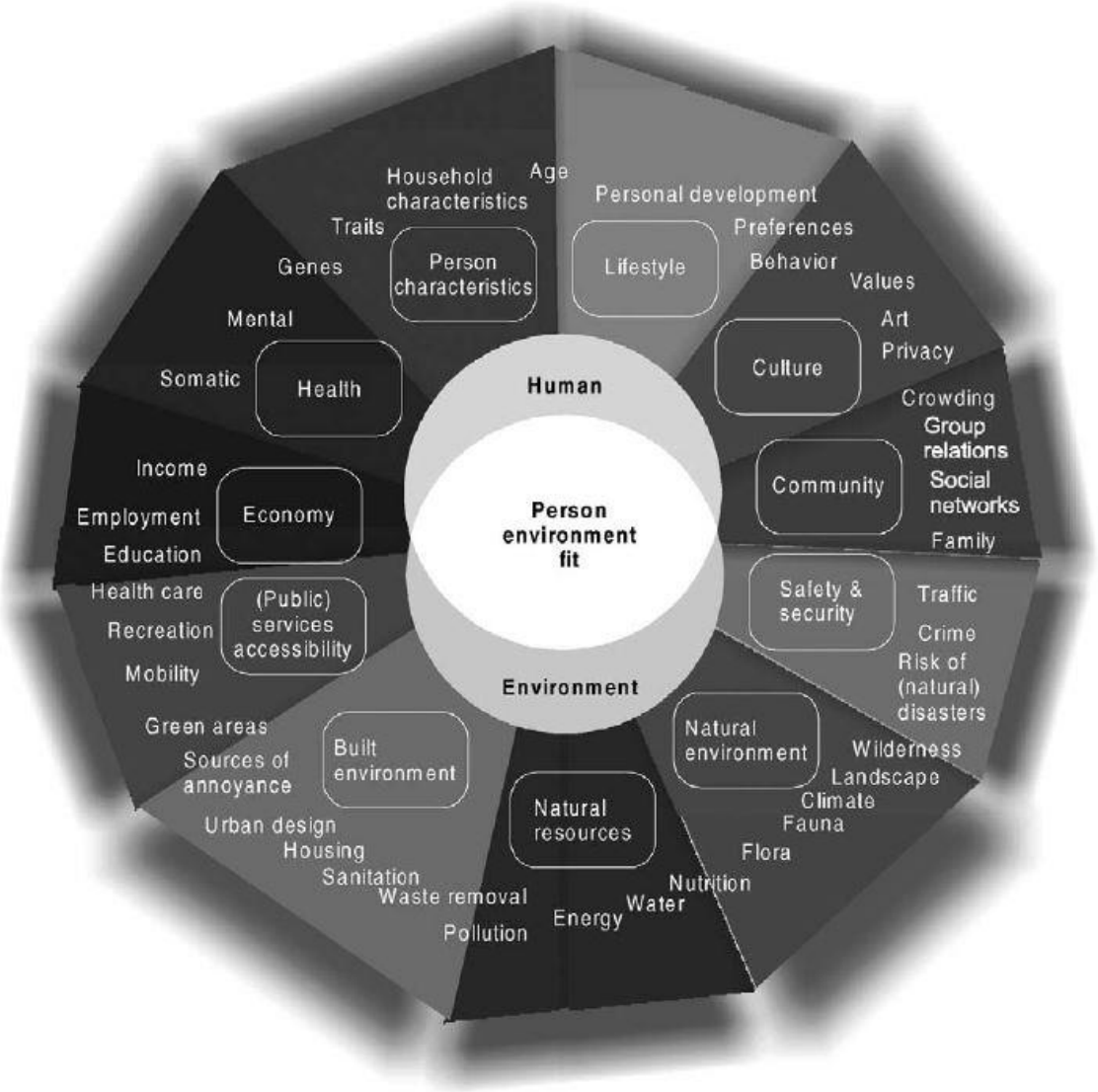


Fig 3. Domains of (human) livability and (environmental) quality-of-life. (Van Kamp et al., 2003)

All previous studies mention the environment as a factor for an improved quality of life. Urban design determinants that contribute to a better environment are mobility, green areas, flora and fauna, pollution and traffic. The study also mentions visions of some very influential urban planners (e.g. Corbusier, 1935; Howard, 1898; Jacobs, 1961; Dantzig and Saaty, 1973). Their visions are based on environmental qualities that contribute to liveability. The ideas are reviewed by Smith et al. (1997) resulting in a summary that states several elements that every urban environment should have. Examples of strong elements are open space areas, outdoor amenities, and 'walkability' while the use of warm colours or the size of front lawns are given as examples of form criteria that have a weak relationship with communal quality, and thus lowered quality of life (Smith et al., 1997). Other studies press the importance of the amount of green in the neighbourhood (Van Kamp et al., 2003). Tzoulas et al. (2007) conducted research that argues that ecosystem services provided by a Green Infrastructure can provide healthy environments and physical and psychological health benefits to the people residing within them.

To recapitulate, the investment decision of MNCs is slightly influenced by the quality of life. Quality of life is influenced by urban planning. Therefore urban planning has a limited influence on the MNC decision making. Judging from previous studies, it is assumed that environmental factors which improve quality of life are infrastructure and green spaces. Hence, these are also suggested to be the urban planning factors that influence MNC decision-making. Singapore's urban policies will be reviewed by using these indicators. However, it is important to keep in mind that determining the qualities is largely a subjective practice, and some assumptions have to be made.

The integration of an efficient infrastructure network in Singapore

The government recognized that Singapore's growing economy needed to be supported by an effective land transport network. One that is cost-effective, efficient, and integrated. It has to fulfill the people's needs and expectations and support the economic and environmental goals. In order to achieve this objective, the government had to take action to improve various facets of the infrastructure. Their focus was put on the expansion of the road network and maximizing its capacity, the management of vehicle ownership, and demand for road usage to alleviate traffic congestion. But most important, on the improvement of the public transportation system. The main public transport services in Singapore include the bus, Mass Rapid Transit (MRT) and taxi. In previous decades, a continuous effort was made to improve their quality and keep them affordable, in an attempt to provide a feasible alternative to the private car. (Ibrahim, 2003)

The bus is one of the oldest forms of public transport in Singapore. During the 1960s and 70s, Singapore's bus operation consisted out of ten private Chinese companies. Their service was considered as very unsatisfying due to the common mechanical breakdown, irregular fare and route structure, less frequent and overcrowded bus services. Singapore Bus Service Limited (SBS) was formed in 1973 from the merger of three private bus companies and became the biggest bus service provider. A few years later in 1982 the Trans-Island Bus Service limited was incorporated by the government as the second major public bus operator. This was to provide some measure of competition to the SBS and ultimately, improve the quality of service provided by the bus companies. Over the years, many measures have been introduced to make traveling by bus more appealing. A few examples of these measures are: Bus lanes, give way signs, rapid and night bus services, facility improvements, and efficient linkage to MRT stations. (Ibrahim, 2003)

The Singapore MRT system is a conventional electrically-driven railway system. It is able to move a large number of passengers at high speed and regular intervals. It is efficient since it is unaffected by traffic congestion, whilst reducing congestion on the surface routes by absorbing traffic from the existing roads. The operation began in 1987 and has been growing and improving its service over the years. As of 2003, the network consists of 51 stations and there are 106 operational trains. Future planning will increase these amounts even further. Both Bus and MRT have an integrated card payment system, which makes transit very convenient. The MRT forms the backbone of the public transport system in Singapore, its routes connect the most densely populated housing areas to Orchard Road, the Central Business District and industrial estates. Its efficiency and affordability make it an attractive alternative to the private car. (Ibrahim, 2003)

Car ownership in Singapore has been regulated since the 1970s. Over the years, the government has taken radical action to reduce the number of private cars driving on Singapore's roads. These policies include heavy road taxes, fuel tax, goods and service tax, additional registration fee, surcharge on imported vehicles, higher parking tolls in the CBD, staggered work hours, car pools, park-and-ride scheme and off-peak car scheme. But also more advanced systems like the Certificate of Entitlements (COE) which required potential car owners to bid on a certificate which was required to drive a car, adversely affecting the affordability. The Electronic Road Pricing system (ERP) was introduced in 1998 as an improvement of previous road pricing systems. It served as a way to monitor the level of traffic on certain roads by increasing the charges at peak hours. Although most of the policies have been restrictive, the government is committed to provide maximum mobility for the car user. Some of their projects include the widening and construction of viaducts and roadways, creating faster and smoother linkages between districts. (Ibrahim, 2003)

Overall, the government was successful in reducing the number of private cars and improving the use of public transport. Statistics show that in 2002, about 60% of the total trips in Singapore were made using public transport. Policymakers were relentless in their efforts to perfect the regulations on the use and ownership of cars. The COE managed to cap the growth of the vehicle population at 3% per annum. Likewise, the ERP system resulted in a drop of 17% in traffic volume on the monitored roads. However, the actions taken didn't result in a loss of mobility. Bus and MRT networks make it possible for Singaporean workers to be very well connected between their homes and the business district. This could be of benefit for future foreign business investors and could therefore impact their investment decision in favor of Singapore. However, the fact that the MRT wasn't introduced until 1987, makes it invalid to assume that public transport played a large role in the rising economy of Singapore in its early years.

The implementation of green spaces in Singapore

Tree planting day is an annual event in Singapore that involves planting trees in public places. The initiative was launched on the 7th of November 1971 by prime minister Lee Kuan Yew. The goal of the campaign was to have at least 5000 households planting trees to replenish fallen trees, induce more rain to provide more water, and make Singapore a pleasant home. It was the beginning of transforming Singapore into a tropical garden city. The event has since been held until current day (Pwee, 2020). The green environment raised the morale of the people and made them proud of their surroundings. Lee describes his drive to distinguish Singapore from other Asian countries. This would be done by turning the city into a hub that answers to first world standards through the use of greening (Yew, 2000). Policies were made to stimulate greening in the urban environment. The green buffer policy required new building developments to leave a 3-5 meter gap between their boundary and the public roads they were facing (Tan et al., 2013).

However, study shows that, despite the greening policies and efforts by the government, Singapore's amount of vegetation isn't significant over other cities. This is shown in table 3 where the amount of tree canopy cover in Singapore (31%) is just slightly above the average of 20 US cities (27.8%). The numbers are even worse for Singapore when it's compared in the park provision ratio (Table 4), which shows the hectares of park area per 1000 residents. Singapore scores a 0.75 which is considered a low-medium amount of park area. The low number is caused by the limited amount of space on the island in combination with its large population, which caused a large decline in natural wild areas (Tan et al. 2013). Almost half of all vegetation cover in Singapore falls under the category managed vegetation, which are the urban green spaces (Table 5). Due to the growing population, there is an increasing need for urban green spaces. Which resulted in the more recent developments of Singapore's highrise environment with the establishment of a ''Vertical Garden City''. Urban vegetation is created through active greening of the vertical space, such as in the form of rooftop gardens, vertical green walls and sky terraces. However these spaces are mostly privatized, so the vegetation will only provide a visual quality for the public when they are visible from street level. (Figure 4)

City	Tree canopy cover as percentage of city area	Notes and sources of information
Singapore	31	Yee et al. (2011) estimated the overall vegetation cover to be 57%, which includes area covered by grass (e.g. amenity lawns, sports field, and golf courses) and other ground cover, other than trees and shrubs. Based on the sum of estimated forested canopy cover (22.1%) and assuming that about a third of managed vegetation cover (27.5%) is treed (including roadside trees, trees in parks, public and private estates, and institutions), overall tree canopy cover is conservatively estimated to be about 31%
Average of 20 US cities	27.8	Figure refers to tree and shrub vegetation cover, ranging from a low of 9.6% in Denver to a high of 51.6% in Atlanta. *Source*: Nowak and Greenfield (2012)
Melbourne	22.0	City of Melbourne (2011)
Los Angeles	20.6	Figure refers to tree and shrub vegetation cover. *Source*: Nowak and Greenfield (2012)
Toronto	19.9	City of Toronto (n.d.)
New York City	19.3	Figure refers to tree and shrub vegetation cover. *Source*: Nowak and Greenfield (2012)
Beijing	19.1	Figure refers to tree and shrub vegetation cover. *Source*: Yang and Zhou (2009)
Chicago	18.0	Figure refers to tree and shrub vegetation cover. *Source*: Nowak and Greenfield (2012)
Sydney	15.5	City of Sydney (2011)
Shanghai	10.2	Figure refers to tree and shrub vegetation cover. *Source*: Yang and Zhou (2009)

Table 3. Tree cover of cities (Tan et al., 2013)

City	Park provision ratio (hectare of park area per 1000 resident)	Park area as percentage of city area (%)	Notes and sources of information
Stockholm	7.38	30	Derived from percentage of park area to city area, city area and population figures from City of Stockholm (2012)
Melbourne	4.77	12.5	Derived from park area, city area, and population figures from City of Melbourne (n.d.)
Los Angeles	2.51	7.9	Harnik (2010)
Average of 13 high-density north-American cites	2.44	11.6	Harnik (2010)
New York City	1.86	19.6	Harnik (2010)
Chicago	1.70	8.2	Harnik (2010)
Shanghai	1.06	2.3	Derived from park area, city and population figures from Shanghai Municipal Government (2009)
Singapore	0.75	3.2	PPR from MOF (2012); park area as percentage of city area from NParks (multiple years) and SLA (n.d.)
Hong Kong	0.35	2.3	Derived from park area (parks, playground and stadia), land area and population from HKSAR Government (n.d.)
Seoul	0.52	8.8	Derived from Choi (2007) for parks in urban areas
Barcelona	0.35	5.5	Derived from park area, city and population from Barcelona City Council (n.d.)
Bangkok	0.19	0.67	Derived from Thaiutsa et al. (2008) for publicly accessible parks, and excluding golf courses

Table 4. Park provision ratio (PPR), and park area as a percentage of city area of cities in Asia-Pacific, North America, and Europe. (Tan et al., 2013)

Vegetation cover	Percentage (%)
Managed vegetation (urban green spaces)	**27.5**
Public parks	3.2
Roadside greenery	3.7
Green spaces in other public and private estates	20.6
Unmanaged vegetation	**28.5**
Scrubland	5.92
Young secondary forest	19.6
Old secondary forest	1.37
Primary forest	0.16
Mangrove forest	0.91
Freshwater marsh	0.11
Freshwater swamp forest	0.39
Total vegetation cover	**56.0**

Table 5. Distribution of managed and unmanaged vegetation in Singapore. (Tan et al., 2013)

Figure 4. Visible greenery on Parkroyal on the Pickering. (Green City Trips, 2020)

So despite its Garden City reputation, Singapore's amount of vegetation is not significantly different from other cities. It appears that the visual presence of the urban green spaces, rather than the total amount of greenery, has a significant impact on Singapore's image. The visual quality and visibility of greenery within the built environment have been suggested to be an important factor of the sensory function of greenery, and this has an immediate influence on the aesthetics of the urban environment and exposure to greenery in the day-to-day life of residents (Tan et al. 2013). The visual quality was used by the Singapore government as a strategy for attracting MNCs. They would plant large amounts of urban greenery along East Coast Parkway, which is the main road between Changi International Airport and Singapore's CBD. The road nowadays ends on the Benjamin Sheares Bridge, which gives an overview of the CBD's skyline, Singapore's iconic Marina Bay Sands building, and the in 2012 constructed Gardens by the Bay (Figure 5 & 6). Lee sees the efforts that Singaporeans put into maintaining their environment as a way to increase their wealth. Since this would prove to visiting MNC executives that they are capable, organized, and hardworking people. Lee describes greening as his most cost-effective project. (Yew, 2000)

"Visiting CEOs used to call on me before they made their investment decisions. I thought the best way to convince them was to ensure that the roads from the airport to their hotel and to my office were neat and spruce, lined with shrubs and trees. When they drove into the Istana domain, they would see right in the heart of the city a green oasis, 90 acres of immaculate rolling lawns and woodland, and nestling between them a nine-hole golf course. Without a word being said they would know that Singaporeans were competent, disciplined, and reliable, a people who would learn the skills they require soon enough." -Lee Kuan Yew

Figure 5. Greenery along East Coast Parkway, the road between Changi Airport and the CBD. (Google Maps, 2020)

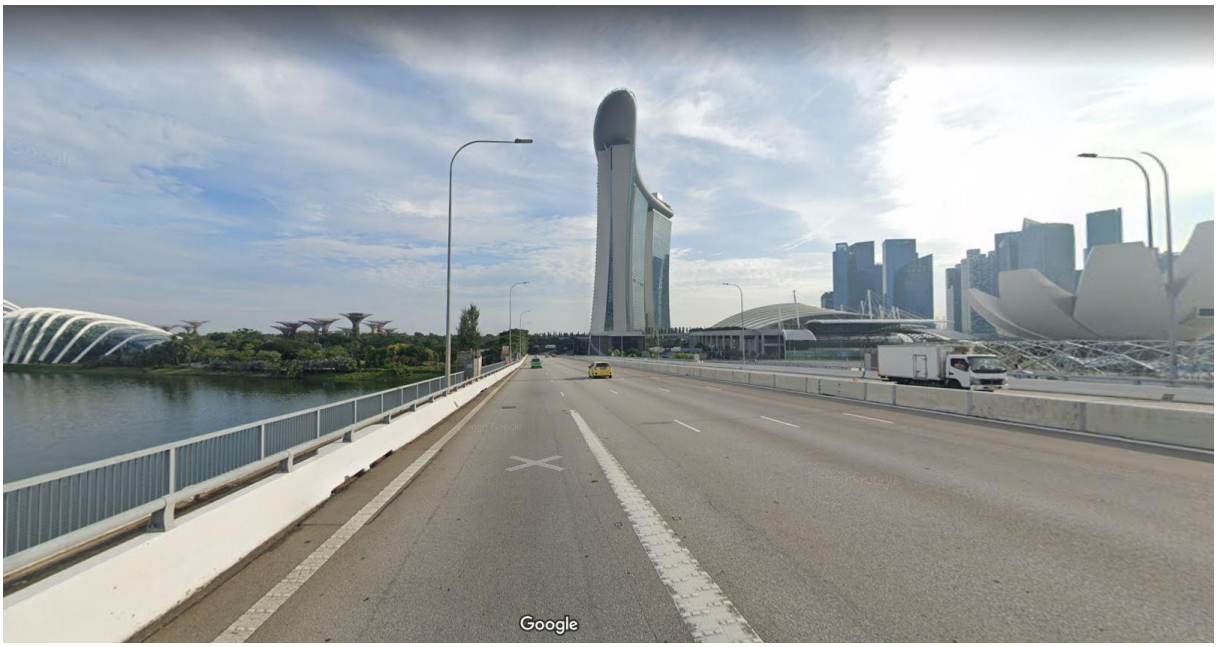
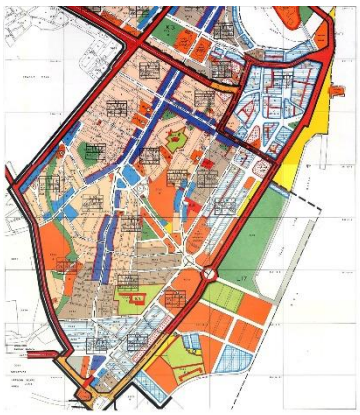


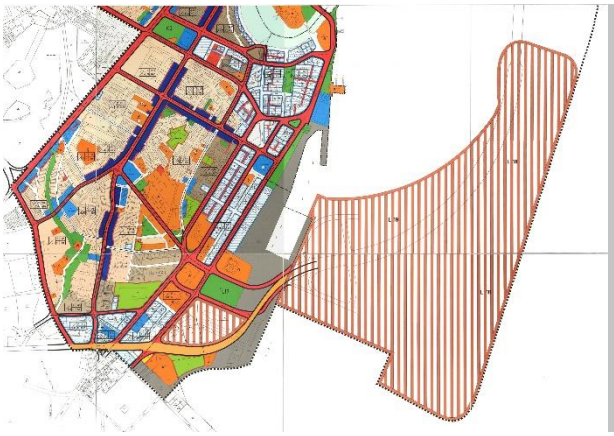
Figure 6. View from the Benjamin Sheares Bridge over Singapore's skyline and Gardens by the Bay. (Google Maps, 2020)

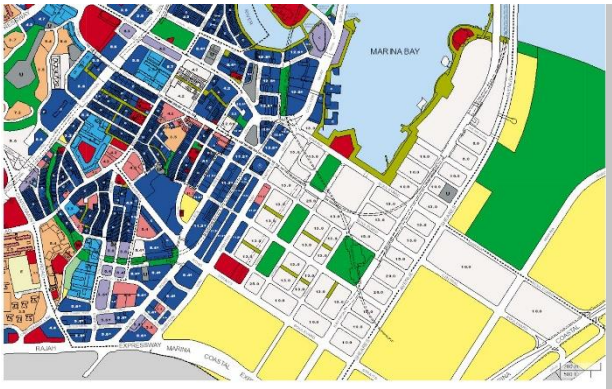
In conclusion, the government put large efforts into improving the urban quality on the aspects of infrastructure and green spaces, resulting in a mobile and visually green Singapore. These qualities contribute to a better quality of life, which is suggested to have a limited influence on the MNC's investment decision. However, this chapter raises new arguments which claim that urban planning might have a bigger influence on the MNC's decision making than what was shown in the study done by Oum & Park (2004). It suggests that the nowadays fast and efficient connection between housing estates and the CBD could be a factor that future foreign investors may consider. Furthermore, Lee describes greening as a method of proving to the MNC's executives that Singaporeans are capable, organised and hardworking people. Nevertheless, most of the greening got implemented over the decades throughout Singapore's development, which is similar to the development of Singapore's infrastructure. Hence most quality of life improvements occurred in the decades after the initial investments of MNCs. Therefore, the quality of urban planning is assumed to be a minor influence on Singapore's initial economic growth. However, it might have a positive effect on the investment decisions of MNCs in the future.

Chapter 3: The impact of MNC establishment on the urban design of the CBD

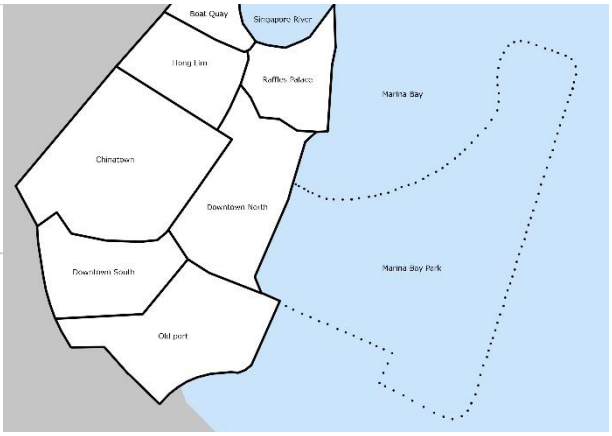
This chapter will give an overview of the impacting result that the establishment of MNCs had on the urban landscape of Singapore. Thereby Singapore's CBD will be analysed on three topics: preservation of heritage, the growth of infrastructure, and the implementation of greenery. The sections about infrastructure and green spaces will show how the urban design aspects that were discussed in the previous chapter are integrated within the CBD. But the first thing that will be discussed is heritage. Since it is necessary to gain knowledge about the demolishment of the former city center. Figures 7 to 12 show the masterplans and schematic versions of them at the years 1958, 1980, and 2008. These plans are used to do the analysis.







Figures 7 to 9. Singapore masterplans 1958, 1980 and 2008. (Urban Redevelopment Authority, 2020)



Figures 10 to 12. Singapore schematic plans 1958, 1980 and 2008. (personal archive)

Preservation and loss of heritage in the city center

In the 1960s, urban renewal had accelerated. Singapore went through a phase where they recklessly demolished the old rundown city center. The buildings got replaced by Highrise in which the MNCs located their offices. These towers form the CBD and have dominated Singapore's waterfront until this day (Figure 13). Throughout the years, more and more MNCs established themselves within Singapore and therefore caused a rapid growth of the CBD.

Figure 13. Skyline of Singapore's CBD in 2010. (Lush Media, 2011)

By late 1970 the Singapore government felt discomfort over the speed at which they were erasing their past (Yew, 2000). Figures 14 and 15 show aerial photographs of Singapore's former CBD in the early 1960s. The majority of the buildings and districts around Singapore's waterfront were demolished. Some of the leftovers are the districts of Chinatown and Boat Quay, as well as a handful of buildings on Singapore's waterfront (Figure 16 and 17).

Figure 14 & 15. Aerial photographs of Singapore's city centre in the early 1960s (Kouo, 1964)

Figure 16. Overview of the preserved buildings and districts on the Singapore waterfront. (personal archive)

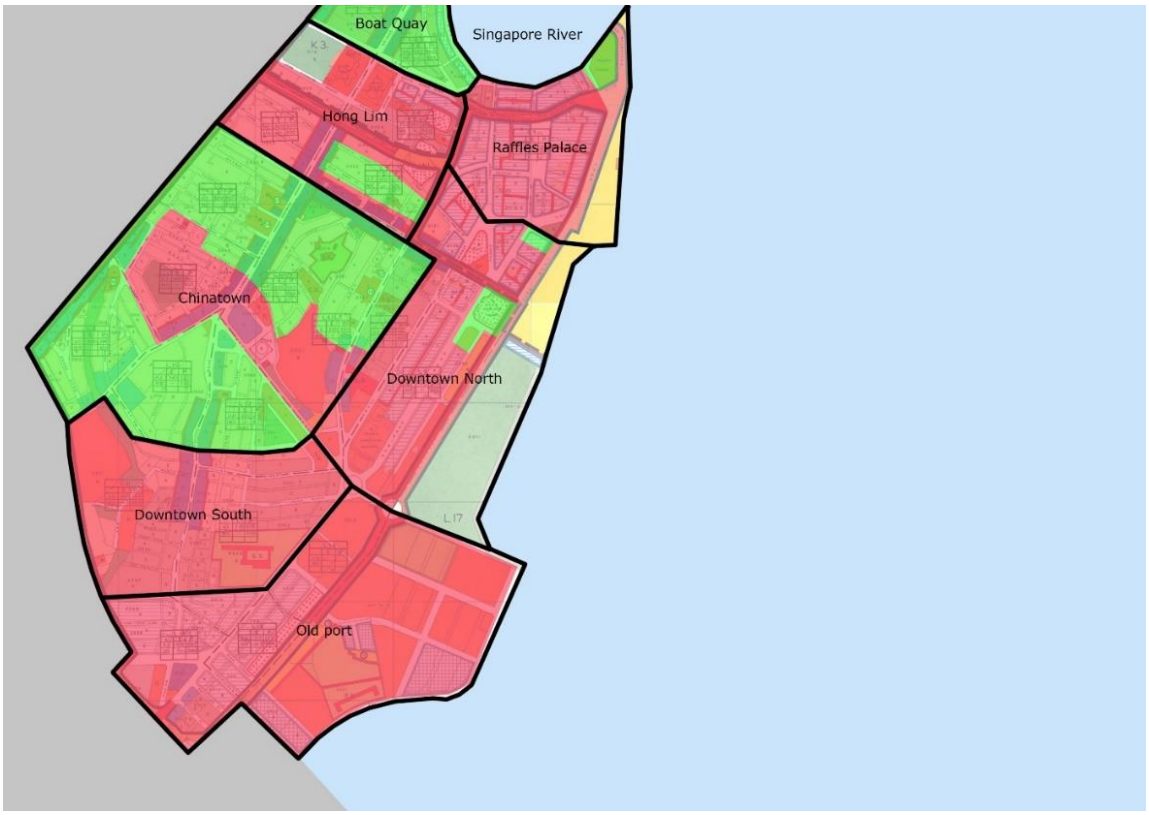


Figure 17. Overview of the preserved buildings and districts in Singapore's city centre. (personal archive)

Due to the rapid destruction of Singapore's city center, the government decided to set up the Preservation of Monuments Board in 1971, which was responsible for the identification and preservation of buildings with historic value. They made sure that the historic neighbourhoods of Chinatown and Boat quay would remain untouched. The buildings designated include old temples, traditional Chinese architecture, old markets like the Telok Ayer Market, and former colonial government offices. The Board has managed to save large parts of the historic city center. On the other hand, these protections restricted the CBD to grow larger in size. The available development space was running out since the CBD is located on Singapore's waterfront with the protected areas of Chinatown and Boat Quay west. The solution was to create more space by the use of land reclamation. The project started in the early 1970s where land was reclaimed on Singapore's waterfront, creating Marina Bay Park. The work was completed in 1992 and forms the center of future expansions of Singapore's CBD.

Development of the CBD's infrastructure

Due to the establishment of MNCs, Singapore kept upgrading its infrastructure. The masterplans show the primary and secondary travel routes that form the basis of the infrastructure within Singapore's city center. The transition in the developments of these roads becomes visible when comparing them to one another. Figures 18, 20 and 22 show schematic versions of the masterplans. The primary routes are highlighted in red and the secondary routes in orange. In the maps of 1980 and 2008 the newly created primary and secondary routes are highlighted in dark green and lime green.

Figure 18 shows the infrastructure layout in 1958 after British rule. During this period the city center wasn't as dense as it is today. Hence, the map shows a limited amount of primary and a medium amount of secondary routes. The major access road was the Anderson bridge which connected the city center to the airports in the north (Figure 19). The main function of the city center was to serve as an entrepot trading port for the British. This caused the docks in the south to remain an important area at this time.

Figure 18. Singapore's infrastructure in 1958. (personal archive)

Figure 19. The Anderson Bridge. (Light, 1961)

By 1980 the business in the city center saw major growth (Figure 20). A lot of MNCs established themselves on the waterfront in the areas Raffles Palaces and Downtown North. In an effort to keep the CBD accessible, a lot of the secondary travel routes developed into primary travel routes. It became difficult to create new roads due to the heritage protection policies. The most notable new travel route was Church Street (Figure 21), a new road that was crossing from the waterfront through Raffles Palace into Hong Lim. The British docks had stopped serving as the port and were demolished. Marina Bay Park had come in its place and was under construction during this period. As a result, plans were made to extend the present infrastructure through the old port to form the connection between the city center and Marina Bay Park.

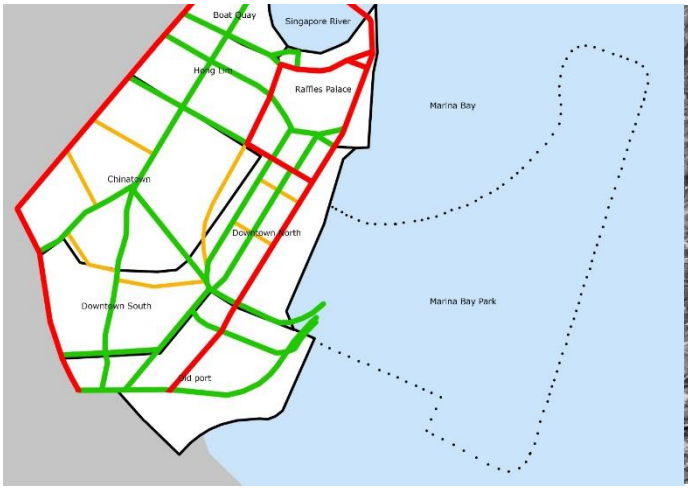


Figure 20. Singapore's infrastructure in 1980. (personal archive)

Figure 21. Chulia Street aerial view. (Kao, 1970)

The masterplan of 2008 shows a further developed Singapore (Figure 22). New MNCs had based themselves in Hong Lim and Downtown South and new establishments are now moving to the in 1992 completed Marina Bay Park. Marina's road network is layed out in a grid structure which exists out of primary and secondary travel routes. The Bayfront Bridge and Benjamin Sheares Bridge form a new connection between Singapore's airport and the CBD. When visitors and residents cross the bridge they are met with Singapore's iconic building 'Marina Bay Sands' (Figure 23). Due to the rapid increase in density, the Singapore government made an effort to prevent traffic congestion and keep the CBD accessible. This was done through various policies which are discussed in the previous chapter. Notable actions that influenced the CBD are the increase in parking tolls, as well as the creation of a highly efficient MRT network (indicated in purple). It connects citizens and workers living around Singapore to the central region.

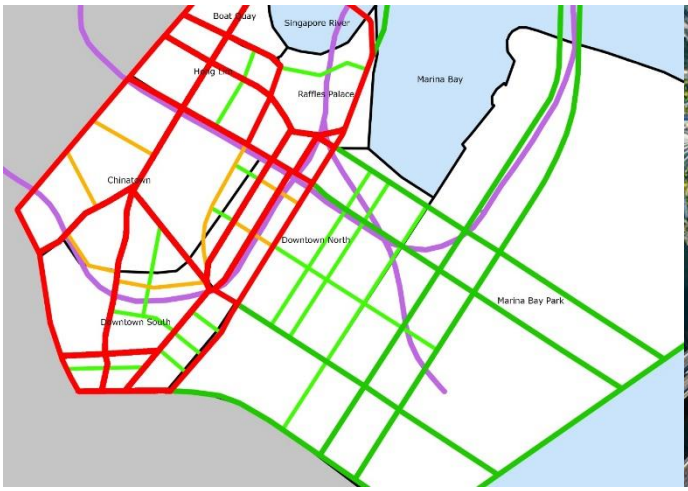


Figure 22. Singapore's infrastructure in 2008. (personal archive)


Figure 23. Marina Bay Sands. (Marina Bay Sands, 2020)

The integration and distribution of green spaces around the CBD

Singapore's reputation as a City in a Garden comes from the perception of the abundant amount of greenery that is interwoven within its urban landscape. However, the previous chapter suggests that this image would be the result of the presence and distribution of visible vegetation rather than the total amount.

Figure 24 shows the distribution of vegetation within Singapore's CBD in the current day. Dark green indicates the planned public parks or green spaces. Most dominant here is Gardens by the Bay, which is a large garden located on Marina Bay Park and one of Singapore's main attractions. Lime green indicates building plots where green facades, rooftop gardens, or vegetation terraces in any significant shape or form were implemented. 20 buildings have been identified within the CBD that fit these criteria. Notable examples are the Oasia Hotel and Parkroyal on the Pickering. The olive green lines indicate the roads that are aligned with trees and shrubs. Most of the primary travel routes are aligned with trees on both sides of the road.

Figure 24. Distribution of different types of vegetation in Singapore's city center. (personal archive)

The study done by Tan et al. (2013) argues that the total amount of greenery in Singapore's downtown area is inadequate when compared to newer housing districts (Table 6). The contrast between vegetation cover in older and newer planning areas suggests that even with urban renewal, areas with a history of low vegetation cover have limited opportunities to further increase their vegetation cover. It suggests that upfront planning is critical for adequate levels of UGS (Tan et al. 2013). This is prevalent when we compare the historic areas in the CBD with the more recently developed areas. These include Hong Lim, Raffles Palace, Downtown North, and Downtown South which got renewed in the decades after the 1960s and seem to have a decent distribution of green spaces. These are also the areas where most MNCs are located. During the day, the people that work at the MNCs get into contact with these green roads which could be a major factor contributing to the 'Garden City' image. Marina Bay Park is the most recent urban project and is still in development. Therefore it is expected to have more green spaces in the future as well.

Planning area	Vegetation cover (%)	Per capita vegetation cover (% per 1000 resident)	Dominant land use
Changi	57.3	22.92	Port/airport, reserve site
Newton	52.3	8.05	Residential, civic and community institution
Singapore River	12.7	5.52	Business, commercial, commercial and residential
Downtown core	19.7	5.32	Business, white, reserve site
River Valley	33.7	3.92	Residential
Tanglin	55.7	3.13	Residential, park
Outram	28.5	1.30	Commercial, commercial with residential
Novena	52.4	1.11	Residential
Rochor	16.9	1.11	Business, residential
Marine Parade	41.8	0.86	Residential, reserve site
Bukit Timah	48.2	0.67	Residential
Punggol	45.3	0.61	Residential
Bukit Panjang	62.6	0.48	Residential, open space
Sembawang	33.9	0.46	Residential, business
Bishan	40.0	0.43	Residential, business
Bukit Batok	56.2	0.39	Residential, park, special use
Queenstown	37.1	0.38	Residential, port/airport, educational institution
Clementi	30.8	0.34	Residential, business
Pasir Ris	40.8	0.30	Residential, business
Toa Payoh	37.2	0.29	Residential
Ang Mo kio	51.9	0.29	Residential, reserve site
SengKang	48.2	0.27	Residential
Jurong East	23.4	0.27	Business, reserve site, residential
Yishun	50.5	0.27	Residential, special use, reserve site
Kallang	26.6	0.26	Residential, business, sports and recreation, reserve site
Bukit Merah	38.2	0.24	Residential, business, park
Choa Chu Kang	35.6	0.20	Residential
Tampines	45.7	0.18	Residential, reserve site sports and recreation
Geylang	19.9	0.17	Business, residential, institution
Serangoon	19.7	0.16	Residential
Woodlands	35.9	0.14	Residential
Hougang	27.7	0.13	Residential, business
Jurong West	33.3	0.12	Residential, residential with commercial
Bedok	32.3	0.11	Residential

Table 6. Vegetation cover distribution in the districts of Singapore. (Tan et al., 2013)

The lack of vegetation space due to the compact urban form with limited building set-back from the street is a condition that is present in the historical district of Chinatown. Efforts to establish a larger amount of vegetation cover could also conflict with the objective of conservation of the built heritage. Chinatown has a certain level of historical authenticity that will make it difficult to extensively integrate modern urban greening technologies. Green walls and green roofs would change the appearance and affect the veracity of the conserved buildings (Tan et al., 2013). Furthermore, amount of space dedicated to planned green spaces seems very little within the CBD. Other than the Gardens by the Bay, the planned green spaces seem neglectable.

Overall, the analysis have shown that the establishment of MNCs had widely affecting results for the urban design of the CBD. The majority of the old city center has been renewed with skyscrapers. However, heritage preservation policies have managed to safe important districts around the city center. The creation of Marina Bay Park made it possible for the CBD to keep expanding in size. Marina Bay Park also offered new linkage ways to Changi Airport. During the years of development, most of the secondary travel routes developed into primary travel routes. The establishment of the MRT system kept the growing CBD accessible for Singaporean workers. Lines of trees and shrubs were integrated along the renewed travel routes, which ran through most of the CBD. This resulted in an even distribution of greenery in most areas. However, the total amount of greenery is limited when compared to other districts in Singapore. Two neighbourhoods that lack an amount of green spaces are Marina Bay Park and Chinatown. Reason for this being that Marina Bay Park is still in development and Chinatown is a historic district. Therefore it offers insufficient space to integrate greenery without losing its authenticity.

Conclusion

This paper's main goal was to find out how urban planning and the establishment of MNCs are interconnected. This is done through various literature reviews and analyses. These would show why the investment of MNCs was important for Singapore, and how the Singapore government was able to convince them to make these investments. A large section has been written about how urban planning and quality of life might influence the MNC's investment decision-making. The paper ends with an analysis of the transformation of Singapore's CBD, which highlights the effect that the establishment of MNCs had on the city center.

The study shows that the establishment of MNC's was of major importance for Singapore's development success. The government applied various policies that affected the interest of the multinational's executives in a positive way. However, the existing literature shows that quality of life might be of mediocre importance for MNC's decision-making. Quality of life is affected by the urban environment. Therefore it is suggested that urban design is of mediocre importance to the MNC's decision-making. Further research into the influence of urban design on quality of life shows that infrastructure and green spaces are design aspects that improve quality of life. These design aspects have a high quality of integration within Singapore. However, the aspects have been implemented over the decennia of Singapore's development history. Which makes it safe to assume that they played an insignificant role in the initial attraction of MNCs in Singapore's early years. Hence, it can be assumed that urban design played an insignificant role in Singapore's economic success. In retrospect, the establishment of MNCs resulted in rapid growth of the CBD, which has had a large impact on Singapore's urban design. Large parts of the former city center got demolished and replaced by skyscrapers. Heritage preservation laws put a halt to this and the creation of Marina Bay Park made it possible for the CBD to keep expanding. Throughout the years, the government put in a lot of effort to keep CBD accessible and green. This was achieved through the implementation of efficient MRT and Bus systems, various car taxes and a fair distribution of greenery along the main routes of the CBD's newer areas. These urban design improvements would improve the quality of life for the Singaporean people that work at the MNCs. Therefore it might influence future MNC establishments.

Validation of some aspects of this research is necessary. The survey done by Oum & Park (2004) shows the importance of the various location determinant factors that the MNCs consider when they make their investment decision. This study got 83 useable responses from international companies, which could be considered a number that is too low to make the results valid. Furthermore, the study done by Van Kamp et al. (2003) on the aspects that influence the quality of life, claims that quality of life remains a vague term. Therefore some aspects could have been left out or the ones that are used could be incorrect. Lastly, the analysis of the MNC's impact on the urban transformation of the CBD is limited in scope and depth. Since it gives a general overview of the CBD's heritage, infrastructure, and green spaces.

More research has to be done to fully understand the interconnection between MNC's investment decision and Singapore's urban planning. Future studies could provide more data about the importance of various investment factors considered by MNCs, as well as expand the knowledge of the significance of urban quality. Therefore more qualitative research will be necessary. More detailed research of the MNC's influence on the CBD's urban landscape could also be a direction for future studies. The expansion of knowledge on this subject might inspire governments to improve their urban design, hoping for an effect on MMC establishment and economic growth.

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