Compact City and Densification Strategies

The Case of Gothenburg

Author: Valentina Cereda
Abstract

The Compact City Model is considered one of the planning strategies that can contain the urban sprawl and develop more sustainable cities, in the environmental, social and economic dimensions. In this paper, I analyze the Compact Model in theory, by focusing on the claimed benefits of this strategy and also on the critics, as a base to investigate after the empirical case of Gothenburg. The analysis of the planning system of the city shows the aim to achieve a denser urban form by applying the driving factors that characterised the Compact Model. At the same time, I consider policies, public transport system, initiatives and campaigning linked with the planning system, as fundamental issues to study the elements of the compaction strategy of Gothenburg.

After a deep analysis of the city development and the urban planning framework, it is clear that densification in strategic nodes is a feasible outcome of the Compact City concept when applied to Gothenburg. The planning strategy of the compact nodes is meant to guarantee a good accessibility and integrate collective transports, services and attractive public spaces to avoid the increase of the urban sprawl.

Keywords: urban sprawl, compact city model, Amsterdam, Gothenburg.
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1. Introduction

1.1 Subject of the thesis

The second half of the 20th century embodies the phenomenon of urban sprawl, characterized by the wide decentralization of the cities outwards. The factors that provoked the spread of the cities are found in the rise in car ownership, the poorer public transport services, the decline in walking and cycling and the excessive growth of built up areas while the population is diminishing. These aspects have influenced the quality of urban life and diverse features of the society, affecting the environment, the economics and the social dimension. [1]

The concern nowadays regards the way that cities should be developed in the future towards a more sustainable model, and the Compact City hypothesis has been proposed as one way to improve urban sustainability.

The Compact City is considered an urban form which can reduce the energy consumption and the car-dependency; it can revitalize the inner-city life and preserve green areas. However, the sustainability of the compactness has not found a general consensus yet, and the literature about the topic shows a difficulty in finding an accurate definition of ‘compact city’ and in analyzing what is a compact urban form, and which elements of the model contribute to the sustainable development.

The purpose of the present work is to provide an overview about the Compact City Model, and the debate underway about its sustainability as a strategy of urban planning for a sustainable future.

The thesis focuses on the analysis of Gothenburg’s case, presenting the strategies for the city’s growth, aiming to understand how and with what measures the city is using the densification strategy, and the relationship of this compact model with the development of a sustainable urban form.

The reason I have chosen the Compact City hypothesis as a field of investigation for my thesis is the fact that the strategies of urban development are an important method to increase the quality of life in our cities and for our future.
1.2 Structure

My Thesis analyzes the urban strategy for the Gothenburg Municipality’s growth. In order to do so, I present first a theoretical framework before I start analyzing the urban planning strategy, the spatial planning policies and the statistics data about the city.

Chapter 2 will give a theoretical overview about the following issues: the urban sprawl phenomenon in general of the 20th century and the impacts on the society and on the environment, the Compact City hypothesis as a strategy to prevent the decentralization of the cities, the debate on the Compact City and its sustainability. Furthermore, I will present the application of the Compact Strategy in practice in the case of Amsterdam, to give an example of the densification applied to an urban planning system in order to understand the dynamics, and to have a model to which I can refer to study the case of Gothenburg.

Chapter 3 will present the case of Gothenburg: I will give an overview about the city, analyzing the urban development and the problems concerning traffic congestion, social life, and environment caused by the urban sprawl.

The next step aims to examine the strategies for the city’s growth, to understand which elements and measures the city intend to steer to implement the Compact urban form, in order to promote a better quality of life for the citizens.

The thesis will finish with my conclusion in chapter 4, where I will recapitulate and discuss my findings.

1.3 Methodology

The content of my thesis will be based on a variety of literature in English and Italian language, mostly used for the theoretical chapter. In addition, articles published in professional journals and Thesis works will be also an important source of information.

Concerning the study case, internet will be used as a resource in order to find current data, statistics and official documents; furthermore, the conduction of interviews with the Municipality of Gothenburg will be a fundamental source of information to get an estimation and an overview about the urban planning of the city from people that actually work in this field every day.

2. Theoretical Chapter

2.1 The development of the urban sprawl

The form of the cities has been shaped through time by the income of new technologies and the cultural traits of the society. Cities before the Industrial Revolution were exemplified by dense and very small areas surrounded by walls, often one close to each other in a distance of not more than five kilometres to be able to walk from one city to another one (Newman, 1992). In this period, the functions of the governments were administrated at the city gate, where goods coming in and going out of the city were controlled (Smyth, 1996).

Since the sixteenth century all the economic activities have taken place within the city, and the change from handcrafts to a large scale factory production transformed the cities in dark smoky hives, becoming a huge machine of production (Mumford, 1961).

The development of new technologies during the Industrial Revolution enabled cities to build up a new urban form, characterised by sub-centres and an expansion out of the walls. This push outwards has been driven by the introduction of trains and trams, which allowed cities to spread up to twenty or thirty kilometres towards the outside (Newman, 1992).

Waves of urbanisation characterised the nineteenth century, which has turned into the inability to contain the city that presents the greater expansion outwards after the Second World War, where the technological development of the automobile took place. Now the automobile became the transport that shaped the city, which developed in any directions, filling first in between the train trucks and then expanding as far as fifty kilometres (Newman, 1992).

With the introduction of the car, people are not obliged to live in the city or close to a transit station, but they are able to escape pollution and noise by living outside the city, using the automobile to reach their place of employment every day. The direct consequence is the development of low-density suburban sprawl and the decentralisation of our cities since the early twentieth century, which characterised mostly North American, Australian and New Zealand cities and the European cities after the Second World War.

How the ‘urban sprawl’ can be defined? The most common definition which can be found in dictionaries and on the web claims that urban sprawl is the “unplanned, uncontrolled spreading of urban development into areas adjoining the edge of a city”. Other
definitions assert that it is “the occupation of the landscape” (Blake, 1964). Moreover, “sprawl stands for chaos, a lack of structure or demonstrable catalyst” (De Boeck, 2002). The European Environmental Agency (EEA) defines the phenomenon of urban sprawl as the “physical pattern of low-density expansion of large urban areas, under market conditions, mainly into the surrounding agricultural areas”.

In the actual literature and in the urban planning doctrine, there is no an accepted idea of what urban sprawl is, how it develops, how it can be measured, and in which forms can be considered sustainable, or not. The process of urban sprawl is very hard to be defined, as it occurs in several diverse shapes and it is considered a multidimensional phenomenon, formed by different parameters (Bernhardt, 2007).

The urban sprawl is a very complex process, and many factors have influenced the development outwards of the cities during last century. The main driving forces that have caused the decentralisation of the cities are the following:

- the progress of transports, which regards the expansion of cars utilisation;
- the economic priorities, which enable the green fields growth to give space at the new suburban infrastructure;
- the cultural traits, concerning the new trends of life styles in our society (Newman & Kenworthy, 1999).

After the Second World War, the automobile dependence become the main aspect of the urban life.

About forty years ago, the car was a means of freedom (Nyström, 2001), that gave the possibility to people to escape the crowded and polluted city, to enjoy their time in the tranquillity of the countryside. Today, advancing transportation technologies brought to the chaotic expansions of the city outwards, facilitating the separation between the home as the family nest, and the work.

The automobile become a sort of dependence to get into town, the easiest, fastest and most comfortable way to solve the problem of the distance between the home, the work, the school, the shopping centre, the gym and all the places which are a part of our daily routine.

The high level of pollution and the congestion in the city centre caused by the traffic of vehicles and the parking is the direct consequence of the uncontrollable spread of the automobile. The need to protect housing from the noise and the bad healthy conditions has increased the distance from the city, and new highways have been built to connect the
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new suburban areas with the cities.
The so called ‘Auto City’ development decreased the overall density to between ten and twenty people per hectare (Newman & Kenworthy, 1999), making feasible the low-density housing and increasing the journey distances.

The economic aspects played as well an important role in the spread out of the cities. The main factors that influenced the urban sprawl regard the land prices and the relocation of companies out of the core of the city. The cheapest prices of the lands, as further those are away from the city centre, caused the displacement of families outwards; in fact, the prices of lands in already built-up areas is much more expensive, as those are served by many existing facilities which are already established. (Bernhardt, 2007).

In conjunction, many companies of every genre of branches moved from the city to the periphery, where they benefit from low taxation, better road accessibility and more space (Bernhardt, 2007). The grow of shopping centre out of the cities, like the mall which contains all the facilities, and the good accessibility of these places increased more and more the development of the suburban areas, facilitating the low-density trait in our cities.

But the phenomenon of urban sprawl is much more complicated, as it includes also a variety of social circumstances. For example, young families with children consider the city as an unattractive, unhealthy, dangerous place to grow up their children; on the other hand, the suburbs are considered much more secure, with less noise, less pollution and lower crime rates. Moreover, the Post-war housing development has been built for a family size and households for other configuration has not been taken into consideration. When the children grow up, they move out and the parents remain in the big-family house, living in a bigger space that they actually would need. This trend brought fewer people per household and, as a consequence, fewer people per district (Nyström, 2001).

Urban sprawl is the result of the combination of many factors at the same time, which do not concern only the diffusion of the automobile, but also the economic prosperity, the new technologies and many aspects of the social life.

The consequences that urban sprawl have brought to our society regard several concerns about the environment, the social life and the economic dimension. My aim is to point out the unwanted effects of the decentralisation of the cities, and for what reasons this phenomenon has been, and still it is, criticised for the effects caused on our quality of life. The impacts on the environment and on the ecosystems are substantial, and the activities associated with the sprawl degrades the natural resources as surface water and ground water, wild habitats, air quality, landscape aesthetics and it influences the local climate.
conditions by the development of lands. [2]

The increase in the use of the car affects the quality of the air we breathe every day; now that distances are augmented from home to work, from work to the gym, or to school to pick up our children, etc., the pollution of the environment has dramatically increased, threatening the health of the citizens and the quality of life for the future generations. In fact, life in an urban sprawl development requires the need to drive the car three times more than in a high-density urban form. [2]

“Industry no longer takes first place in environmental pollution, commuting by car does.” (Nyström, 2001).

Beside the congestion of the city centre caused by traffic and parking, which is a severe problem for its liveability, the decentralisation created distances which leave us more and more dependant on the car. What about poor people, children and old age people which do not have the chance to owe a car? For them getting around is not an easy problem to solve (Nyström, 2001).

Social issue linked with the sprawl of suburbs is the increase of the segregation and the consequent development of ghettos, which is an actual problem in many neighbourhoods and different realities.

The loss of community values and less leisure time, due to the longer commuting times are also pointed as unfavourable assessments of sprawl’s social impacts. The crowded public spaces that once held the social life and were important meeting-points for the citizens do not exist anymore, because of the lack of the civic bonds to belong to a community and also due to the fact that people have less leisure time, which most of it is often spent by commuting to work by car or train.

The distance between sprawled areas implicates more investments in infrastructure, as the one for the water and energy provide, and the wastes removal, followed by the necessity to build more roads and to implement the public transports, which most of the time are few and far between and with sparse stops (Madureira & Möllers, 2006).

In conclusion, urban sprawl is damaging the quality of life of our cities, although many factors damaging the environment are also related to other forms of urban development and social phenomenon.

2.2 The Compact City Model

The Compact City Model becomes known as one of the solutions to face the problem of the rapid development of the decentralisation outwards of the cities. The compact form has been studied in the planning literature mostly during the last twenty years, to implement the sustainability within the urban environment.

The European Commission and national governments in many Western Countries adopted in latest years policies to promote the densification of the cities to reduce the pollution and the energy consumption (Breheny, 1995). In fact, the European Community and Agenda 21 encourage and require the high density development as a central principle for the growth of cities (De Roo, 2000).

Moreover, the hypothesis that the ‘compact city’ is a valuable solution to contain the sprawl has been claimed by the Council of the Protection of Rural England (CPRE, 1993) and by Friends of the Earth (Elkin et al., 1991), the British’s most influential environmental campaigning organisation, which has an extensive network in the world.

The model of a dense and charming core of historic European cities, seen by architects, planners and tourists as the perfect place to live and experience the vivacity of urban life, represents the image of the compact city from outside. In fact, the European Community has been the major promoter of the compact form, although the policies proposed have not found yet a practical application in our cities (Jenks et al., 1996). The lack of empirical researches on the validity of the principles of the hypothesis generated many critics and the arguments are debatable.

The United Kingdom developed a large amount of policies to generate higher densification, to reduce transport energy consumption, making this goal as the central element of the UK strategy for sustainable development since 1990. Moreover the majority of studies regarding the validity of the urban densification and empirical investigations have been developed in Britain, where the main writers are Michael Breheny, Elisabeth Burton, Katie Williams and Mike Jenks.

In addition, the Australian government and New Zealand adopted consolidation policies over twenty years, even though the implementation of those evidences a little difference of how a ‘compact city’ strategy is applied. The different approach to the development of the densification is probably due to the fact that these countries present different urban growth and varied form, which is immediately clear if European and Australian cities are compared (Arbury, 2005).
Define the Compact City

The concept [see Annex, def.4] of the Compact City has been defined by many authors and planners, and like the urban sprawl, it is a very complex urban strategy which involve several dimensions that are supposed to act together. The concept does not have a common definition, and it is often associated with the term of ‘urban intensification’, that “relates to the range of processes which make an area more compact” (Williams et al., 1996).

The first image which appears in my mind thinking about the ‘compact city’ is a concentrated medieval city with thick visible walls, and an assortment of activities confined within the borders.

“The so-called compact city has a variety of definitions but in general is taken to mean a relatively high-density, mixed-use city, based on an efficient public transport system and dimensions that encourage walking and cycling” (Burton, 2002).

Dantzig & Saaty (1978), one of the first that have made the effort to define the Compact City, give an explanation of the densification characteristics by presenting the features of the urban form, of the space and the social functions as follow:

Urban Form:
. High dense settlements
. Less dependence on automobile
. Clear boundary from surrounding areas

Spatial Characteristics:
. Mixed land use
. Diversity of life
. Clear identity

Social Functions:
. Social fairness
. Self-sufficiency of daily life
. Independence of government [3]

Lock defined the Compact City as a process of “ensuring that we make the fullest use of land that is already urbanised, before taking green fields”. Furthermore, Elkin et al. claim that the urban intensification leads to cities which are better suited to the pedestrian movement, to energy saving in public transports and in district heating, and it is not only a means to reduce the utilisation of the countryside by the urban development (Goodchild, 1991).

Breheny asserts that the compaction is a solution to solve the problems of the city within
its predefined space, without spreading out into the countryside its own troubles (Madureira & Möllers, 2006).

It is pretty clear that the compaction of cities is considered as one solution to the urban sprawl phenomenon, but an exhaustive and comprehensive theory [see Annex, def.1] has not been accomplished yet, and many questions remain around to what extent the Compact City widens beyond the increase of the density of the population, and how, when and under which factors or indicators it is possible to claim that a city is ‘compact’. Does the compactness have to be measured by the scale of a city? Or by its capacity of how many and what kind of functions can be fitted in? What is its intensity? (Thomas & Cousins, 1996)

“One of the key problems with the Compact City hypothesis [see Annex, def.2] is that it brings very diverse concepts together under a potentially misleading banner. Moreover, these concepts vary from polemics based on rather utopian ideologies through to minutely detailed empirical research.” (Pratt & Larkham, 1996). [4] Furthermore, there is a physical problem within the model caused by the several centres that many cities have spread out within the development of retailing spaces (Smith, 1996).

The aim of this work is to present the strategy and the benefits of the Compact Model until it has been studied and discussed in the literature, by presenting arguments, principles and study cases, and the expected impacts on the society.

The hypothesis of the Compact City is mainly based on the followings advocate qualities:

- high-density development;
- less car dependency;
- improvement of the public transportation services and support for the walking and cycling;
- mixed-use development and better access to services and facilities;
- the preservation of green areas and the conservation of the countryside;
- the regeneration of inner urban areas;
- the efficient use of infrastructure.

All of these aspects are considered the best efficient urban strategy [see Annex, def.5] from a sustainable planning development perspective for the social, economic and environmental dimensions, and they have to interact one with each other to increase the density from current levels. In fact, in recent years there has been a significant consensus that planning to get a more dense urban form is the most proficient way to reduce energy consumption and pollution (Breheny, 1995).
The supporters of the Theory believe that the urban densification, beside environmental and energy advantages, bring also economic and social benefits; although the main concern nowadays regards the problem of global warming and the climate changes, which can be attenuated by the development of dense urban forms.

Burton (2002) identified three main aspects of the Compact City: a mixed-use city, a high-density city and an intensified city. I would present what is meant by a ‘Compact City Model’ and its advantages by explaining the strategy of the mass transports, the mixed-use development and the social benefits.

To achieve sustainable environmental goals and a better health for the citizens, the Compact Model [see Annex, def.3] promotes a less car dependency and the improvement of the public transports. The development of strategic policies to reduce the travel journey by car aims at the decrease in air pollution and CO$_2$ emissions per capita, and the high-density form aims to increase the efficiency of public transports and to lessen the road infrastructure to save the waste of land.

The relationship between transport and urban form is a fundamental aspect of the Compact Model, as diverse principles regarding the use of land must be taken into consideration. For example, the hypothesis of using the third dimension (the air and underground space) is an important option for the compact city concept, as the quantity of space is limited (Niijamp & Rienstra, 1995).

The work of Newman and Kenworthy provides the evidence that the urban forms characterised by higher density are associated with a high use of public transports and less fuel consumption. They measured the consumption of petroleum per capita and the density of the population in different cities in the world, finding a negative correlation between the two, although these findings cannot be simply generalised, as the environmental benefits of a Compact City depend also on many other social and economic driving factors.

The conclusion of the study was the necessity of new better policies regarding the urban containment and more investments in mass transport system (Breheny, 2004). Another evidence about the relationship between urban density and fuel consumption is given by the ECOTEC study made by the Department of Environment, where it is proved that the total distance travelled by car per week is less where the population density augments (Breheny, 2004).

As the hypothesis of compaction asserts, the modal shift from the private car to the public transport is much more efficient concerning the emissions of harmful gases and the
increase of pollution. In fact, most of the collective transports are powered by electricity, and when this is produced by solar, wind or bio fuel energy, the reduction of emissions is significant (Niijamp & Rienstra, 1996).

Other advantages are presented in the article of Niijamp & Rienstra (1995), where it is claimed that the modal shift to public transports influences the use of the space by having a larger capacity of the infrastructure, which it is important especially in a compact city characterised by little spaces. In addiction, also the amount of solid waste is reduced because of the long life time of the vehicles; social security, social costs and less noise in urban areas are mentioned as well as advantages of the collective modes.

In order to implement the use of collective modes, new strategic policies have to be put in practice to discourage the use of the automobile. Niijamp & Rienstra (1995) suggest the increase in parking levies and the reduction of parking places to make the use of the car less attractive; also the road pricing is considered a good strategy. Furthermore, the stimulation of the use of public transports can be helped by a discount bus-card released by the working places within the contract of employment.

The strategy of the implementation of the public transports has to cope with other tactics to reach the objective of a sustainable city. Another measure that the Compact Model points out to reduce fuel use and emissions of greenhouse is the importance of the mix urban uses, which is a fundamental element that can realise a sustainable urban form. “Neighborhoods should be compact, pedestrian-friendly, and mixed-use” (Charter of New Urbanism, 1996). Many critics have been addresses to the single-use zone that contributed to the urban sprawl, and new policies should encourage the planners to include a mix land use development in their projects. “[.] residential, employment and leisure uses should be brought together where possible” (Fulford, 1996).

The Planning Policy Guidance 13 promotes the development of policies which “seek[s] to reduce car dependence by facilitating more walking and cycling, by improving linkages by public transport between housing, jobs, local services and local amenity, and by planning for mixed use” (PPG13, p.8).

The mixed-use strategy, which is hand in hand with the high-density approach, refers to four main dimensions, which are: the social mix (housing, demography, visitors, lifestyles), economic mix (business activity, consumption, production), physical land use mix (vertical and horizontal, amenity and public space), temporal mix of social and physical issues (Evans & Foord, 2007).
All these four dimensions have always been treated as disconnected elements in the design of urban policies and strategies, although their inter-action is fundamental to understand the effects of the urban development and the land use change (Evans & Foord, 2007). Evans & Ford collect the urban environmental elements, which contribute to the quality of life of high-density and mixed-use locations, in the following scheme.

FIG.1 : Interaction of urban elements

Jane Jacobs (1961) presented four main essential conditions to generate a mixed-use development, which generates ‘exuberant diversity’ in city’s districts:
- each district has to serve more than two different functions to ensure the presence of people on diverse schedules and have different purposes for being in that place;
- the possibility to turn corner should be recurrent, so the blocks must be short;
- the building of a district must be vary in age and conditions;
- there should be a dense presence of people, including the residents.
All of these conditions are considered necessary to develop the potential vitality of a district (Jacobs, 1961).

An interesting aspect of the mixed-use is presented by Burton (2002), which identifies the possibility of a mix development in a vertical way, where the same building hosts different functions, or in the horizontal way, where the different functions are set up side by side. The mixed-use strategy is necessary not only in order to decrease the use of the automobile, but also to answer at the demand of housing due to the increased population and changes in social trends, as the high percentage of singles and ageing people. “Local Planning Authorities should develop housing density policies” (PPS3, p.16), in order not to waste space and by offering range and choice to the population. The high-density development is encouraged in the PPG13, which claims that local authorities should set measures to maintain the existing densities and increase them where it is feasible. Moreover, the development of mixed-use buildings for housing, retail, commerce, offices is needed to encourage local employment and to augment the economic sustainability of local business because of their location in the proximity of a large number of people (Arbury, 2005). “Mixed use development can provide very significant benefits, in terms of promoting vitality and diversity” (PPG13, p.12).

The reduction of the need to travel to work and routine activities is another advantage of the mix use form (Evans & Foord, 2007): instead of driving every day, the mixed-use promotes the walking and cycling modes, made possible by the concentration of activities hosted in new buildings erected in spaces left empty by brown field areas, which have been renewed. “The increased use of existing buildings or sites; changes of use, which lead to an increase in activity; and increased in the numbers of people living in, working in, or travelling through an area” (Williams et al., 1996).

The Compact City hypothesis promotes the social justice as a prerequisite to achieve urban sustainability, as it has been claimed at the Rio Summit in 1992. The researches regarding this issue are limited, probably because of the difficulty to define the social sustainability (Burton, 2001). Moreover, empirical researches about the sustainability of the densification have always been centred on environmental issues as energy consumption, natural habitats, waste of land and green fields, and the rate of pollution. The compaction strategy claims that the urban densification supports and promotes the fairness of the distribution of resources in the society, acting in favour of disadvantaged groups and reducing the gap between the advantaged and the disadvantaged (Bur-
Elisabeth Burton examines the legitimacy of the statements that a higher compaction of cities promotes benefits for the life-chances of low-income groups (Burton, 1999). One of the arguments which supports the social equity is the possibility to have a better access to facilities and services in a compact urban development. In fact, the mixed-use and the high-density play an important role in favour of the disadvantaged: the grouping of different activities gives the possibility to people without a car to save money in travelling to stores out of town, or using more expensive local stores. Furthermore, the potential to reduce the distances between home and work permits to save time and money usually spent in commuting (Burton, 1999). The reduce of crime is mentioned as well as an argument in favour of the densification, and as “Jane Jacobs argued, the presence of ‘eyes on the street’ deters wrongdoing and promotes personal safety” [5].

The level of social segregation can decrease with a dense urban form, where the communities are more mixed and not spatially segregated, as the phenomenon of segregation apparently is a result of the decentralisation. The researches demonstrate that compactness may encourage the social equity for some aspects, but at the same time, it can be negative for others. The evidence suggests that the benefits include the reduction of social segregation, the improvement of public transports and the better access to services (Burton, 2001).

A number of indicator to determine the compactness of a city does not exist yet; although I will present a table about indicators to measure each of the three aspects of urban density (mixed-use, intensification, density), which has been identified by Elisabeth Burton to study the effects of compactness on social equity.

In fact, the main problem of the Compact City Model is the lack of objective indicators that can define whether a city is compact or not. After studying and investigating this topic, I believe the indicators that should be taken into consideration are also the percentage of bicycle, public transports and car users in order to understand at what degree a city is compact, due to the fact that a high percentage of bikes and public transports users usually corresponds to a dense city.
Burton (2001) makes use of the table above in the case of some English towns and district, in order to understand if the Compact City promotes the social equity. Levels of compactness have been compared with corresponding levels of social justice to identify any possible relationship between the two sets of indicators (Burton, 2001).

The findings demonstrate that some indicator of the Compact hypothesis support social equity, some others don’t.

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**FIG.2: Table- Indicators of Compactness**

<table>
<thead>
<tr>
<th>DIMENSION OF COMPACTNESS</th>
<th>NATURE OF INDICATORS</th>
</tr>
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<tbody>
<tr>
<td>Density</td>
<td></td>
</tr>
<tr>
<td>Density of population</td>
<td>Persons and households per hectare</td>
</tr>
<tr>
<td>Density of built form</td>
<td>Persons and households per hectare within built up areas and residential area of district</td>
</tr>
<tr>
<td>Density of sub-centres</td>
<td>Density of most dense ward (p/ha)</td>
</tr>
<tr>
<td>Density of housing</td>
<td>Percentage of housing stock made up of higher and lower density housing, and small and large dwellings</td>
</tr>
<tr>
<td>Mix of uses</td>
<td></td>
</tr>
<tr>
<td>Provision of facilities</td>
<td>Quantity of ‘key’ facilities</td>
</tr>
<tr>
<td>Horizontal mix/spread of facilities</td>
<td>Percentage of postcode sectors containing less than two, four or more, six or more, and all seven key facilities per postcode sector, variation in number of facilities per postcode sector, and variation divided by average number of facilities per sector</td>
</tr>
<tr>
<td>Vertical mix of uses</td>
<td>Incidence of mixed retail/residential and commercial/residential development</td>
</tr>
<tr>
<td>Intensification</td>
<td></td>
</tr>
<tr>
<td>Increase in population</td>
<td>Rate of in-migration 1981-</td>
</tr>
<tr>
<td>Increase in development</td>
<td>Rate of new house building, change in proportion of small and large dwellings, derelict land reclamation and planning approvals 1981-91</td>
</tr>
<tr>
<td>Increase in density of sub-centres</td>
<td>Change in density of most dense ward 1981-91</td>
</tr>
</tbody>
</table>

The Compact City is a very important challenge the world needs to face and to put effort in, to achieve the goal of a sustainable development of our cities.

Since I faced difficulties in finding a general consensus on the driving factors of the concept of the Compact City, and the lack of empirical researches is considerable, I have collected the benefits of the densification strategy which are under discussion nowadays. In my opinion, it is very hard to find an objective strategy which can be applied in such different contexts; each city should deal with its own urban development and form, applying the compaction strategy and implementing policies to contain the sprawl outwards in order to improve the quality of life for the citizens.

4.3 The critics on the Compact City Model

Since 1987, when the Brundtland Commission report established that the protection of the natural environment has to become a political priority, an international debate across the world took place at inter-governmental, governmental and local government levels. Changes in policies and in political attitudes have been displayed in many countries, and the problem was how to develop sustainability to get environmental improvements (Breheny, 1996). The clear answer at this question was through the use of planning systems; at the end of the 1980s and at the beginning of the 1990s, a widespread consensus claimed that the urban compaction is the greatest planning strategy to achieve a sustainable development. The Compact City hypothesis became “so dominant that it seems inconceivable that anyone would oppose the current tide of opinion towards promoting greater sustainable development and the compact city in particular” (Smyth, 1996).

Since the concept of the sustainable development came into force, the “planners are about to become the heroes in an as yet unwritten play. [..] It provides the opportunity to return to a period of planning [..] based on a set of principles accepted globally and endorsed nationally” (Welbank, 1996).

The debate on the Compact City Model raised up when the benefits expected from the implementation of compact policies did not happen as it was claimed. Empirical experiences in some cities in Britain demonstrated that after ten years since the intensification, no reduction of car used has been proved, and other problems showed up, like the increase of pollution in the city centres due to the higher density and traffic. “[..] there is an evidence which suggests that these claims are at the very least romantic and dangerous, and do not reflect the hard reality of economic demands, environmental sustainability and social expectations” (Thomas & Cousins, 1996).

Moreover, “there was found to be a significant difference between the romantic, vibrant, traditional city and the reality of traffic congestion, poor environmental quality and ‘town cramming’; in other words ‘the city’ was something which many people wished to escape from, through suburbanisation and rural living, rather than embrace” (Williams, 1999).

Is the compaction of cities the urban form that can deliver a sustainable development of the cities to protect the environment? This is a hard argument of discussion in the contemporary debate.

The debate is actually between two groups: the ‘decentrists’, in favour of a decentralise form, and the ‘centrists’, in favour of a high-density and compact urban form.

My intention is to present the critics to the Compact Model moved by the decentrists, by
presenting their argument, in order to have another perspective on the hypothesis.
The dominant reasons which keep the debate on fire are the global warming, and the consequent reduction of gas emissions, and the loss of green fields and open countryside in favour of the urbanization. The centrists’ view insists on the urban containment to decrease the need to travel by car, by provoking shorter journeys and better public transportations (Breheny, 1996). Through the literature the main point against the Compact hypothesis that are discussed in the debate concern the scepticism on the environmental benefits delivered by the strategy, and the very modest expected energy reduction compare to the discomfort caused by the necessary rigorous policies. Decentrists believe also in the impossibility to halt the urban decentralisation phenomenon, which has developed already during the last century and it fits the attitudes of the major part of the population, which prefers to live in the tranquillity of rural and semi-rural areas, far away from the chaotic city.

“Generally, marketing surveys carried out by house-builders reveal a strong preference for houses with gardens and as much space in both as possible” (Breheny, 1997).

“One definite problem with the compact city proposal is that requires a complete reversal of the most persistent trend in urban development in the last 50 years: that is, decentralisation” (Breheny & Rookwood in Blowers, 1993).

Another point against the model regards the inevitable development of green fields outwards and the loss of urban green spaces in the cities, due to the increased congestion and high-density development (Breheny, 1996). The decentrists believe that a high and better quality of life in a dense urban form is not ensured as the congestion and the lack of green areas in the cities will cause more pollution, more traffic and overcrowding streets. Moreover, they claim that some empirical researches in some London Boroughs, where intensification policies have been applied over ten years, showed that there has not been any reduction in the use of the automobile, and that the walk-trips in these mixed-use areas are a supplement instead than a replacement of the car (Arbury, 2005). The critics on the compaction strategy are moved as well to the disadvantages regarding the social equity, which is associated with an over weak relationship within compactness.

The increase in density will cause the reduction in housing size; health risks are linked with residential overcrowding and mixed-use development, as the urban densification will lead to a higher congestion and pollution of the city centres. The issue concerning the augment of crimes in high-density urban form has been determined by many empirical researches, which asserts that more dense urban areas are often responsible for high crime
The critics on the Compact strategy point out the problem on the affordability of housing, claiming that the reduction of available land to build on will be better increase the prices of the dwellings for the citizens, rather than decreasing. “It is to be expected that congestion and property costs will rise in the Compact City” (Breheny, 1992). Gordon & Richardson are the protagonist, among Evans, Simmie, etc., of the debate, not supporting the case for promoting compact cities. They evaluate whether or not the promotion of the model is a worthwhile planning objective, although by restricting their remarks to the case of United States. Their study focuses on the pressure on agricultural land, where they demonstrate that America is not running out of open spaces; on the low-density settlement as the overwhelming place where people prefer to live; on the benefits of suburbanization, which reduce congestion; on the efficiency of compactness which has never been sufficiently demonstrated; on the feeble relationship between social equity and higher-density (Gordon & Richardson, 1997).

According to Breheny (1997), the environmental benefits delivered from the compaction have been quite studied, although the conclusions are pretty vague and vary from case to case. In his study about the Britain case, the author determines three different types of investigation to test the compaction case, which are the veracity, the feasibility and the acceptability. Breheny (1997) wonders if the principles of compaction are feasible, and if the solution would be accepted from the communities affected. Breheny's intention is to concentrate the attention on the economic and political feasibility of the Compact hypothesis, wondering “the degree to which the compaction logic defies the market, and the degree to which the market can or will bend”. In fact, the economic benefits of the densification have often been inquired, and the empirical evidence which demonstrate that higher-density leads to an economic growth is very scarce (Gordon & Richardson, 1997). Moreover, Breheny (1997) examines empirical data regarding the effects of the compact policies on the population, which results deeply unsatisfied about the higher-density of dwellings development, as it has been proved that “[i]f you give me a garden then you’ve got my vote” (Fyson 1996). [9]

Furthermore, unsolved problems and contradictions point out by the decentrists gaze at the high energy and renovation costs needed to reuse the existing infrastructure in the inner city, which might discourage investors in choosing urban sites to develop their activities. And also those investors are the same that years ago abandoned these inner urban areas to seek for more space (Thomas & Cousins). The aim of the centrists to reach a
better quality of life through the compaction strategy is considered in contrast with the intensification of the infrastructure, which will steal space at the green areas.

The socio-psychological factors are very important in the promotion of a denser form, as they play a role that cannot be ignored. The necessity to change the travel behaviour of the citizens is essential, and the critics on the Compact Model insist on the big psychological responsibility of the automobile: are the policies to improve the public transports and the higher density enough to modify the behaviour of the citizens in abandoning their cars for the journey travels?

The private car is psychologically very significant, as it embodies the comforts of having a private transport, the personal control, the nice feeling of being sitting in a warm place when is cold outside, and colder during the hot summer days. This pleasant feeling can be increased when the goal of a more compact urban form will be achieved, with its more crowded and traffic streets compare to a diffuse form (Nijkamp & Rienstra, 1995). That is way the behaviour of the citizens is hard to be changed, as they perceive low benefits from other transportations modes.

The promoters of a compact solution and the decentrists are obviously the extreme parties of the actual debate; to mention the existence of the compromisers I believe it is important to understand that a third attractive theory can be achieved and it is actually discussed, even though usually compromises are not the most fashionable solutions. The compromisers accept as true the regeneration of urban sites, the containment strategy and the development of new intra-urban environmental programmes, in order to obtain sustainable goals without damaging the quality of life. From the decentrist side, the compromisers allow the growth of new settlements in the form of environmental friendly development, to take into consideration the necessities of the market without being passive to it.

The debate so far does not present any final solution and conclusion, as the general agreement claims that it is certain that urban decentralisation is not a sustainable strategy for urban growth (and it has been deeply proved during the whole last century); on the other hand, the compaction of cities is still a questionable method towards the protection of the environment, as it riddles vary contradiction and complexities. Does a common acceptable solution about an urban sustainable strategy which is applicable to the all city’s variety of sizes and forms exist? (Retoric question, of course)
Like Jenks et al (2005) assert, “[..] as everywhere is so different, there is certainly no ‘one size fits all’ solution. However, there are many pathways to achieve sustainability. [8]


2.4 Compact strategies in practice: Amsterdam case

2.4.1 Presenting Amsterdam

Amsterdam is the capital of the Netherlands, and it is situated in the north of Holland with a population of about 750,000 inhabitants and a density of 5,809 inhabitants/kmq. It is known as the greatest planned city of northern Europe, with a good economy and its tolerant character. [10]

Amsterdam is a part of the Randstad Polycentric Region situated in the western part of the Netherlands, with Utrecht, Rotterdam and The Hague as major cities. These cities are separated by green areas and located on an imaginary ring which surrounds a predominantly rural area called the “Green Heart”. Amsterdam is considered the image of the modern urbanism, where the phases of the town planning history are clearly recognizable in the urban development of the city, a model to look at as an example of city planning.

The origins of the Dutch capital are rooted in the thirteenth century: the first known evidence of the name “Amsterdam” goes back to a document dated 1275 which mentions that the inhabitants of a small fishing village, situated on the banks of the River Amstel, had built a bridge located before its mouth, which was already equipped with wooden doors that could be closed if necessary. That is why “Amsterdam” means precisely “on Amstel’s dam.”

The city continued to grow and soon joined the diocese of Utrecht, but it was only in 1300 that the official status of the city had been guaranteed. The 14th and the 15th century were characterised by a rapid development, which laid the foundation for the Golden Age in the seventeenth century, when Amsterdam became the largest European port and one of the major financial centers worldwide: during this period Amsterdam continued to widen, especially in areas around the canals.

In the eighteenth and nineteenth centuries, because of wars with England and France, Amsterdam saw its rapid decline, and the Napoleonic War is probably one of the darkest parentheses in the history of the city.

The economic growth started again between 1813 and 1940, followed by a great expansion after 1870 when the Industrial revolution brought the increase of the wealth and a rapid population growth.

Amsterdam was known as the “magical centre of Europe” in the 1960’s and 1970’s, due to its tolerance on soft drugs and to the widespread occupation of abandoned buildings. The big migration from Morocco, Turkey and Suriname that characterized the 1980’s
provoked the development of satellite city and new neighborhoods around Amsterdam. Nowadays the city presents emergencies concerning integration, security and discrimination mostly caused by the collision between diverse cultures and ethnicities which are not able to live amicably. [11]

2.4.2 The urban development of Amsterdam

The Amsterdam’s urban development has been shaped at the beginning by the topography of the territory, growing continuously by the radio concentric disposition of the settlements. [12]

![FIG.3: Amsterdam 1550](image)

The first urban plan has been made by Kalf in 1875, which implemented the modernization of the city in order to take advantage from the expansion that concerned the population growth from 230,000 to 683,000 inhabitants between 1850-1920 (Panerai et al., 2004). The key points of the plan proposed were the ring development around the old city core, by using the irrigation grid of the existing canals; this system brought to the abandonment of the radio concentric development in favor of two main orthogonal directions. Kalf did not plan the construction of new buildings, which has been left in the hands of speculative developers: this can be considered the starting point of the social segregation and the formation of working-class districts in contrast with bourgeois neighbourhoods (Panerai et al., 2004). [12] The new districts occupied little by little the left over land between the enclosed space of the canals and the boundaries of the communal territory, as Spaarndammerbuurt, Staatliedesbuurt, Kinker, Dapperbuurt, Pijp and Osterparkbuurt. The urban form of the city after the built of the new housing results very dense and crossed by many canals, due to the characteristics of the territory, where the stability of a building depends on those next to it (Panerai et al., 1987).
The nineteenth century is marked by the abandonment of the radio concentric system and the implementation of the orthogonal grid.

In fact, the year 1896 is very important for the city of Amsterdam, because its territory expanded from 3250 ha to 4630 ha, due to the attainment of Nieuwer-Amstel. Berlage was responsible for the connection of the old city core with the new Zuid district, and the design of the latter one. Berlage did not apply the orthogonal system proposed by Kalf, but projected a homogeneous dense area with its own structure, huge boulevards characterized by a similar grid of the canals of the old city. The Zuid Plan (1917-1940) has been created from the idea of a compact city, and implemented by the design of many public and symbolic places for the citizens (Morbelli, 1997).

FIG. 5: Zuid Plan

During 1929-1932 another urban plan for Amsterdam has been projected by Van Eesteren, with the objective to reduce the land-use and the commuting time for the citizens. Van Eesteren rooted his plan (The General Extension Plan AUP) in the concept of the ‘functional city’, which divided the different functions in different areas (Morbelli, 1997), and which has been approved in 1935, but because of the Second World War the plan has been realized between 1950-1970. The industrial areas were located along the Nordzee Kanaal, in the south-east and south-west of the city; in the west, close to the city centre, is located the expansion of the new residential district (like Slotmeer); in the south a new park of 900 ha has been created. [12]

FIG.6: General Extension Plan AUP 1935

The plan rejected the idea of compaction towards the creation of residential areas for 10,000 inhabitants, where the collective services are reachable in a walking distance, and where each district is separated by green belts that end up in big parks in the south-west of the city (Gravagnuolo, 1991).

After the Second World War the diffusion of unemployment brought the population to emigrate from the periphery areas of the country to the flourish Randstad Region, implementing the urbanization and the congestion of the latter one. This is the reason why the politics of the post-war were focused on the development of decentralize poles in order to de-concentrate the population (De Klerk, 1986).

Amsterdam, after 1945, needed to be renewed and rebuilt, starting by restructuring the existing building stock, the relocation of industrial sites and the de-concentration of the population, aiming at the fair distribution of wealth throughout the land by getting rid of unemployment.
The sixties are characterized by the widespread diffusion of the car and the trend of living in the countryside; as a matter of fact, people started buying houses with garden and parking in a low density area out of the city, implementing the commuting time by car from home to work of about one hour (De Klerk, 1986), provoking traffic and congestion.

Not only the population but also companies moved out the city to settle their factories in the countryside, where the land price was much cheaper. After the sixties the basic problem was the uncontrolled urban sprawl of Amsterdam outwards, due also to the lack of space in the inner city.

At the outset of the seventies Amsterdam found itself face to face with heavy problems, such as: the migration of families with medium/high income, an ageing and impoverished population left behind with a fall in the rate of activities, the pauperization of the old residential districts, the recession of the urban economy. Between 1960 and 1980 Amsterdam registered a loss of 200,000 inhabitants, from 869,000 in the sixties to 676,000 in the eighties (De Klerk, 1986).

In this period fields such as traffic, transport policy, water management and environmental planning became an emergency (De Roo, 2004).

The General Extension Plan (1974) has been introduced in order to decentralize the city, due to the increase in housing demands and pressure on urban space: no space was left in the municipal’s borders to build dwellings, and as a consequence new suburbs of 100,000-130,000 inhabitants each have been created out of the city’s boundaries, one in the west, one in the south and the last one in the south-east, connected with the city centre by radial streets.

The development of urban sprawl is a phenomenon that affected the city of Amsterdam, and after the analysis of the urban development the key factors that have caused the sprawl can be resumed as follow: the lack of space for building new housing, the citizens behavior which preferred to live in single detached homes with garden and car parking on large lots, the implement in the use of the car, the demographic and economic development, and the deterioration of the city centre.

2.4.3 Amsterdam and the Compact Model

Amsterdam can be defined a Compact City both for its dense urban form and for the compact policies that have been implemented since the seventies. In fact, Netherland is considered to be among the initiators of the idea of the Compact City, with diverse concentration policies to implement the economy and the social problems, like the segregation caused by the spread of the city.

It is important to underline that the promotion of the ‘compact city’ first was not intended as the spatial blueprint for sustainability, but it was a directive to intensify the urban space with the necessary care (De Roo, 1996).

Amsterdam’s Municipality started working towards a Compact City since 1978, when the citizens contested the transformation of the city core in a central business district and the relocation of the inhabitants of the city centre in the periphery (Morbelli, 1997). A new master plan was drafted because of a switch in planning policy brought about by the Council after 1978, which was faced with the task of finding space, and opted for the promotion of a ‘compact city’ in opposition to the ‘fragmented city’ (Klusman & Teunissen, 1986). Because of the negative effects of the functions’ separation, Amsterdam promoted the mixed-use, the diversity and the intense use of space to achieve the great quality and functioning of the urban life and to fight social imbalances and the bad economy that have influenced the attractiveness of the inner city (De Roo, 2004).

The breakthrough of the Compact City concept has been confirmed with the emission of the report “De compacte stad gewogen” (The Compact City Evaluated) in 1985, which motto was ‘the city in the centre’ (De Roo, 2004), and with the ‘City Central’ Structure Plan, that promoted the process of reversion of the de-urbanisation in favour of developing compact cities, and it was the first structure plan to deal with all policy areas in an integrated manner. The report describes the strategies and benefits of the compact hypothesis, as the traffic reduction, a better quality of life, the limitation of the sprawl and the improvement of the accessibility; although at the beginning the compact strategy has been used mostly with housing in order to abate income attrition (Faludi, 1992). Nevertheless, the compact city policies evolve rapidly and constantly in other sectors, such as economy and transports. The leading principles claimed by the report are: (De Roo, 1996)

- to increase the city’s population and limit the increase in use of urban space;
- to emphasise city and landscape, build by adding to the existing structure;
- to emphasise public transport and low traffic speeds in the city;
- to strengthen spatial and functional cohesion;
- to distribute facilities to limit necessary traffic and improve accessibility for inhabitants;
- to utilise investments already made.

These leading principles aim at the change in traffic patterns as a result of compact building, which should lead to a reduction in mobility.

The City Central Structure Plan opted for urbanization in an east-west direction, and the reinforcement and preservation of the city-centre is the key-factor, where the mix of functions had been strengthened and new housing location had been found (Jolles et al., 2003).

New policies have been focused on improving the competitive position of public transport, by opting for a radial system instead of a tangential system on the edge of the pre-war city, also to support the existing city’s facilities (Klusman & Teunissen, 2003).

FIG. 7: The City Central Structure Plan


In the 1990s, VINEX (the Fourth Policy Document on Physical Planning) dominated the spatial policies in the Netherlands, by serving as a framework for making decisions and it elaborates what is considered as the most desirable urbanisation pattern and it describes how this can be achieved (De Roo, 2004). The point of departure of this document is the harmonization of housing provision, physical planning, environment and mobility, reaffirming the faith in the concept of the Compact City. The VINEX policy covered the period between 1990-2005, and it has been extended to 2010.

The main points of VINEX report are the concentration of activities in the city regions in order to fortify the economy, to reduce the consumption of land and the car use in favour of public transports and bike use (Kruythoff & Teule, 2006). The new constructions
have to take place first in areas already urbanised, in proximity of services and facilities to reduce mobility; second preference goes to areas bordering built-up sites, then in places at a short distance from existing agglomeration (Kruythoff & Teule, 2006).

The report claims that Compact Cities should develop as networks in the region without losing their individual character and by using spaces inside the boundaries of the city, and by redeveloping industrial sites in disused and railway yards (De Roo, 2006).

The Amsterdam Structure Plan 1991, 1996, 2003 were adopted by the City Council that implemented the ‘compact city’ as the basic principle, following the VINEX guidelines, by introducing also policies for social renewal that were meant to provide a solution for socially disadvantaged people. New policies to reduce the commuter traffic has been introduced, by increasing the connections with the most important employment areas with bus, tram ad trains; the bicycle is a very diffuse transport mode for the Amsterdammers and in order to reduce the road traffic, a new system of good urban cycle routes linked with public transports has been planned for the city (Kruythoff & Teule, 2006).

FIG.8: Bicycle parking in Amsterdam

The cycle paths appeared for the first time in the General Extension Plan (1934) where the most important roads were implemented with paths for bikes. “In the thirties, the bicycle was the dominant means of transport in a compact city with very little car traffic and scarcely any need for special provisions”. [15]

Until 1955 over 75% of journeys were undertaken by bicycle, but during the sixties the use of the bicycle declined, reaching the 25% in the seventies. This phenomenon is due to the implement of the automobile ownership, the economical growth and the spread of the city. During the eighties the realisation of a cycling infrastructure has been made, including storage facilities at metro, railway and bus stations. [15]

The Structure Plan 1996 stipulated a cohesive green structure in order to protect the most important green areas from construction and to ensure a good quality of life and a live-
able city to the citizens. The Structure Plan 2003 includes a regional outlook for the first time, and it opted for urbanity which is considered a great contribution the city can make to establish a ‘network city’ on the regional scale. This requires the realization of metropolitan densification in Amsterdam, with the construction of 10,000 dwellings through to 2010, while 50,000 are planning after 2010 (Kruythoff & Teule, 2006).

Some studies about the spatial effects of urban development have been made by environmental policymakers in order to monitor the impact on the environment of the Structure Plans. The first National Environmental Policy Plan (1989-1993) supports the Compact City strategy as a spatial concept; the second National Environmental Policy Plan, however, presented contradictions between the compact urban development and the quality of the local environment, which leads to several dilemmas when they intersect.

In 2005 the first Sustainability Report of the city of Amsterdam has been published, describing the efforts and the strategy of the city, the services, and the enterprises to achieve the balance between social, environmental and economic interests. The Compact City is claimed to be one of the strategy to achieve sustainable development, by using in the most efficient way the limited space left available in Amsterdam. [13] The Planning Department is working towards the compactness of the city by accommodating facilities at the neighbourhood level, by covering distances with bike, walking or by using the clean transport system, and by reducing the use of raw materials and energy use. [13] During recent years, diverse urban plans have been implemented by using more intensively the space left available in the city’s borders, like the renovation in the Bijlmermeer district, in the Eastern Docklands, in IJ riverside, and the development of the Zuidas zone into mixed-use areas, combining housing, working and public facilities. Beside the urban regeneration and the intensification of land use, the new district in Amsterdam-Zuidas has been created following the strategy of the Compact City, with high-density construction and mixed-use. [13]

FIG.9: Amsterdam-Zuidas

>Source:www.img.photobucket.com
The new Ijburg district is an example of compact and sustainable site, designed as a mixed-use area where all the facilities are reachable in a walking distance, and also “the children can make their own way to school”. [13] The district integrates working and living, high quality transports that link Ijburg to the city centre and many green areas and playgrounds.

Nowadays, the statistics regarding the current mode of transport in Amsterdam are 35% bicycle, 40% car and 25% public transports. That is why the city is implementing transport policies, described in the Amsterdam Traffic and Transport Plan, to improve accessibility and the life-quality.

These policies aim at the integration of cycling issues with the traffic and transport policies, environmental and planning policies aiming at the switch from car to cycle by creating also new cycle routes in and surrounding Amsterdam. [15]

Parking policies have been developed since the nineties to discourage the use of the car, For reaching the objectives promoted by the Compact City strategy towards sustainable development Amsterdam still needs to walk a long path, although it can be considered a Compact City, in the sense of the urban form and the spatial planning strategy that has been applied since more than thirty years. The implementation of compact policies must be complemented with assistance to travel behaviour at the individual level, in order to make people more aware about the impacts on the environment of our cities.

3. Gothenburg case

3.1 Presenting Gothenburg

Gothenburg is a city situated near the mouth of the river Göta älv, in the south-west of Sweden in the Västra Götaland County, and is the second largest city after Stockholm, with a surface of 450 mq. The population is about 491,000 in the municipality, with a density of 1,084 inhabitants/kmq, the 80% Swedish and the 20% from other countries, and about 900,000 in the region. Furthermore, Gothenburg is the largest student city in Sweden, with 61,000 students, as the Chalmers University is well known internationally, and the major amount of people between 20 and 30 years. [16] The city is well connected by road and rail to Oslo, Copenhagen and Stockholm. It is also the biggest harbor in Scandinavia and its importance is also due to the fact that it is in a distance of 500 kilometers from the 70% of the industries in the Nordic countries. [17] Trade and shipping have always been the main source for the city’s economy, but also manufacturing and industry contribute to the wealth of Gothenburg, which hosts big companies such as Volvo, Ericsson, SKF.

The historic centre is situated on the south bank of the river, where the land is flat, characterized by wide avenues, canals, green spaces and institutional buildings. Housing is in high demand in the core of the city, which is considered an attractive and safe area. Away from the centre and from the river the land becomes hilly and here the most of population live in suburbs. The industrial land is mostly concentrated on the north bank of the river, in front of the centre. [18]

3.2 The history of Gothenburg urban growth

First era: the consolidation of the city.

The Old Town (Nya Lödöse 1473-1621) grew up in the same location as Marienhofm today, but starting from 1621, the town moved to Gothenburg, where the Danes settled down the final foundation of the city, which is considered the precursor of the contemporary city. In 1603 the king Charles IX named this small town Göteborg from the settlement on the northern bank of the Göta river; however in 1611 the village was burnt down by the Danes. The strategic position in the narrow area between the Norwegian and Danish territories made the settlement a craved prey for the surrounding countries, which tried to get it for years. The year 1621 is considered the official date of foundation of the city by King Gustav II Adolph, which gave birth to Gothenburg; the first town plan has been
made by Dutch experts in building on a marshy soil, which has been consolidated by an angled moat, determined by pointed bastions and fitted with internal drainage channels. The city developed with the blueprint of Amsterdam, with orthogonal streets and canals. [19]

In fact Gothenburg has been influenced pretty much by the Dutch culture, following Dutch laws until 1652 when the Swedes acquired political power. The city had to chance to expand its borders on the north and south of the coast, and the most productive industry during 18th century was fishing. [24]

Second era: the trade and industrial city.

During the 1700s Gothenburg began to expand with the growing international trade. In 1731 the trade to Asia has been opened thanks to the foundation of the Swedish East India Company, and porcelain, tea, spices, textiles were shipped to Göteborg. Now it became important to have contact with the outside world and not to defend themselves against it. Fortification works were pulled down in the early 1800s and the ground along the moat has been saved as a park streets. [24] During the 19th century the city evolved developed into a modern industrial city, continuing evolving in territory surface and population for all over the 20th century, when the head offices and factories of the major companies as Volvo and SKF settled their activities in the city.
3.2 The urban sprawl of Gothenburg: causes and effects

Until the mid-1900s Gothenburg was a cohesive city where all the different districts were in a walking-cycling distance. It was a mixed city, with short distances between functions and people. With the breakthrough of the industrialization, the division of the functions became the urban planning strategy. People did not want to live in the vicinity of the noisy and dirty industry, and as a consequence the city began to spread out. From the 1960s a sudden and fast expansion took place, due to the fact that the value of the city as an important harbor, shipyard and industry in Scandinavia brought the necessity of labor housing and new industrial sites. Gothenburg starts its irrational expansion in the neighboring former agricultural and hilly landscape, by buying a lot of farmland in surrounding municipalities. [20]

The idea was to create communities in the expanding urban centers by building each new district as a distinct functional, social and architectural unit. Commerce and services were concentrated at the neighborhood center, the jobs were in the periphery. Traffic separation was introduced in urban planning and carried out with increasing impact in the new districts. Most of the apartment blocks that has been built during the 1950s and 1960s were part of the Sweden’s One Million Homes Programme in order to provide accommodation at a reasonable price for the people coming from rural areas to the city to look for a job with higher salary. Those boroughs were not like the British districts, attacked by vandalism, graffiti, and individual houses: the housing in Gothenburg is of high quality and the surroundings very well clean, with local shops and a centre provided with any type of service. [18]

The large scale of urban construction was directly followed by the increased dispersal of the settlements.

The high demand for dwelling after the Second World War and the development of the One Million Homes Programme between 1960 and 1974 generated the decentralization of the city in few years’ outwards, with the creation of many suburbs around the centre and outside Gothenburg. The district that were part of the Million Homes Programme in Ten years are Hjällbo, Angered, Bergsjön, Kortedala and Biskopsgården. The suburb of Kortedala was developing during the 1950s in the north-east of Gothenburg. It is mainly a residential district, one of the typical boroughs formed after the Second World War [21], which is recognised as the fastest-built residential area across Europe. The district was the politicians’ answer to the housing request of the post War period, as many people moved to Gothenburg in search for a job.
Angered suburb has been built in the same period, with also Hjällbo and Bergsjön, and it is the biggest area of the Million Programme, characterized by a hilly land which forced the planners to develop different part of the suburb at some distance from each other. In 1967 Angered and Bergum have been incorporated with the City of Göteborg, which needed more land for the development of mainly residential areas but also for businesses. The Master of Angered - Bergum 1968 shows the grand plan for the area. It would be a self-sufficient urban area with over 100 000 inhabitants, about 70 000 jobs and a well-developed center. [25]

At the same time, Biskopsgården district was built in the 1950s in the north-east of the city, to answer at the high housing demand. In fact the population kept on increasing from 13,000 inhabitants in 1800 to 130,000 in 1900, reaching 610,000 in 1980s. [20]

Other districts in the city have been built between the 1950 and 1960, as the expansion of Västra Frölunda with its indoor centre Frölunda Torg developed in the south-west of Gothenburg. The inauguration of the shopping centre in 1966, the biggest in Europe at that time, caused the development of the district, which is characterised by the shopping mall surrounded by the white eleven-floor towers for housing. [26]

Continue demand for housing led to the development of new residential areas in the north, very far from the city centre, as Hammarkullen, Gårdsten, Rannebergen. [23]

Today the distance between the northern and the southern part of the city, within the borders, is about 50 km.
The collapse of the economy of the city in the 1970s, due to the oil crisis, brought to the sudden abandonment of the sites where industrial areas were developed: Gothenburg was in crisis with unemployment and loss of identity. The consequences at the urban scale were the creation of unsafe, frightening and ruined areas, such as Norra Älvstranden and Gamlestad, which contributed at the social, economic and environmental problems of the city.

Norra Älvstranden district have developed during the industrial era, when new shipyards (Götaverken, Lindholmen and Eriksberg) were created in order to increase the prestige and the competitiveness of the city. Moreover, in the same period, large harbours like Sannegård, Frihamnen, Lindholmshamnen and Lundby have been built in the north side of the river. The site is situated right opposite to the city core river, and it is five kilometers long and 0.6 kilometers wide. The fast growth of this area brought to an industrial site, which has been abandoned during the 70s because of the oil crisis, when the shipyards had to close one by one. The result is a large area in the city, plenty of dumped factories which needed to be renewed from scratch. “The area became virtually derelict, and many of the buildings that remained were huge and difficult to reuse. It was a forbidding place that nobody went to, an eyesore in full view of the city” (Ander & Ekman, 2001) [27]. The yards have been taken by a state-owned company called Swedeyard, which had the primer responsibility of what to do within the area.

Gamlastaden is another area that has faced the phenomenon of degradation. It has been rented by Dutch farmers between 1700 and 1800 used for cultivation and livestock farming for the city supply. Some examples of such farming are Mariedal, Marieholm, Kviberg, Kvibergsnäs, Anas, Kristinedal and Savena. With the industrial revolution the arable
land and pasture were converted in new settlements for factories, such as SKF which was born as an industrial area in 1907, designed by Architect E. Kreuger (also designed the “Governor Houses”), although the first factory was a Sugar Mill in 1870. Later on the development of the area continued, and several industries resided the area, augmenting the expansion of the city and the development of new dwellings for the workers. During the 1900s, it was SKF who took great responsibility in the housing issue in Gamlestaden which was in their interest. When housing was “finished” in the old city in early 1960, a major expansion of routes in the city began and satellite cities around Gothenburg were linked with the major arteries, due also the fast increase in the use of the automobile, which gives the possibility to drive everyday to go to work. [22]

The result of the continuous growth of the population, the high dwellings demand, the industrialization and the consequent crisis, the increase in the use of the car, brought to the wide expansion and sprawl of the city outwards, causing also the development of abandoned industrial sites transformed in unsafe, dirty brown field areas. [23]

FIG.14: Causes and effects of the urban sprawl in Gothenburg

[16] Presentation Population & Housing by Linda Almjung, Pontus Boden, Alexandra Chiriloe, Olof Green, Erik Tellden, Course of City Planning Project -Gothenburg-, BTH.
[23] The informations collected about the urban sprawl causes and effects come from also from the interviews.
The crisis during the seventies has transformed drastically the pattern of Gothenburg, by moving from an industrial city to a knowledge and event city, where Chalmers and the University of Gothenburg became very important, and the focus on the sustainable development has increased. The core of the city is still represented by the dense settlement on the river, and the ongoing transformations of brown field areas and abandoned shipyards highlight the will of the Municipality to develop Gothenburg into a vibrant and modern benchmark of the region.

3.4.1 The Compact Strategy of the Municipal Comprehensive Plan

The Municipality of Gothenburg is formed by many actors involved in the urban development of the city: planners, politicians and stakeholders influence the planning strategy by cooperating one with each other.

The City Council can be defined the parliament of Gothenburg, as it represents the supreme decision-making body of the Municipality, and it is made up by 81 members elected by the citizens. The City Council points the 13 regular members that form the City Executive Board, which represents the executive management of Gothenburg that prepares all the issues the City Council has to take decisions on.

At the local perspective, the District Committees have to consolidate the activities in the city and to implement the public services for the citizens. Diverse specialized committees, politically elected, are involved in the urban planning system of the city, and they are represented by: the Environmental Committee, Water and Sewage, Traffic and Public Transport, Planning and Building, Recycling Board, Arts and Cultural Affair and Property Management Committee.

Moreover, other actors as companies and stakeholders have a big influence on the urban planning system of the city, such as Norra Älvstranden Utveckling AB, Göteborg Energy AB, Göteborg&Co., and the Business Region Göteborg responsible for the coordination of projects at a regional level. [28]

The Comprehensive Plan of Gothenburg is meant to present the planning strategy of the city in order to set up the framework for the urban development. The Planning Committee got the task from the City Council to update the previous Comprehensive Plan-'99, focusing on strategic issues and new policies, with the adoption scheduled for 2009. The
goals are mainly based on the citizens’ needs and are found in the environmental, economic and social dimensions. In fact, the approach claimed in the Municipal Comprehensive Plan 2009 focuses on three dimensions: [29]

- The ecological / environment / sustainability
- The economic dimension / growth / competitiveness
- The social dimension / man / citizen power

“The three dimensions are equally important and mutually dependent. Individually, they are necessary but not sufficient”. [29]

It is important to underline that the Comprehensive Plan is not a legally binding document, but it serves as a basis for dialogue between the Municipality and the state of public and national interests. Each of the 21 communities has a Comprehensive Plan which represents its political strategy.

Hans Ander, comprehensive planner of Gothenburg, during our interview defined the MCP-2009 by its subdivision in three levels:

1. The first level is the agreement between communities and the state about national interests, for instance the harbor, which is a national interest from an industrial and economic point of view, the historical monuments, etc. It also concerns the environmental aspects according with European and National policies.

2. The Community level is meant to set up the priorities of the city, and it is a very complex system of networks, reviews and expositions among different parties and district, where accurate policies decisions have to be taken hand in hand with budget availability and investments.

3. The third level comes when stakeholders, companies and community members are invited to take part at some consultations and exhibitions, in order to take into consideration their opinions. It is a means of saying what are the important questions, and to get a dialogue with experts outside and inside the community, and to meet the political system which is responsible to create and revise policies.

A master plan is essential for the development of a city, but the Municipality also needs to use a range of other instruments to reach their goals. Budget, contracts, environmental, social, cultural sector, stakeholders must work together to make Gothenburg a good town to live in.

The proposed Comprehensive Plan presents 13 strategic issues, based on the city’s budget, in order to develop Gothenburg as the benchmark of the region. The follow diagram represents the strategy to develop Gothenburg into the core of the region, for its role
of business centre and the possibility of a large variety of jobs, and also because of the increase in population and the consequent need of infrastructure.

FIG.15: Regional Structure

The Compact City model is the main strategy used for the planning system of the city, and it aims at the combination of environmental, social and economic dimensions to get a more sustainable development of the city. The compaction strategy is a brand new system which came into force in Gothenburg only four years ago, when the old Comprehensive Plan 1999 has been revised and mostly changed into a clearer strategy proposal. The most important objectives of the Comprehensive Plan are:
- Build and develop centrally
- Complement and mix
- Develop the Gothenburgness
- Strengthen public transport
- Concentrate on key nodes
- Reserve outer areas for future development

Ylva Löf, comprehensive planner, during our interview claimed that the Compact strategy has been chosen after some studies about the best effective planning system that can go hand in hand with the sustainable development. The densification model applied in the strategic nodes presents more benefits within environmental sustainability, and also it supports the need of space to accommodate the increasing population, which is foreseen to augment 40,000 people in ten years. The Compact Model is considered the best way to promote walking and cycling as collective modes, beside the public transport system, and it is promoted in order to have shorter commuting time and safer streets and districts. The Comprehensive Plan of Gothenburg has to be amended continuously, with constant revisions and updates.

Anders Svensson, housing architect in the Municipality, confirmed that densification is
the unquestionable strategy of Gothenburg to reach sustainability, although this kind of model can create some contradictions and it is not free from problems; as an example, gathering lot of people in a dense smaller place may create a lot of movements and more crowded areas, where citizens might find some concern in living in. Moreover, the urban planning is just a part of the strategy which needs to cooperate with politicians and many other actors involved in the decision-making system of the city.

Hans Ander highlights the fact that it is not possible to ignore that Gothenburg is an existing city with already 500,000 inhabitants, the reason why the urban strategy has to move into two different directions:
  - Which strategy to use with the already existing city that is already built?
  - What new methods have to be used for the future urban development?

**Developing Compact Nodes**

The densification strategy aims at the creation of high-density nodes in order to contain the sprawl and to implement the use of public transport, and reducing the use of the car. The key-nodes that will bring together functions and people are: City, Backaplan, Frolunda Törg, Gamlestaden, Angereds Centrum.

The key-node strategy is meant to contain the further expansion of new areas, until the empty spaces left in the inner city and the surrounding nodes are developed. Dense settlements are planned to be developed around strategic hubs, that collect functions and people to create living spaces for many hours of the day. Beside the five main nodes, there are several smaller hubs and interchanges with good accessibility which also pursue the high density.

Those areas are characterised by a mix of functions as housing, offices, culture, services and recreation to achieve a vibrant urban environment, combined with a good access to
public transport and good cycle paths linked with the rest of the city, meant to facilitate the mobility.

Gamlestaden [35]
Gamlestaden is one of the five strategic nodes that Gothenburg is developing, and it serves as the entrance to the city from the north-eastern districts, and it has a familiar position with both trade and services, plus it is a very important historical hub. In fact, it is characterised by old historic buildings, as the factories of SKF company, that need to be preserved and renewed. The area is important also at a national level, as it is crossed by E20, which connects Gothenburg-Stockholm, and RV45, which connects Gothenburg-Karesuando. A new link that connects E20 and RV45 is foreseen to reduce the traffic congestion and to include new possibilities for the construction of housing.

FIG. 17 : New Connection with a bridge


The city of Gothenburg is growing by about 3600 inhabitants per year, and the planned area of the Old Town is the major land resource for the further development. In fact, in Gamlestaden there are good conditions of densification, such as very good public transports, infrastructure and the possibility of urban renewal. Plus the site is centrally located and is an important entry-point to the city.

The plan proposed for the Gamlestaden strategic node aims at a sustainable structure based on the mix of functions, to create an attractive, accessible and safe hub. The driving factors of the strategic plan are:
- Long-term sustainable
- A hub for northeastern Gothenburg
- Conservation and Development in balance
- Increased the trade activities
- Attractive hub for public transport
- Commuter train stations
- Safe and attractive (right content and the right mix of features can create life even under evenings and weekends, which contributes to increased security)

The urban structure includes residential, commercial, cultural and leisure activities, office, education, crafts, etc. that will increase significantly the district values and provide to populate the southwestern parts of the planned area in a completely different way than today. The cooperation of the implement of public transport, the densification and the mix use of functions and activities will transform the old city square in one of the most important and dense hubs of Gothenburg.

FIG. 18: **Gamlestaden Map**


FIG. 19: **Densification Strategy**

3.4.2 The Public Transport System

The public transport system in Gothenburg represents one of the most important driving factors in order to reach a more sustainable city.

The recent discussion on climate issues has made clear how important it is to have a long-term perspective and openness to new questions. The changing climate brings both a question of how a warmer and rainy climate may affect Sweden and as a matter of what Gothenburg can do locally to limit emissions of carbon dioxide. A local environmental climate situation has been decided by the City of Gothenburg to reduce carbon emissions by 30 percent in 2020. Much has already been made, but further measures will be explored in the next few years.

The Public Transport Authority is responsible to build, maintain and develop all the transport parts of the city, and the mobility management is a sort of soft measure to make the already building infrastructure more efficient, and it keeps also the dialogue with businesses, school, youth, how they should make the choice of travel modes for the everyday needs and how it is possible to change the travel behavior of the citizens.

The Public Transport Authority is made up by 110 employees, with a budget of 2 billion SEK, and it is responsible for:

- 10 million m² Roads
- 0.8 million m² Bike Lane
- 3.5 million m² Foot Path
- 165 km Tramlines
- 15 km Industrial Railway Track
- 85,000 Lighting Points
- 4,900 Traffic Signals
- 50,000 Road Signs

The main objectives of the City Council are the increase of trips with public transport and bicycle compared to single car use, and as a consequence the reduction of fossil fuel consumption, by making the public transport more popular and make people more aware of the environmental problems that pollution causes by campaigning and initiatives within the city.

Today the Public Transport System includes:

- 200 Trams on 12 lines
- 300 Buses on 50+ lines
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- 25 Commuter trains on 2 lines
- 10 Ferries on 6 lines

The diagram above shows the car predominancy of the city, and the few bike and public transports users.

Gothenburg is not considered so far a "cycling-city", as the bike users are few compare to big bike-city as Stochkolm, Copenhagen and Amsterdam. This is due also to the topography of the city, which is mainly hilly and it does not encourage the bike-use. The Public Transport Authority is promoting a lot of campaigning, initiatives, bike-weeks, and services in order to make people more aware about the importance of the use of clean transport modes.

The promotion of clean vehicles is a fundemantal initiative in order to face the problem of the air quality, and this campaign started 10 years with the goal of 90% clean vehicles in the city; nowadays the percent of clean vehicles in the city is 80, and 25.000 is the number of clean vehicles in the streets of Gothenburg.

The statistics data below shows that the tram is the most used collective mode by the citizens of Gothenburg, even if the aim is to increase the amount of users also for the buses. According to Lisa Sundell, a planner working in the Public Transport Management of the city, the Authority would prefer to have more trams than buses, but the tram is much more expensive and for the moment it is not an affordable solution. The strategy the city adopted is to build bus lanes in a way that when more budget will be available, those will be converted in tram lanes with new trams.

FIG.20: Diagram

>Source: Presentation *City of Gothenburg*, Lisa Sundell

FIG.21: Table - Statistics Data on Collective Modes

| Trafikslag | Göteborgs stad | | | | | Overiga regionen | | | | | Totalt | | | | |
|------------|---------------|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Spårvagn   | 92 342 | 94 110 | 100 480 | 20 363 | 21 040 | 21 980 | 63 271 | 63 170 | 65 083 | 100 480 | 100 480 | 100 480 |
| Buss       | 42 878 | 42 130 | 43 103 | 4 853 | 4 206 | 6 903 | 4 853 | 4 206 | 6 903 | 51 580 | 51 580 | 51 580 |
| Tåg        | - | - | - | 1 003 | 920 | 921 | 3 114 | 3 018 | 3 056 | 5 137 | 5 137 | 5 137 |
| Båt        | 2 111 | 2 098 | 2 135 | 1 003 | 920 | 921 | 3 114 | 3 018 | 3 056 | 5 137 | 5 137 | 5 137 |
| Summa resor | 137 331 | 138 338 | 145 718 | 26 249 | 26 166 | 29 804 | 163 580 | 164 504 | 175 522 |

>Source: www10.goteborg.se
**K2020** [32]

The K2020 is a long-term strategy for public transport in the Gothenburg Region, which aims at the increase of the percentage in the use of collective modes by 2025, from 25% to 40% (1 million trips per day instead than 450,000).

The K2020 works at the regional level and it has been chosen as the fundamental strategy to solve the problem of the commuting from the suburbs, the big challenge the city is facing at the moment, and it immediately comes to our eyes when we look at the traffic congestion map of Gothenburg below, where the traffic is concentrated on the bridge in the centre and in the main streets from the suburbs to the city. In fact, new methods and initiatives are required in order to obtain a substantial shift to public transport.

**FIG.22: Traffic Congestion Map**

Source: www10.goteborg.se

**FIG.23: K2020 Strategy**

>Source: Kollektiv trafikprogram för Göteborgsregionen, 2008.

The K2020 is based on five main strategies that are to be developed at the regional level:
1- Link areas: from a radial to a network structure, in order to connect the major nodes of the system;
2- Faster Journey time: new separate lanes for the public transports and to ensure a punctual and reliable system;
3- Greater Frequency: more frequent services along the main corridors;
4- Developing the nodes: the major nodes will be new attractive and dense points for the city, with new business, facilities, housing and multi-modal travelling;
5- Guaranteeing quality and service: an easy system to understand, safe and secure to get the satisfaction of the citizens.

The measures taken to change the travel behavior of the citizens.

The strategy the Municipality is using to change the behavior of the citizens consists in the implementation of services, bus-card discount, initiatives and campaigns to make peo-
ple think before they take the car for short trips.

According to Lisa Sundell, the densification strategy and mixed-use is the only chance for the Public Transport Authority to get a good public transport system, which cannot be obtained in a spread and diffuse city. In fact, Gothenburg is still a car city, and this connotation has to be changed both in the citizen’s mind and in the urban planning strategy. According to Ylva Löf, on one hand there is the need to integrate public transports where those are not well developed, and on the other hand it is important to work on the behavior of the people that do not have the mind set up for using other travel modes than the car.

In order to change the travel behavior, the Public Transport Authority is working on three different levels; [30]

1- Workplaces: by organising meetings with managers, and by giving transport informations and more services to the employees;

2- Children and Youth: by giving school materials for all ages (9-16 years old) by integrating traffic in the subjects taught at school, training for teachers, walking and cycling to school campaign and don’t drink and drive campaign;

3- Private Individuals.

The employees of the Municipality do not have anymore a free car-parking close to work, but they have a discount for the bus-card, and the possibility to get a leasing bike with all the maintenance services; for example, if the bike breaks, an assigned person will take it from the work-place and repair it, then he will bring the bike back to the owner. This service is diffuse in many companies in Gothenburg, in order to encourage people not taking the car, and if it is necessary, to use only clean vehicles which can be rented in the car pools.

In fact, Helena Westholm, EFEM architect working in a private studio in Gothenburg, claims that her office since years works in the respect of the environment, by renting always a clean vehicle when they need to go out of the city for some commissions and inspections; this trend is actually pretty diffuse in the city as a strategy for the offices.

Beside that, a new parking policy is on the process as a measure to steer to where a person should use the car or not, and also to promote more bike-parkings. Lisa Sundell asserted that the new parking policy is a fundemental step the city needs to walk in order to contribute to a more liveable and accessible city for everyone.

The objectives of the parking policy can be found in the support of sustainable development and a more diffuse use of the bike and collective modes instead of the car. The main
strategies of the policy are the increase in the car-parking tickets, the creation of parking-house in 3-4 storey building instead of underground parking, more bicycle parking and the introduction of a fee (green card) to enter the city-centre by car. The parking policy aims to accomplish the urban planning strategy of Gothenburg as a strategy to discourage the use of the car.

*Lundby Mobility Centre* [31]

Lundby Mobility Centre is an initiative taken by the Traffic and Public Transport Authority with the aim to test methods and influence the travel and transport choice of the citizens, by influencing the transport demand among private individuals, children and workplaces. The main goal of the campaign in Lundby district is to make people think before choosing the car as their transport mode, and to encourage the use of more environmentally friendly transport modes.

The Lundby Mobility Centre was financed by Interreg IIIB North Sea Region Programme and it was set up within the framework of TARGET (Travel Awareness Regional groups for Environmental Transport), an EU project.

The measures taken in the project have been developed in some programs, such as cycling activities, car sharing, public transport and mobility coaching. Some of the initiatives are cycling courses for women from other countries that have not learnt how to cycle: the course gives them the opportunity to travel in a more independent and environmentally friendly way. The car sharing is another initiative aiming at the reduction of the number of car’s owners, by having access to a car whenever a person needs it without being responsible for services and insurance.

Another way of reducing the car-use has been found in the Lundby Card, which has the same price of a normal public transport card but in addition it offers discounts at car sharing companies, car rentals and taxi services.

“Scrap your own car” is a smart project which consists in the offer of an annual travel card for public transports if you scrap your car dated from before 1988, which are cars having a very higher level of gas emissions. Mobility coaching is another initiative promoted in 2006 aiming at changing the travel behavior by participating at lessons and training. All those projects and campaigns actually have been successful, as the car-use and the air pollution have considerably decreased, from 62% to 27% of car journeys to and from work, which have been replaced by bike ride and tram/buses.

The Lundby Mobility Centre works also with the companies when it comes to business
trips, employee’s journey and client visits. Bike stands have been installed around the district that have been also advertised by the companies: the bike sharing scheme aims at the use of a leasing bike for the journeys of the workers, and the positive factor felt by the users is that they do not have to maintain and repair the bike anymore, and not even look for a parking place. This project has been successful, and now it has been extended also to the residents of Lundby.

Today, the Public Transport Authority is preparing new strategies to change the travel behavior of the residents in the left 20 districts of Gothenburg: the problem, according to Lisa Sundell, is that each district embodies different life-styles and diverse people and cultural backgrounds, that is way every district needs its own methods and initiatives to make people more aware about the importance to reduce the car-use and to travel with environmentally friendly modes.

FIG.24: Campaigning from the Public Transport Authority

>Source: Presentation "City of Gothenburg", Lisa Sundell.

### 3.4.3 The Mixed-use Development

The mixed-use is a clear strategy which is part of the urban planning system, with the goal to have a more lively city and more people around for 24 hours, although researches show that it does not reduce so much the car dependency, as most of the people do not live and work in the same areas, but in most cases the work is far away from the house.

The mixed development is foreseen in the central Gothenburg, where the renewal of industrial areas is needed and also in the intermediate city, where the motto is to develop brown field’s areas first in attractive and safe interchange nodes.
The mixed-use strategy is also used to obtain more integration among the citizens of Gothenburg from different cultures and social classes: in fact, according to Anders Svensson, the problem of social segregation is mostly due to the fact that immigrants and people from the same class tend to stick together by living in the same area, without mixing with people with different backgrounds. In order to solve this problem, the Municipality is working in different levels:

- **S2020**: it is a new project that aims at the social sustainability; it is a sort of network of cooperation made by social agencies, planners and diverse knowledge from different part of the cities, but so far not much has been written and decided yet.

- The urban planning system is working with a mix of different type of housing in the new projects and in the integration of already built up sites to better combine different communities.

- The enlargement of the city-core to combine and integrate the different interests in the centre.

The most diffuse housing type in the city is the high-rise dwelling (6/7 storey) in high-density area, but the trend consists also in mixing this type with terrace houses and different kind of housing in order to avoid high and low quality district, aiming at cultural-mix areas.

According to the statistics data of Gothenburg, the mixed-use land nowadays is only the 5.1%, and the dense urban structure 1.1%.

Those data shows that Gothenburg has still a long path to walk to reach a more compact form with a mix of functions, and those highlight the big problem of the sprawl of the city.
Norra Älvstranden district is an example of a project that aims at the mixed-use of functions and mixed-housing type, on one hand to face the social segregation and on the other hand to intensify the city to implement the use of the public transports. The Älvstranden Utveckling AB is the municipal company commissioned to lead the design, the regeneration and the development of the district in the region’s urban core along the Göta Älv River. [33]

The mixed-use is the political issue of Gothenburg: different interest coming together in the public spaces, mixing offices, culture, shops, residential, in the closest area to city centre, in order to integrate the old core with new areas, to make it three times bigger and to expand it by using the empty old industrial lands, to have an attractive, dense and mix functions multi-modal node.

Regarding the segregation issue, the strategy concerns the enlargement of the core of the city to combine different interest-groups that have the centre as a common public space/meeting point. The aim is to make people integrate in the city centre first, and then try to mix them in the same living areas, by expanding the attractive core.
The regeneration of the area started in 1985, and in 25 years the 50% has been done, but still there a lot of empty spaces and parts that need to be designed. So far, a mixed-housing area has been built in the west part of the district, the more far from the core, and it is characterized by the presence of different type of housing. The central part of the district embodies a mix of functions, such as schools, cultural activities such as the Science Park, residential area and offices.

>Source: interview with Cecilia Stromer.

FIG.28: The strategy for the social integration.

FIG.29: Norra Älvstranden Development

>Source: interview with Cecilia Stromer.
What is the citizens attitude regarding a denser city?
The hardest part in building a denser city is to face the problem of the citizen’s behavior, which is very difficult to change when it comes to life-styles and habits.
Swedish people are known for being attracted by their beautiful natural landscape in the countryside, where they actually prefer to live. The trend in Sweden is to grow up in the suburbs, then go to a bigger city to study and live, then move back in the countryside as soon as they have children and a family.
In the majority of cases, Swedish families usually live in the tranquility of the suburbs, where the children grow up in a safe and quiet district; on the other hand, young people live in the vibrant inner city, to enjoy the student life and also the night amusement that the city centre offers to them.
Lately a new class entered to be a part of the Gothenburg’s community: the so called “creative class”, which is a symptom of the changes that are taking place in the society. According to Hans Ander, the creative class is represented by either families with children, or singles, that as a living-strategy chose to settle down in the city-centre, in order to not use the car to go to work, which includes saving money in fuel, but also saving time on the commuting, to have more free time to spend at home with the family or for personal interests. However, the high-ways are so crowded and stressful to use which made people decide to live in the city centre.
As a token of this, each of the six planners I had interviews with, confirmed the existence of the new trend; as a matter of fact, all of them assert to live in the centre and to walk/cycle or use public transports to go to work, and also they claimed the majority of their friends and workmates live in the inner city.
The densification of Gothenburg so far is not considered a threat for the living conditions in the city from all the inhabitants, but a new attractive lifestyle which can find more supporters than a few years ago. Moreover, a new politically independent network named Yimby, is working as a pure civil initiative of Gothenburg that is in favor of a more dense, dynamic, vibrant urban environment and against the isolated neighborhoods, which motto is:”Yes, in my backyard!”, that stands the positive view of densification in the city against the segregation and standardization.
The opposite is Nimby “not in my Backyard”, a term used to describe those who, for selfish reasons oppose the intensification in the neighborhood. [34]
Although still a lot of citizens prefer the countryside life-style, and as Cecilia Stromer

3.4.4 The Compact City and the Citizens

Although still a lot of citizens prefer the countryside life-style, and as Cecilia Stromer
claimed, the only way possible to change their mind is to build an attractive, mix and safe city centre, made by good facilities, services and public transports in cooperation with campaigning and other initiatives to set up their mind in a more sustainable direction.

[31] The informations about the Mobility Management in Gothenburg are taken from the web-site www.visionlundby.goteborg.se and from the interview with Lisa Sundell.
4. Conclusion

My work addressed the issue of the Compact City Model, which aimed at the full comprehension and at the clear definition of the so called “Compact Theory”, in order to understand what the densification strategy actually is and how it works, and also how a city applies this model in its urban planning system.

My research did not result in a clear and unique definition of what a Compact Model is, and did not even found a general consensus of what are the benefits and the detriments of the Compact Theory. The debate about the sustainability of this urban planning strategy is still under way, and there are no extraordinary empirical facts that demonstrate the veracity of the claimed sustainable benefits.

Moreover, it is still not clear when a city can be considered “compact”. What are the parameters that define the achievement of the Compact City Model?

The parameters that define a compact city are still vague; however, a few parameters are taken into consideration in some studies that addresses the characteristics of compact urban forms:

• density in population;
• density in built form;
• percentage of mixed-use areas;
• percentage of provision of diverse facilities in the same area.

In my opinion, the Compact Model aims at a wide range of objectives. Due to this fact, the parameters of compactness cannot be found only in those cited above.

The reduction in car use, the implement in the use of collective transports to decrease the air pollution level, the preservation of green areas and the conservation of the countryside, the regeneration of inner urban areas, the social integration are all goals related to the high-density development of the urban form and they are considered to be the direct consequence of the densification strategy. This brings up the question: “Shouldn’t we consider the parameters linked to those factors in order to define the compactness of a city?”

After the thorough investigation and the deep analysis, I decided that the following parameters should be taken into consideration to define whether a city is compact or not, beside those I’ve cited above:

• percentage of car users;
• percentage of public transport users;
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- percentage of bike users;
- rate of pollution level;
- percentage of people living in the city-centre;
- percentage of empty land left in the city;
- commuting-time;
- percentage of diverse culture living in the same area.

As a conclusion of this thesis, it is clear to say that the strategy of compaction cannot be considered a proper theory, but a hypothesis which asserts the containment of the urban sprawl and the growth of the cities towards a more sustainable development. In fact, I decided not to use the word “theory” next to Compact in my thesis. Moreover, I believe that it is not possible to formulate a Compact City Theory which can be applied in every spread city, as each city has its own urban development, its own sprawl that emerged from diverse factors and circumstances, and its own planning system, linked with policies, transports, housing and culture.

In my opinion, the Compact Model should be meant as a guideline [see Annex, def.6], a lead and a general strategy that a city can develop according to its particular environment and needs.

The investigation of the Compact strategy of Gothenburg in details, and also of Amsterdam, even if in a more overall perspective, brought me to the variety of differences between the theory and the put into practice of the Compact Model, which requires a wide cooperation among the different actors of the city. In fact, the action of the urban planning system is the starting point to implement the densification, but it is not sufficient to achieve the objectives of a more sustainable city. Public transport authority, politicians and social agencies have to collaborate with the Municipality, in order to fight the urban sprawl from different angles.

In the case of Gothenburg, the planning system proposed the Compact hypothesis as the strategy to control the urban sprawl and to achieve a more sustainable city: the development of Dense Strategic Nodes is foreseen in order to achieve a more Compact City. In fact, the implement of compact nodes is a more feasible strategy for the city of Gothenburg, which is already very diffuse (45 km from North to South), and the restructure of the city in a sole compact settlement is not feasible.

The strategy of Compact Nodes is already established in Holland (Randstad Polycentric
Region), where Amsterdam represents a dense city and one of the dense nodes that are part of the Randstad Polycentric Ring, where the major compact cities are accessible and connected by good infrastructure, and surrounded by green empty lands.

The question comes immediately up in my mind: “Is this the future of Gothenburg?” “Is the strategy of the dense nodes the first step to be followed by a more general densification of the city, or Gothenburg will spread in diverse hubs throughout the region, creating vibrant poles on the Holland’s blueprint?”

I believe that the question cannot be answered for the moment, as the obvious outcome that I have learned after studying the urban system of Gothenburg is that such an issue cannot be predicted easily, because of the abundance of factors and mechanisms that influence the development of a city.

I would like to finish this conclusion with the following remark: the level of the sprawl in most of the cities reached incredible high rates, the reason why the creation of a unique compact settlement cannot be considered an achievable goal. In my opinion, it is not fully correct to talk about a Compact City Model when it comes to the urban strategy that should be implemented to develop more sustainable cities. I think it is more realistic and feasible to talk about the “Compact Nodes Model” as the most effective planning strategy to avoid the further increase of the sprawl of the cities outwards, meant to create dense hubs throughout the city and the region, bringing people and functions together in more compact settlements.
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Compact City and Densification Strategies


**Municipal Documents:**


**Internet Sources:**

- www.treccani.it

**Interviews:**

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Questions from the interviews:
The phenomenon of urban sprawl has characterized many cities in Europe after the Second World War. The urban growth of Gothenburg embodies this process, and nowadays Gothenburg is considered the city most influenced by the urban decentralization in Sweden, presenting serious damages to the environment.

1. Which factors do you think have brought to the sprawl of the city? Was it caused by economic interests and market demands, by the trends and lifestyles of the society, or the topography? Or something else?
2. What do you think are the effects of the sprawl on the city? Which are the benefits and the disadvantages?
3. Which strategies the Municipality should adopt in order to contain the sprawl and to achieve a more sustainable city?

In the Comprehensive Plan, the Compact form is promoted as the best way to achieve sustainability, and many advocate urban strategies of the compaction theory are part of the plan for the city's future development, as:
- the high-density development;
- less car dependency;
- the regeneration of inner urban areas;
- the improvement of the public transportation services and support for the walking and cycling;
- the mixed-use development and better access to services and facilities;
- the preservation of green areas and the conservation of the countryside.

1. In what measures do you think the Municipality of Gothenburg is influenced by the stakeholders, investors and citizens in the decision making process of the urban planning strategy?
2. Do you think Goteborg is improving in practice these 'compact elements' in the planning strategy?
3. What do you think about the mixed-use urban renewal? Is the regeneration of Norra Alvstranden in a mixed-use site a successful revitalization?
4. How much do you take into consideration the issue of good collective modes in your planning process?
5. How do you think the travel behavior of the citizens to increase the walking and cycling can be changed in order to discourage the use of the car? Do you think the improvement of the public transports and the higher-density is sufficient to convince people to abandon the automobile for the journey travels?
6. Which impacts the promotion of Compact Policies will have on the living conditions in the city? Do you think the higher density will bring negative environmental effects at a local level? What measure should be taken if this case happens?
7. Would you prefer living in the vibrant inner city or in the tranquility of a suburb out of town? Do you think that the politicians and planners responsible for the urban planning system of Gothenburg will take part in the compaction process by living in the city centre, adhering to the strategy that has been promoted by them, or do you think they prefer living in villas in the quiet countryside?
Definitions [36]

- [def.1] Theory
Formulation logically consistent (in terms of concepts and institutions more or less abstract) of a set of definitions, principles and general laws that allow to describe, interpret, classify, explain, at various levels of generality, aspects of natural and social reality and the various forms of human activity. The theories set the vocabulary by which the phenomena and objects investigated are described and recognized as a particular case that can be explained through more general laws and principles.

- [def.2] Hypothesis
Assumption of facts or situations that give a provisional basis for demonstrating a particular fact, which requires further analysis and a chain of deduction in order to prove its validity.

- [def.3] Model
The schematic construction based on a purely hypothetical and intuitive source, through which is represented globally or only in part the subject of a research.

- [def.4] Concept
In the ancient philosophy, the concept is meant to indicate the essence, what remains stable beyond the volatility of sensitive data and the multiplicity of appearances, the true and immutable reality.

- [def.5] Strategy
A set of general rules and principles that foresees the possible development of certain situations, and provides the actions that should be taken in order to achieve the established objectives.

- [def.6] Guideline
A statement or a plan meant to guide the settlement of rules and directions, in order to determine a course of actions.

[36] The definitions are taken from the Encyclopedia Italiana Treccani.