

Adaptation to Climate Change

An exploration of effective components  
and design criteria for  
**Social Inclusion**

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THESIS FOR THE DEGREE OF MASTER OF SCIENCE  
DESIGN FOR SUSTAINABLE DEVELOPMENT

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Göteborg, Sweden 2011



## Abstract

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Adaptation to climate change in coastal cities is a crucial issue to prevent severe and inevitable impacts of flood risk. As a consequence of climate change, the vulnerability of societies, nature and economy is expected to increase. However, adaptation could be an opportunity rather than a threat if we make climate adaptation integrated into urban planning. A transdisciplinary study has been carried out by Mistra Urban Futures -centre for sustainable urban development- to propose adaptation strategies for sustainable development for Frihamnen former port in central Gothenburg which is the departure point of this thesis.

Regarding the fact that incorporation of social inclusion and supporting all parts of societies could be a challenge in the future of adapted to climate change cities, I have to pose the main research question of this thesis as “How can social inclusion be promoted in coastal areas which are about to be adapted to climate change?” and subsequently “What design criteria could be recommended in order to enhance social inclusion in these areas?”

Since more attention to climate adaptation strategies’ effects on the society is required, I have explored effective components of social inclusion to show how it can be promoted in the process of adaptation to climate change. During the studying I have developed sub questions and defined facts and ideas by studying three cases of urban renewal supported by the theoretical framework. The findings on how urban redevelopment processes affect societies have been analysed using systems thinking method for the interpretation of academic findings into design criteria that may inform design practice. This research has been analysed across three main themes: a) urban policy; b) gentrification; c) public interaction. It shows that urban policies could direct social inclusion with a mixed blend and variety of urban environment to attract wider group of people; different type of land ownership makes various groups of people to reside; public spaces and different activities causing advent of more audience; more facilities to entrepreneurs resulting opportunities for smaller ventures. Eventually this work has lead to come up with effective components as well as six design criteria by which the planners might benefit from.

Key words: Climate change adaptation, Gentrification, Social inclusion

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## **List of acronyms and abbreviation**

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BSSSC	Baltic Sea States Subregional Cooperation
CABE	Commission for Architecture and the Built Environment
FOI	Swedish Defence Research Agency
GHG	Green House Gas
ICE	Institution of Civil Engineering
ICT	Information Communication Technology
IPCC	Intergovernmental Panel on Climate Change
OR	Operational Research
NERC	Natural Environment Research Council
SMHI	Swedish Meteorological and Hydrological Institute
SEU	Social Exclusion Unit
SGI	Swedish Geotechnical Institute
SGOR	Swedish Government Official Reports
SIDA	Swedish International Development Cooperation Agency
UNRISD	United Nations Research Institute for Social Development
UNFPA	United Nations Population Fund
UNECE	United Nations Economic Commission for Europe
VRS	Verband Region Stuttgart
FSSK	Forum för Studier av Samtidskultur

## **Acknowledgement**

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The pilot project as the departure point of this thesis have been carried out by Mistra Urban Futures. Moreover, the urban renewal cases discussed in the present thesis have been implemented within a number of research projects.

There have also been researchers in Chalmers University and in the municipality of Gothenburg and Stockholm who supported me along the way to give me recent documents related to my research and taking time to respond my emails: Gregory M. Morrison, Ulf Moback, Camilla Näslund, Malena Karlsson, Catharina Thörn and Bo Aronsson.

I would like to express my appreciation to my supervisor and examiner Jaan-Henrik Kain for his professional and kind supports during this period, Liane Thuvander and Per Knutsson for assessing my project.

I owe great gratitude to Sweden for giving me the opportunity to study and research in a comfortable and equipped circumstance.

Finally, my gratitude goes to my parents who have given me the security needed to carry out this thesis from abroad.

## Preface

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I have practiced and taught architecture for five years before starting studying Design for Sustainable Development programme in Chalmers University. I have done a design oriented project as my first master thesis in architecture about how social integration between ‘Iranians’ as hosts and ‘Afghans’ as guests can be promoted in a residential complex for refugees. While I was designing the refugees’ residential complex I was thinking about how my researches for the thesis might contribute to the design quality of the project. During that period that I was working as an architecture consultant and tutoring academic projects in architecture school, I realized that research about architectural realities is necessarily an interdisciplinary matter and architectural research must be engaged with different disciplines.

After few years, armed with many more questions about architects’ role to produce knowledge for sustainable development, I found myself interested in mitigation of climate change and adaptation of its impacts of it. In the master programme of Design for Sustainable Development, I have studied almost all of the courses related to designing sustainable building and mitigating climate change in construction field. However, my question about ‘what are the urgent needs of cities to cope with the impact of climate change?’ was the motivation to become engage with the pilot project by Mistra Urban Futures ‘A City Structure Adapted to Climate Change’. Through reviewing the technical strategies for protecting the former port in the inner city of Gothenburg, I realised that more interdisciplinary research is needed to recommend appropriate useful design criteria for planners and architects to achieve the goal of the City to create a sustainable city. Finally, I have decided to explore some social aspects of sustainability which I have been involved with it for several years.



“Architectural research allows us to understand a little better, that successful built environments are successful not just because of their physical attributes, but also because of many human considerations.”  
David Wang, 2002, Architectural Research Methods

# Introduction



## **1. Introduction**

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### **Adaptation to climate change**

Climate change is an ongoing phenomena which has been recognized as an existing risk of flooding in coastal areas. Cities play an important role in the climate adaptation process since they have already been adapting continuously to changing conditions and attracting economic activities and investments. Climate change is therefore an additional opportunity rather than a threat if it is addressed in urbanization planning and regulations. Since, today's choices will influence vulnerability in the future (Aerts et al, 2011), it is important to explore different effective measures and aspects of planned infrastructures. An adapted-to-climate-change plan, based on all three pillars of sustainability, environment, economy and society, may initiate opportunities and innovations for investors and spatial planners.

Mistra Urban Futures -centre for sustainable urban development- has carried out a trans-disciplinary study in the frame of a pilot project 'A City Structure Adapted to Climate Change'. Three different strategies (retreat, attack, defend) based on recent UK report (ICE 2009) are examined to be used in planning and development of Frihamnen in this pilot project. These strategies will be explained as background of this thesis. However, uniting social sustainability with climate adaptation is a remaining research challenge (Morrison et al, 2011).

while there are quite a lot of discussions and reports about climate change adaptation less attention has been directed to how adaptation strategies affect cities and how these supports all parts of society's needs (Morrison et al, 2011). Since the incorporation of social fairness into the future of Frihamnen seems to be a challenge as a result of adaptation to climate change, I will inquire about effective components of social inclusion to discuss:

“How can social inclusion be promoted in coastal areas which are about to be adapted to climate change?”

and

“What design criteria could be recommended in order to enhance social inclusion in these areas?”

The first research question is aimed towards academic research, while the second is aimed to translate the findings into a format that is useful for e.g. planners and architects. To address these two main research questions I will employ theoretical framework to explain urban renewal effects on the societies and make the research problem more clear. To define effective components and their consequences on societies, I will review three urban renewal projects -Vesterbro in Copenhagen, Hammarby Sjöstad in Stockholm and HafenCity in Hamburg- in the material and analyses chapter. Reviewed case studies will be compared to reach a general set of observation through a narrative model. Facts and ideas in the narrative model will be used to find effective components to promote social inclusion in urban renewal projects. In the systems thinking method in result chapter I will show relations between mentioned elements in systems thinking analytical method via graphical diagram in order to interpret academic theories into design practice in the discussion chapter. Here, urban policy, gentrification and public interaction are the main themes which will show how social inclusion could be promoted in urban climate adaptation through more integrated adaptation to climate change strategies.

## 1.1. Background

In this chapter, the importance of adaptation to climate change in Sweden will be discussed (Chapter 1.2.), with focus on coastal areas of Gothenburg (Chapter 1.3.) and Frihamnen as a former inner port in this city (Chapter 1.4.). Moreover, the Göta River dynamics and the security margin for important infrastructures will be discussed (Chapter 1.5.). Substantially, the effects of the three strategies of adaptation to climate change on the areas' sustainable development will be reviewed (Chapter 1.6.) in order to approach more understanding of development process effects on societies. Besides, five contiguous strategies based on continuum of sustainability fundamental aspects have been brought out by the focus group to become able to analyse and assess the results of the transdisciplinary study for the development of Frihamnen (Chapter 1.6.). Finally, the research questions of this thesis will be described (Chapter 1.7.).

## 1.2. Climate Change in Sweden

Climate change has been recognized as one of the main barriers to sustainable development. This process is progressing rapidly according to the report of the Intergovernmental Panel on Climate Change (IPCC 2007). The ongoing trend of climate change will continue even if green house gas (GHG) mitigation policy as the main feature around the globe would be successful (EU, 2007; Swedish climate policy), i.e., the EU climate strategy has aimed to restrict global average temperature to no more than 2°C above the pre-industrial level (European Council, 2007). Besides, non European countries are in need of a major emission reductions to reach the target. Therefore it seems that more efforts are needed to be prepared for more substantial changes in temperature than in the target for the mitigation policy (Climate Adaptation in Sweden, FOI, 2009).

The Swedish Government appointed the Swedish Commission on Climate and Vulnerability in June 2005 to assess global climate change impact regionally and locally on the Swedish society including costs. Effects of climate change are expected to be significant in Sweden due to the increase of temperature by 3-5°C by 2080 compared with the mean level recorded along the period 1961-1990 (Cli

mate Adaptation in Sweden, FOI, 2009) and extra precipitation and higher sea levels are also expected. Sea level is estimated to rise approximately up to 0.8m (UN's Climate Panel) depending on sea temperature increases. Precipitation will increase in most parts of the country during autumn, winter and spring; however, in summer-time the climate will be warmer and drier especially in southern Sweden. Sea levels are estimated to rise by up to 0.2 metres in the seas adjoining Sweden. These measures are calculated based on both average wind and maximum gusts (SGOR, 2007). Climate change can be considered in normal planning activity due to the efforts have been made at national level in Sweden to change regulations. Regarding physical planning which have been changed regulations, new buildings should place on land suitable for that purpose regarding to accidents, flooding and erosion (FOI, 2009). Developing methods and planning instruments for the above mentioned changes have been assigned to the National Board of Housing, Building and Planning. The most important documents for climate adaptation are the comprehensive plans revised on an area-specific basis by local authorities in Sweden which has formed the basis for physical planning in the country. Several local authorities have changed the recommendations to suit their planning activities for foundation laying. Both government and private actors play an important role in creating a network that's primary role is to deal with climate change (FOI, 2009).

### **1.3. Gothenburg**

Gothenburg is the second largest city in Sweden. The city has a population of 549,839 inhabitants in urban area (Statistiska centralbyrån, SCB, 2005-2010). Gothenburg has a mild climate and quite a lot of rain caused by the Gulf Stream. The city is placed along the Göta River and the harbour where the construction of industrial areas are planned to take place. It is the second largest industrial city in Sweden after Stockholm and the manufacturing sector contributes over 20 percent of all jobs. Gothenburg is also a significant commercial and maritime city, including the largest port in Nordic Countries; financial activities, educational, research sectors and food industries. Gothenburg is the hub of west Sweden's road and rail network and also has car ferry and passenger boat to Denmark, Norway, Britain and Germany. The city has also two airports and the collective inner-city traffic uses trams (Swedish National Encyclopedia, 2011).

Gothenburg is located on the west coast, in south western Sweden,

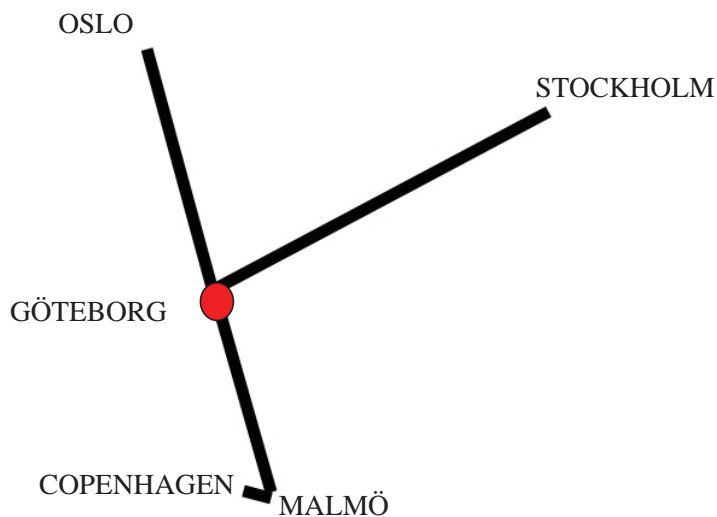


Figure 1. Gothenburg location between Scandinavian capital cities

approximately half way between the capitals Copenhagen, Denmark and Oslo, Norway (See Fig. 1). This city has grown as a trading city because of locating at the mouth of the river Göta.

The industrialisation of the 19th century sparked Gothenburg's shipyard era. In the 20th century, three of the world's biggest shipyards grew up on the north bank in Gothenburg: Götaverken, Lindholmen and Eriksberg. In the same period, Gothenburg became the most vital port in Scandinavia. Götaverken was threatened with bankruptcy as early as 1970, but nothing happened until 1975, when the Government took ownership of the company and began to commit mass lay-offs. In 1977 a state-owned company called Svenska Varv was founded and eventually took over all the shipyards' assets and problems. A large area of central Gothenburg was gradually emptied of all activities. The two largest landowners, the City of Gothenburg and Svenska Varv AB, started a joint project aiming to develop visions for the renewal of the area. Gradually the idea of the Friendly City evolved a place where business, residences, education, commerce, research, culture and recreation merged in a fruitful blend (Ander, H., et al, 2009)

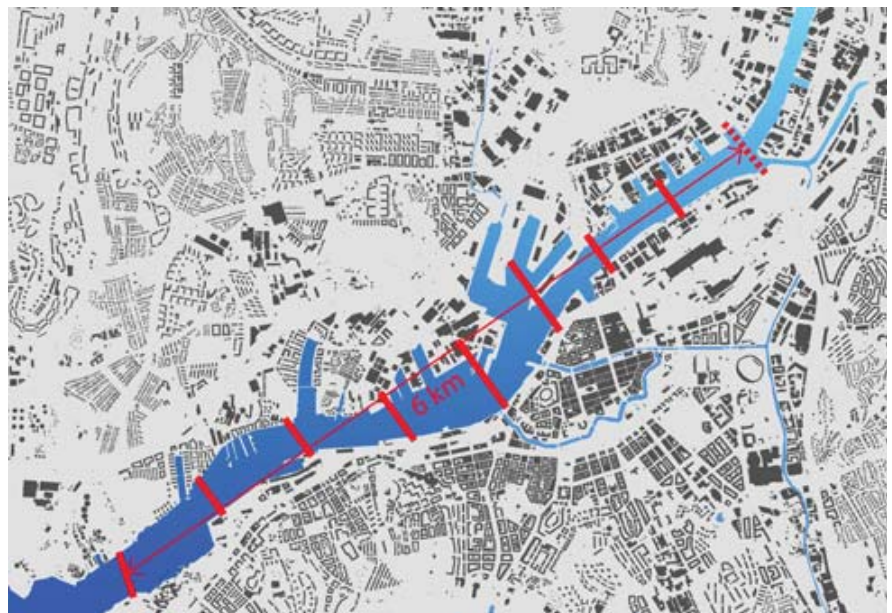
The city expanded over low reed areas, some of the canals were filled in and the harbours and quays were extended. These low filling areas are now in focus for renewing the City. Earlier brown field areas are transformed to a modern City. There are also geotechnical problems for development in areas with unstable clays. At the same time, making the City secure against higher future sea levels is another challenge which is expected to be addressed by planning and building

new areas (Moback, 2009).

In the developed plan of Gothenburg, in Centrala Älvstaden strategies it is expected that people's access to Göta River become easier and mainland of the city join to Hisingen (See Fig. 2); so the central area will be bigger and nicer. Frihamnen's central location opens opportunities to reduce the need for vehicle crossing over the river. Pedestrian and bicycle traffic will improve and Frihamnen could be seen as part of the city centre. Transportation between Frihamnen and Lilla Bommen can be easier by shuttle ferry or bridges. In the long term plan 40,000 new jobs and 30,000 new inhabitants envisage in Centrala Älvstaden includes Frihamnen, Ringön, Backaplan and Gullbergsvas. (City of Gothenburg, 2009)

In the frame of River City workshop, researchers and practitioners in different international groups have cooperated with the municipality of Gothenburg (June 2011), they worked out a proposal for a vision for Central Älvstaden. Groups' proposals will be part of the vision and strategies for Central Älvstaden that the municipal council takes decisions in 2012. Frihamnen is one of the districts along the Göta river which is the case of this thesis.

Figure 2. The proposed bridges on Göta River, Source: <http://gbg.yimby.se/>



#### 1.4. Frihamnen

Frihamnen is inner harbour of Gothenburg which is located in the north side of the river Göta in Hisingen Island opposite the city centre and nearly below the Gota Älvbron. It consists of three basins and three piers: South Frihamnspiren or Bananpiren, Northern Frihamnspiren



and Kvillepiren with an area of 104 ha. It is almost the same size as the historic core of Gothenburg.

This port had been active for loading and unloading coal, timber products as described in some literature. The area was remodelled to port in the 1910s; the main activity has been general cargo handling. Before 1990s, this port has been active for unloading imported fruits and other goods. Shipping/port operations, manufacturing of plastic/polyester, metal finishing, surface treatment with varnish/paint/adhesives and car care facility are the operations reported based on MIFO database. There are 19 berths with depths of 3 to 9m alongside (Maryland, 2010). Currently the activities that take place in these areas are automative racing, annual rock concert events and limited harbour facilities for ferries and cruisers (Morrison et al, 2011). Also, some warehouses which were transformed ones into offices are operational.

Surveys of Frihamnen basin have declared low contamination levels in soil and into water. Tjårasfalt# has been found in some studies. It can cause high costs if it is found in large scale (Centrala Älvstaden, kartläggning av förorenad mark, 2011).

Frihamnen is surrounded by six districts; Lindholmen, Ringön, Gullbergssvass, Kvillebäcken, and Bråmaregården which four of these areas are former industrial and shipyards.

## 1.5. Göta River level rising

The Swedish Meteorological and Hydrological Institute (SMHI) has the mission to study the Göta dynamics in particular with regard to the scenarios with high average water level in the ocean. SMHI has put together six different extreme situations which occurred in the Gothenburg region during the 1900s and so far in the 2000s and compiled overview regarding future climate changes and their potential meaning for the Gothenburg region. The relevant weather parameters with record levels based on available statistics are water levels in the Göta River, rainfall, snow, heat and drought, freezing rain, hail and winds. In the report of SMHI the calculation and description of return periods are also considered and the water level in the Göta River is determined primarily by sea-level. The most serious risk of the climate change is temperature increases and consequently the sea level rise of 0.9m with a new storm similar to 'Gudrun'<sup>2</sup>, in January 2005, on the coastal and the low-lying settlements along the

<sup>1</sup> Tjårasfalt or PAH asphalt is an asphalt concrete containing coal tar.

InGothenburg [http://www.miljosamverkan.se/upload/Regionkanslierna/Milj%C3%B6samverkan/Avfall/farligtavfall\\_kurs0308\\_forroen\\_massor\\_MiljoforvGbg.pdf](http://www.miljosamverkan.se/upload/Regionkanslierna/Milj%C3%B6samverkan/Avfall/farligtavfall_kurs0308_forroen_massor_MiljoforvGbg.pdf)

<sup>2</sup> Hurricane Gudrun was a powerful hurricane in the form of a deep low pressure as the 8 to 9 January 2005 withdrew from the Atlantic and hit northern Europe (NEODAAS, 2011)

river in the central city (Göteborg Stadskansliet, 2006). Sea level recorded from two local stations (Torshamnen and Klippan) shows that the mid-tide level of Gothenburg is 9.96m and the highest recorded tide levels are 11.47m and 11.65m at Torshamnen and Klippan, respectively (SMHI). It is assumed that Gothenburg would have the mid-tide level at 9.96-10.76m and the highest recorded tide level at 12.27-12.45m around 2100 (PSMSL, 2011).

The Municipal executive board in the city of Gothenburg assigned to the commission of investigating on adaptation to climate change which is called Extreme Weather, 'Extremt väder', in 2004 (City of Gothenburg). According to the reports of IPCC (2007), municipality of Gothenburg has increased the security level of such important infrastructure for the society resulting has increased the margin to migrate from extreme high water level from 1.5m (2003) to 2m (i.e. railroad, tunnels). During 2010, they have made a pre-study of a hydro model with the aim of connecting the sea, the rivers, the sewer network, tunnels and surface in one model in order to make better prognoses of flooding, testing different scenarios and inform the inhabitants. In addition, they have started to work with new water level-measurements and a web based site showing water levels.

Frihamnen as a flat and low land area is 1.1m to 2.6m over normal water level (Sephehr, 2011). The present situation of Göta Älv is that when a low pressure weather system and a high tide coincide, the water level at the quay reaches +1.8m above normal level and one of the three piers floods. The whole of Frihamnen area would flood within the next 50-75 years with a 0.5m rise in sea level (Morrison 2011).

If the sea rise with 0.5 m

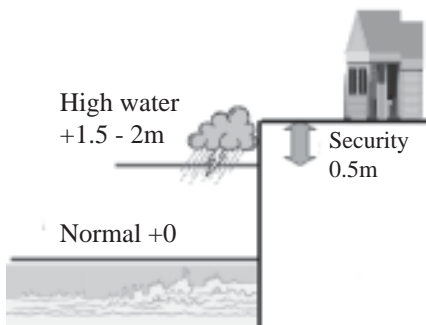


Figure 3, Sea level rising in Frihamnen, Source: Goteborgstad website

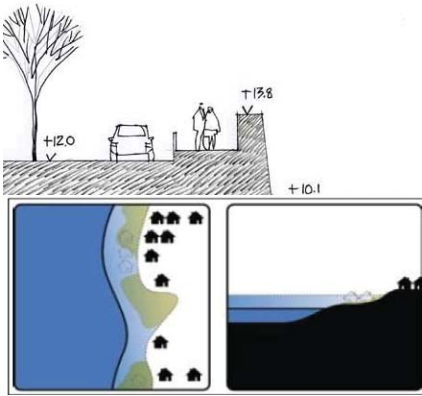
Figure 4, Sea level rising in Frihamnen  
Source: The Gothenburg City



## 1.6. Strategies of Adaptation to climate change in Frihamnen

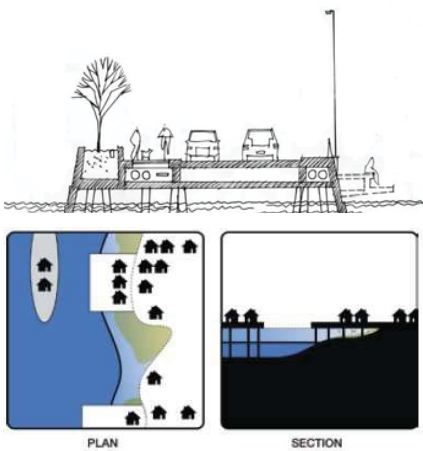
Sweden will be faced to the effects of climate change in spite of being successful to reduce greenhouse gas emissions (Mistra Urban Futures, 2010). So climate adaptation is inevitable in urban planning and city development to reduce the risks and take advantage of the opportunities of changing climate. Mistra Urban Futures<sup>3</sup> has worked on a pilot project called 'A City Adapted to Climate Change: Scenarios for Future Frihamnen'. The three possible strategies are outlined for Frihamnen for long term adaptation of coastal areas which are supposed to be faced to rising water levels. Retreat, Attack and Defend strategies are based on British report and issued by Building Futures and the Institution of Civil Engineering (ICE) in 2009 to protect the area against sea level rising. The pilot project of Mistra Urban Futures examines the ways that these three adaptation strategies can be used in planning and development in Frihamnen with focus on how the district's planned buildings can be climate adapted to rising sea and water levels.

<sup>3</sup> <http://www.mistraurbanfutures.se/english/startpage.4.15c2317a1266994794c8000596.html>



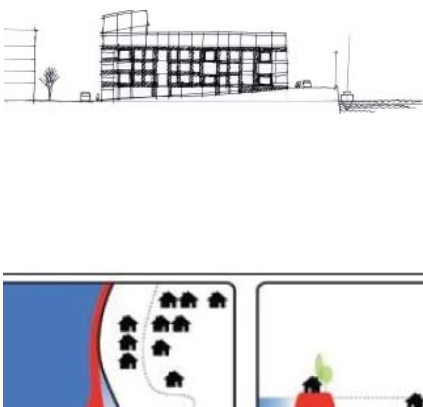
Figures 5, 6, Retreat Strategy  
Source, Gothenburg Municipality

**Retreat**, a controlled retreat with marshlands, strategy is planned for the areas below the level +13.8m, generally. These low-lying areas are excluded for the functions of no everyday use of people and are allowed to be flood. These areas can be used for temporary uses such as parks, rollerblading, cycling, ball games, skateboarding, concert and motor race events which are facilitated for basic needs of the infrastructure. The low-lying areas are not planned for residential, commercials, schools or kindergartens, tramway or railway, main streets or road, etc. (See Fig. 5, 6)



Figures 7, 8, Attack Strategy  
Source, Gothenburg Municipality

**Attack** strategy, an active penetration of floating structure into the water environment, means using water rather than seeing it as a threat as it pulls away from or a problem that to protect themselves from. Water is allowed to rise, fall and surge underneath inhabitable spaces. Regarding this strategy, buildings and infrastructures are floating. This is a flexible way for city developers in recent centuries to build their constructions on existing coastlines and the possibility to condense city. Amphibious buildings are standing on solid grounds but floatable structure. High rise Residential and commercial buildings and individual small floating ones are allowed to be built on these floating structures. Extending the public transport infrastructure is planned through this floating system to connect the city centre to Hisingen Island and further to develop Lindholm district (Mistra Urban Futures, 2010). (See Fig. 7, 8)



Figures 9, 10, Defend Strategy  
Source, Gothenburg Municipality

**Defend** Strategy, a series of defensive structure, is a way to protect the area from sea level rising. Different types of temporary and permanent constructions arrange preventing water to enter to the existing built environment. Defend solutions have been criticized by many engineers because of costly maintenance structure, water access difficulties, unsustainable and damaging coastal habitants (ICE). However, protecting the area by defend strategy makes investments on all the existing piers be secure. Different functions, mix of houses and businesses are supposed to take place in the protected area. Designing these barriers against water could develop residential and commercial spaces in the largest amount of areas in comparison with the retreat and attack strategies (Moback 2010). (See Fig. 7, 8)

Based on the above explained strategies, SWECO<sup>4</sup> as one of the participant in River City workshop in Gothenburg City, spring 2011, proposed three different plans with regards to attack, defend and retreat concepts. The allocated functional zones, residential and commercials are estimated for the plans and compared in this study. (See Fig. 11,12, 13)

RETREAT  
DEFEND  
ATTACK



DEFEND  
ATTACK  
ATTACK



RETREAT  
DEFEND  
DEFEND



Figures 11,12,13, Illustration Retreat, Attack, and Defend by SWECO, Available in Mistra Urban Future Website, Annual Report 2010

<http://www.mistraurbanfutures.se/download/18.7df4c4e812d2da6a416800080234/Mistra+Urban+Futures+Annual+Report+2010.pdf>

<sup>4</sup> Sweco is an international consulting engineering company that provides qualified consulting services with high knowledge content. The service offering covers the entire spectrum from feasibility studies, analyses and strategic planning to engineering, design and project management (<http://en.sweco.se/en/swecose/About-Sweco/>).

Besides the three possible strategies for long term adaptation to rising sea level for Frihamnen, the effects of suggested strategies on the economy, society and ecology are investigated in this project. Through the cooperation between Mistra Urban Futures and the Gothenburg municipality, ecological, politico-economical and socio-cultural focus groups have worked to develop practical and scientific results. The practical results assessed the climate adaptation concepts of attack, defend and retreat effects on the Frihamnen area's sustainable development. The scientific results explored the conflicts of interest and conflicting objectives identified during the focus group work.

The politico-economical group suggested further issue about the financial benefits of the adaptation strategies of all stakeholders in an inner city land. They have also discussed about fairness and inter-generational equity by exploiting the area in terms of innovation and growth alone. In addition to the socio-cultural focus group discourses provided through a dedicated social sustainability character with ideas for a socially stable, secure and equal society. Consequently, five contiguous strategies based on continuum of sustainability fundamental aspects have been brought out by the focus group to become able to analyse and assess the results of the transdisciplinary study for the development of Frihamnen (Morrison et al, 2011):

- Consonance with Nature
- Waterfront Heritage
- Liveable City
- Adaptation for Sustainable Building
- Branding Adaptation and Sustainability

**1. Consonance with nature** should provide biodiversity enrichment related to human needs (Costa et al, 1997) through a varied biotype corridor within the built environment. People's access to the valuable ecosystem raise the market value of the area (Morrison et al, 2011), but by building with long time perspective to include future generations rights (Tisdal, 2001).

**2. Waterfront heritage** and challenges of the threat of the ocean provides an adaptation strategy through an attractive cultural maritime resource (Marrison et al, 2011). The gentrification promoted by this type of strategy supports middle to upper income oriented development (Bounce 2009).

**3. Liveable city** as a sustainable adaptation strategy has a strong element of social inclusion by refurbishment of urban environment based on ecosystem services and built spaces (Morrison et al, 2011). This sustainable strategy specifies a balance of nature and social sustainability (Mori and Christodoulou 2011). Additionally, Dempsey et al (2009) emphasized equitable access and community sustainability as the two key aspects of social sustainability for the urban context. Frihamnen is an attractive living area through close social and economic connection to the city centre and expected to gather all generations in residential area integrated with schools planned for social inclusion and integration (Morrison et al, 2011). Low energy houses, water management, innovative and knowledge intensive businesses and carbon emission reduction buildings are proposed for development of this area (helm et al 2011).

**4. Adaptation for sustainable building** has an emphasis on a socio-technical transition (Geels and Kemp 2007) based on new innovations in climate adaptation and sustainability (Morrison et al, 2011). Innovative adaptation strategies could be consisting of water and waste management, transport systems with a context specific request for pedestrian and bicycle access to the city over suggested bridges across Göta Älv; plus energy homes with innovative materials contribute to climate mitigation.

**5. Branding adaptation and sustainability** is a discourse provided by socio-cultural and politico-economical focus groups, through their expression based on resilience city, socio-political structure and markets. A unique mix of latest ideas in climate adaptation and sustainability to attract successful national and international projects from elsewhere to Gothenburg is the direction of decision-makers (Morrison et al, 2011). Sustainable development is an advantage of the city that its features are often visible through tree planting or green roofs (Basset and Shandas 2010). The difficulty of developing sustainable city areas without turning this into a brand with which to sell the city to tourists, mobile classes and capital has discussed by Kear (2007).

## 1.7. Research Question

Throughout the history of mankind, there has never been a time where more than half of the population of the world lives in urban

areas as they do today. This population is expected to rise upto 5 billion by 2030 (UNFPA, 2007) of which two-thirds live and work in coastal areas (Hinrichsen, 1998). It is estimated that many of the large cities in the world are vulnerable to the sea level rising and climate change, with the remarkable number of people exposed to extreme floods and storms (Aerts et al, 2009). In many regions in the world, it is expected that the frequency, intensity and duration of precipitation will increase as well as the droughts because of the climate change. The need for adaptation to climate change is increasingly recognized in cities in order to moderate the harm as a result of these alterations; however, it is a complicated issue and it is necessary to keep all options open because of the uncertainty of how the future will develop and what measures will be needed (Aerts et al, 2011).

In this chapter, I have explored the necessity of adaptation to climate change along the Göta River in Gothenburg as a start point of this study. Three possible strategies -retreat, defend and attack- for long term adaptation of coastal areas have been examined by Mistra Urban Futures as possible solutions for Frihamnen. This new centre where researchers and practitioners cooperate to produce innovative and effective knowledge was established in January 2010 for sustainable urban development with the ambition to become a world-leader in the field in the near future. It is funded by Mistra, the Foundation for Strategic Environmental Research, the Swedish International Development Cooperation Agency (SIDA), and the consortium partners. Chalmers University of Technology hosted the centre.

The expression by researchers and practitioners of creating social well being by shaping the built environment for climate adaptation and sustainability underlined a need for further consideration of built innovations (Morrison et al, 2011). The incorporation of social justice into the Frihamnen will be a challenge if the area becomes attractive and market forces prevail (Morrison et al, 2011). Although there have been quite a lot of discussion's reports about climate adaptation in Frihamnen, some social effects of this issue e.g. how we can develop the area for different groups require further investigation (Näslund, 2011). The balance of nature and social sustainability in the context of sustainable adaptation strategy seems missing from current urban planning literature as evidenced by the recent review of indicators and proposals for a new City Sustainability Index (Mori and Christodoulou 2011). When I was reading reports by Mistra Urban Futures and interview with Camilla Näslund<sup>5</sup>, I realized that the

<sup>5</sup> Social sustainability issues and dialogue work in Central Älvstaden, Gothenburg Municipality, 2011



incorporation of social fairness into the future of Frihamnen seems to be an opportunity as a result of current approaches to adaptation to climate change. Therefore, the research oriented objective of this research is to inquire about effective components of social inclusion to discuss:

“How can social inclusion be promoted in coastal areas which are about to be adapted to climate change?”

and the practice oriented question of this thesis is:

“What design criteria could be recommended in order to enhance social inclusion in these areas?”

During the studying of the urban renewal projects, I have developed four sub-questions to the first main research question to illustrate relations between the effective components of social inclusion in the adapted to climate change coastal areas.

Q. 1. What are the effective components of social segregation incident in cities?

Q. 2. What are the effective components to gentrify district?

Q. 3. How are the relations of the effective components to promote social inclusion?

Q. 4. What are the effects of adaptation to climate change strategies on social inclusion/social exclusion in coastal cities?

I use a simple theoretical framework to make the research problem clearer and to assess employed approaches if they are feasible for interpretation of academic inputs into practice outputs. Through in-depth reviewing urban renewal cases of the districts Inner-Vesterbro in Copenhagen, Hammarby Sjöstad in Stockholm and HafenCity in Hamburg the research will link the knowledge and experience in these cities with Gothenburg harbour redevelopment proposals via the narrative model through facts and ideas. Furthermore, I will analyse consequences of redevelopment projects through answering ‘how’ and ‘why’ questions to define effective components of systems thinking and their relations which will be used for interpreting academic input (different social aspects) into practice output (propose criteria to promote social inclusion in the future plan of coastal areas which are about to adapted to climate change and specifically for Frihamnen) and addressing the second question of this thesis.

# Methods



## 2. Methods

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In this chapter, methodologies to approach the objective of this research will be explained with focus on the method which has been employed for each part (Chapter 2.1).

### 2.1. Methodology

The research design and approach are based on the main object of analysis and two main concepts. The analysis focuses on the social objects of urban development. The concepts are sustainable urban development and adaptation to climate change in coastal cities.

The first chapter deals with the background to the thesis and the necessity of adaptation to climate change along the Göta River in Gothenburg. Research questions are defined through reviewing reports by Mistra Urban Futures, Central Älvstaden and the Gothenburg City. This chapter is also supported by different identified options and the proposed potential strategies by several international consultants through three focus groups that are called ecological, socio-cultural and politico-economical particularly in the frame of River City workshop in Gothenburg. Data about Frihamnen and its future proposals is collected through literature reviews, email interviews and observation. The literature search showed that within this part of the research, there was no established approach on how to move analytically between documents and the built environment.

Regarding the rather considerable quantity of reports and published documents about climate change adaptation, the notion of adaptation strategies and the way they might affect cities and support all parts of societies, if not neglected, of course is addressed with less focus and attention. Therefore, I will inquire about effective components of social inclusion to discuss about these questions:

“How can social inclusion be promoted in coastal areas which are about to be adapted to climate change?”

and

“What design criteria could be recommended in order to enhance social inclusion in these areas?”

To address the first main research question which is aimed towards academic research I have developed a simple theoretical framework to focus on urban renewal studies and develop the research theory regarding the importance of urban development effects on the society. Relevant literature about the development of the theory in the field of adaptation to climate change in coastal cities supports this task.

To translate academic research findings into design practice and make the research more operational I evolved it based on case studies as developed by Robert K. Yin (1994) who states: “In general, case studies are the preferred strategy when “how” or “why” questions are being posed, when the investigator has little control over events, and when the focus is on a contemporary phenomenon within some real-life context”. Case study method was first introduced into social science by Frederic Le Play in 1829. In this research, I have linked data and the aim to give an operational structure as a link between the empirical data and the assumption. Data come out from studying three urban renewal cases and use to expand and generalize theory for further analyses. Subsequently, effective components of social inclusion have been emerged through urban renewal cases -. Inner Vesterbro, Hammarby Sjöstad and HafenCity-. For further analyses and illustrating the relations between the effective components of social inclusion in the adapted to climate change coastal areas I have developed four sub-questions to the first main research question in the second part of this study.

Q. 1. What are the effective components of social segregation incident in cities?

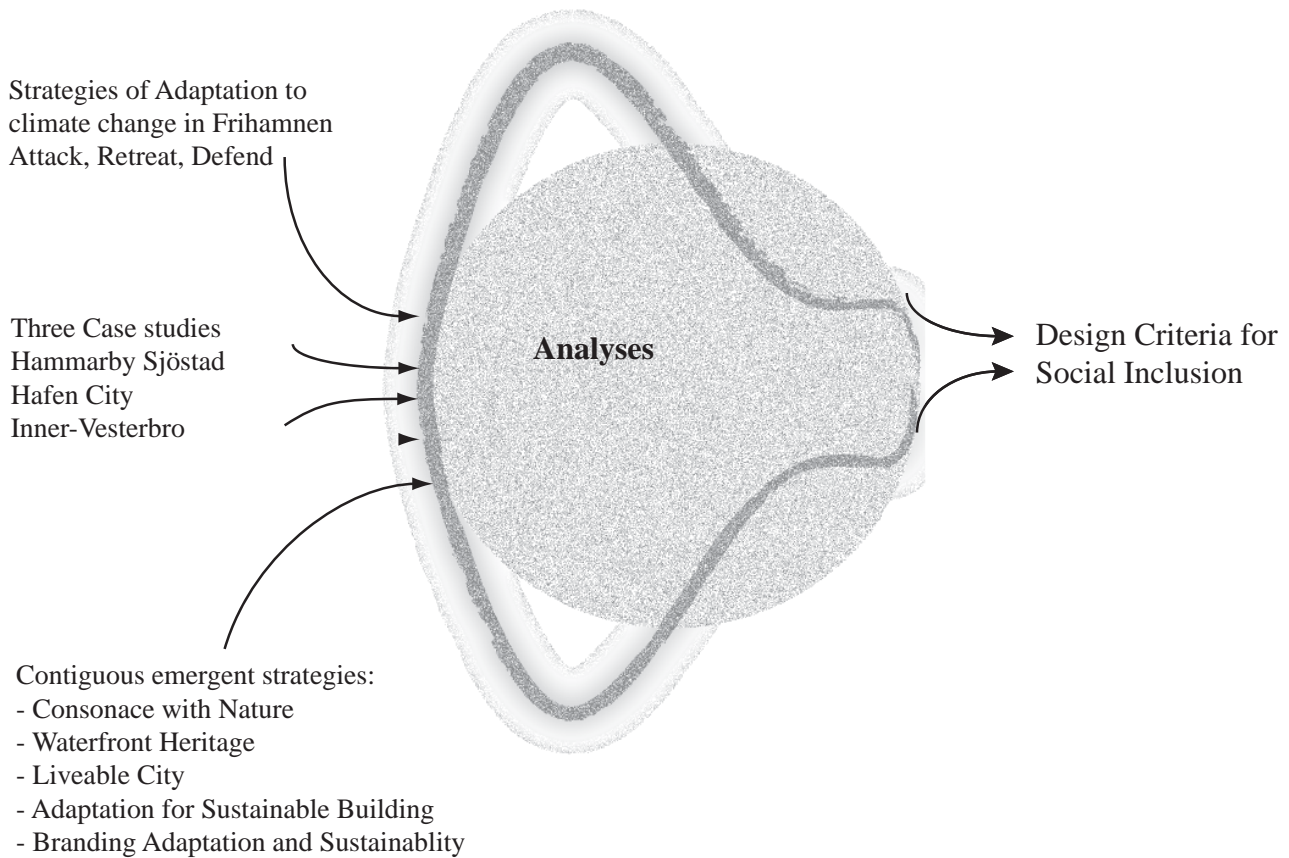
Q. 2. What are the effective components to gentrify district?

Q. 3. How are the relations of the effective components to promote social inclusion?

Q. 4. What are the effects of adaptation to climate change strategies on social inclusion/social exclusion in coastal cities?

To evaluate the effects of renewal processes in these studies, literature is organized in terms of facts and ideas. Jacques Barzun and Henry Graff, in their well-known text *The Modern Researcher*, make this useful distinction. Facts as “a clear and distinct relation held to be so by tacit agreement” are recognised to search for the ideas as “a statement of interference or hypothesis” (Wang, 2002), i.e. facts are quantifiable and certifiable pieces of information, while ideas, even though they may be well obtained in the same ways by searching into the literature, tend to have more of illustrative or interpretative role. In this thesis, I use the ‘facts and ideas’ analytical model to explore ‘how’ and ‘why’ urban redevelopment process affects societies. In order to approach more understanding of effective components of social inclusion I will study three European cities with several similarities with Gothenburg in the following chapter. In this research, facts and ideas integrate to generate the study report as a narration through email interviews, city observation, books, articles and cities’ websites. An arrow and three ellipses have formed the narrative model which has illustrated ‘how the ideas have been emerged by facts’. Ellipses which are included by different renewal effects in each city are overlapped because of showing that some facts influence on the other one and ideas can be consequences of some facts.

In the following chapter, I use systems approach to describe an organised or connected group of objects and forming the complex unity of effective components in order to interpret academic findings into design criteria which is useful for e.g. planners and architects. In the systems area, relations and association between effective social components are illustrated. System theory as is undertaken in this research has used from 1940 (Flood and Jackson, 1991). The more recent definition of systems theory is forwarded by John van Gigch, by arguing that a system is an aggregation of concepts, objects, and/or subjects (van Gigch, 1991). The processes within the system -transforming input into output- are also influenced by feedback loops (Flood and Jackson, 1991) (See Fig.14). To better understand the systems structure of social exclusion/inclusion, I have illustrated them in a graphical



# Inputs → Processes → Outputs

Figure 14. Research process

diagram as a casual loop which is adopted from a figure in Richardson and Pugh (1981).

As it was argued above, one way to develop structure and to analyse knowledge regarding the complex relations between social components in the sustainable urban development would be to employ systems theory. In this study, system dynamic approach has employed to illustrate the complexity of relevant components reflection. The system dynamic was developed during the mid-1950s by Professor Jay Forrester of the Massachusetts Institute of Technology. I have used it to frame, understand and discuss the complex urban issues and problems in order to interpret academic findings into design criteria. In this thesis, two systems of ‘social inclusion’ and ‘social exclusion’ have been defined to figure out the messy local relations of different components. To analyse and evaluate likely social effects

of adaptation in coastal areas, systems go through three contexts -gentrification, public interaction and social deprivation- for further discussions in the following part. These are some contemporary social issues which are discussed for future Frihamnen in focus group -ecological, socio-cultural and politico-economical and the Forum for Studies of Contemporary Culture seminar (Forum för Studier av Samtidskultur- FSSK<sup>6</sup>) in Gothenburg. Social exclusion as a likely consequence of urban development in the future of Frihamnen will be explained by the effective components and their relationships to promote or mitigate this phenomena in the adapted to climate change area. Also, equitable access and community components as the two key aspects of social sustainability for the urban context (Dempsey et al, 2009) will be explored through social inclusion system thinking model to illustrate relations between effective components to promote this objective in the city development.

In the last part of this study, results of the systems are discussed; limitations and strengths are also identified to propose through implication of findings for the future programme of adaptation to climate change in Frihamnen.

<sup>6</sup> FSSK (Forum for Studies of Contemporary Culture) in collaboration with urbanum, Göteborg City Museum hosted the conference on gentrification <http://www.kultur.gu.se/forskning/FSSK>

# Materials & Analyses





### 3. Materials and Analyses

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The theoretical framework for studying urban renewal cases is explained (Chapter 3.1). In order to approach more understanding of sustainable development, three urban renewal cases has been studied in Urban Studies chapter (Chapter 3.2) with focus on Inner-Vesterbro, Copenhagen renewal project (Chapter 3.2.1), Hammarby Sjöstad, Stockholm redevelopment (Chapter 3.2.2) and Hafan City, Hamburg (Chapter 3.2.3) through the narrative model.

The first research question “How can social inclusion be promoted in coastal areas which are about to be adapted to climate change?” is aimed towards academic research and the second “What design criteria could be recommended in order to enhance social inclusion in these areas?” is aimed to interpret the findings into a format that is useful for e.g. planners and architects.

Materials which support the background of this research are based on Gothenburg City Urban Planning documents, Mistra Urban Futures institution, Swedish Defence Research Agency and the UN’s Climate Panel.

The research design has been formed with practicality in mind. Therefore, it becomes based on linking three urban cases which have been studied and the discussed strategies in focus groups for future Frihamnen. First of all, the theoretical framework has been defined based on the literature and several course materials in Chalmers University and the University of Gothenburg. Then, I have reviewed literature

about the planning and development processes and the other articles which are found from scholar E-engines and some books about the three recently developed cities. I have also observed the existing situation of Frihamnen in Gothenburg and Hammarby Sjöstad in Stockholm through study excursions. To inquire about effects of renewal project of Inner-Vesterbro in Copenhagen and HafenCity in Hamburg I review comments of case studies of the districts' redevelopment process and cities' websites.

To study the proposals of Frihamnen I have employed Mistra Urban Futures report from focus groups, the River City workshop (2011) and Centrala Älvstaden documents. I have also discussed the likely urban policies for the future Frihamnen to include all inhabitants with Camilla Näslund, Bo Aronsson and Anders Svensson in Centrala Älvstaden in Gothenburg through email interviews and telephone conversation.

### **3.1. Theoretical Framework**

I have developed a simple theoretical framework to study urban renewal effects on three societies -Vesterbro, Hammarby Sjöstad and HafenCity in Hamburg- which are chosen for study in this research because of their similarities with Gothenburg.

To develop the theoretical framework in order to translate findings of academic research into design criteria, I have defined basic context with focus on social inclusion for this research which will be seen as the main systems' components in the following chapter of this thesis.

**3.1.1. Social exclusion:** It is described as a systematic process that blocks individual or entire communities of people from rights, opportunities and resources (Dr. Lynn Todman, Adler school). In another word, social exclusion is such a process that detaches groups and individuals from proper participation in social relations and institutes in normal and normative activities of the society in which they live (Middle East Youth Initiative Working Paper 2007).

**3.1.2. Social Integration** has been defined in three meanings, by different people, in the explanation of United Nations Research Institute for Social Development (1994). For some, it implies equal opportunities and rights for all people. It is the explanation that I have employed in this thesis. Others see it as becoming more integrated as

a means to improve life chances. However, there are some who feel that increasing integration by enforcing uniformity has a negative undertone. A third group of people's opinion do not involve either a positive or negative stance. (UNRISD, 1994).

**3.1.3. Gentrification** is a term for the changes in culture and character of a district by wealthier people (Keating, 2003), who arrive in an existing urban area and increase properties' value and improve neighbourhoods' relation (Freeman, 2008). Consequences of gentrification are not almost positive and their impacts could damage social integration of inhabitants. Irvin Allen, a sociology professor at the University of Connecticut, claims that the heterogeneous city sponsors cultural advantages for both single persons and families with children. In a gentrified district the low income groups are vulnerable to the effects of gentrification primarily because of the lack of the knowledge which is necessary to recognize the phenomenon in its wake, and the lack of the unity needed to confront it. It can make residents disabled from coming together and rectifying issues within their own community (Ebenezer, 2011).

**3.1.4. Anti-social behaviour** is a behaviour that shows disregard to others' concerns and damages society (Berger 2003). This term is interpreted differently related to the region and defined law for that area.

**3.1.5. Liveability** is defined by Webster dictionary as "suitability for human living". Standard of living is assessed by comfortability of city which consists of goods and services like health care, education, telecommunication facilities, clean water, houses, cost of living, foods, etc. Trust is correlated with objective liveability and subjective satisfaction with city (Okulicz-Kozaryn 2011) which has influence on economic development, trade, entrepreneurship and stock market participation (Knack and Keefer 1997; Guiso et al. 2006). City appearance, beauty of streets, sport facilities, outdoor recreation, green spaces, public spaces and so forth are indicators of satisfaction in some studies about measurement of quality of life. Furthermore, the Economist presents their components of liveability in 2011 as cost of living, public transport and roads, safety and security, besides culture and nightlife. Cities have their own personalities and are comparable

with character of people who are willing to live there to know if it is suitable for them. Feeling, perception and subjective values are connected to the quality of life (Senlier et al. 2009).

**3.1.6. Social deprivation** is reduction or prevention of normal interaction between an individual and the rest of the society. Multiple deprivation prevents individuals or groups to participate in the economic, political and social life of the area that they live there. Low income groups are mostly vulnerable group in a changing situation. Low socioeconomic status, poor education, lack of political freedom or basic capabilities such as mental illness may cause social deprivation in societies.

## 3. 2. Urban Studies

Cities play an important role in the climate adaptation process because of developing the ability to adapt constantly to change and attract economic activities and investments. Today adaptation to climate change is an additional challenge that needs city planning, investments and regulations. Since many cities are growing interests in sharing and exchanging experience and knowledge, three cities redevelopment processes and social consequences of these processes are studied in this research to translate academic research findings “How can social inclusion be promoted in coastal areas which are about to be adapted to climate change?” into design practice “What design criteria could be recommended in order to enhance social inclusion in these areas?” and make the research more operational.

I evolved my studies based on case studies to answer “how” or “why” questions. A narrative model consists of ‘facts’ and ‘ideas’ is also employed in this chapter to emerge effective components of social inclusion/exclusion through each urban renewal cases. Moreover, I have developed four sub-question to the first main question to analyse and illustrate the relations between the effective components of social inclusion/exclusion in the adapted to climate change coastal areas.

Q. 1. What are the effective components of social segregation incident in cities?

Q. 2. What are the effective components to gentrify district?

Q. 3. How are the relations of the effective components to promote social inclusion?

Q. 4. What are the effects of adaptation to climate change strategies on social inclusion/social exclusion in coastal cities?

Hammarby Sjöstad in Stockholm and Inner Vesterbro in Copenhagen as two Scandinavian planning projects which are mostly residential zones have been reviewed as well as HafenCity in Hamburg, Germany which is a large port with similar functions to Frihamnen as an inner city port and an important commercial coastal area in North Europe.

### 3.2.1. Inner Vesterbro, Copenhagen

It is an example of influences of renewing Vesterbro in Copenhagen individually and the city as a society. Vesterbro, a district near downtown of the capital city of Denmark, located west of the city centre at the location of the old Western Gate “Vesterport”, is targeted for revitalization. This process was a grant of government to rehabilitate old tenement buildings and local residents were helpful in drafting plans (Walljasper, 2001). Originally, this district has been inhabited by immigrants from countryside and latterly from the other countries. Working class people have been the majority of this area’s residents in the late 19th and early 20th centuries where it was notorious for drug trade and being traditionally red-light district of Copenhagen. Revitalization of Inner Vesterbro has become the objective project for both local and central governmental of the Danish state.

“The past 20 years of changes in Danish urban politics have involved three intertwined tendencies. First, urban political priorities have moved from an agenda of redistribution to an agenda of growth. Secondly, urban politics has shifted perspective from predominantly ‘inward’ looking to a more ‘outward’ looking approach.



Figure 15. Vesterbro Passage  
Source: Unknown

And thirdly, private enterprise is to a greater extent included in decision making, while the public sector has embraced entrepreneurial forms of organisation and behaviour.” (Larsen and Hansen, 2008, p. 5)

Increase of attractiveness for international investments in Copenhagen in comparison with Stockholm, Hamburg, Berlin and Malmö was expected. Motorway, local railway, cross-border infrastructure and symbolic architecture works have been invested in Copenhagen. Furthermore, luxury hotels, shops, houses and renewal of inner city were added to the infrastructure development. Holger Bisgaard, the municipal head of Copenhagen expresses on changing the housing policy and attracts middle classes to stay in Copenhagen. It is the key for the city development and if not it would not be a sustainable work (2001).

Inner Vesterbro was a meat market and it is still a food market now. The old abattoirs have been transformed for cultural purposes. This district was known for porn shops, drug pushers and users, bars and restaurants.

Population of Vesterbro was about 2000 in 19th and it increased rapidly from 65000 to 85000 in 1920s. This area has accommodated 36,000 inhabitants in renewal houses now (Larsen and Hansen, 2008). (See Fig 16)

The renewal project was planned to be implemented for two to four blocks per year based on dwelling-hygienic, social consideration and inhabitants’ involvement in all processes of revitalization from planning to implementation. The social problems of the area

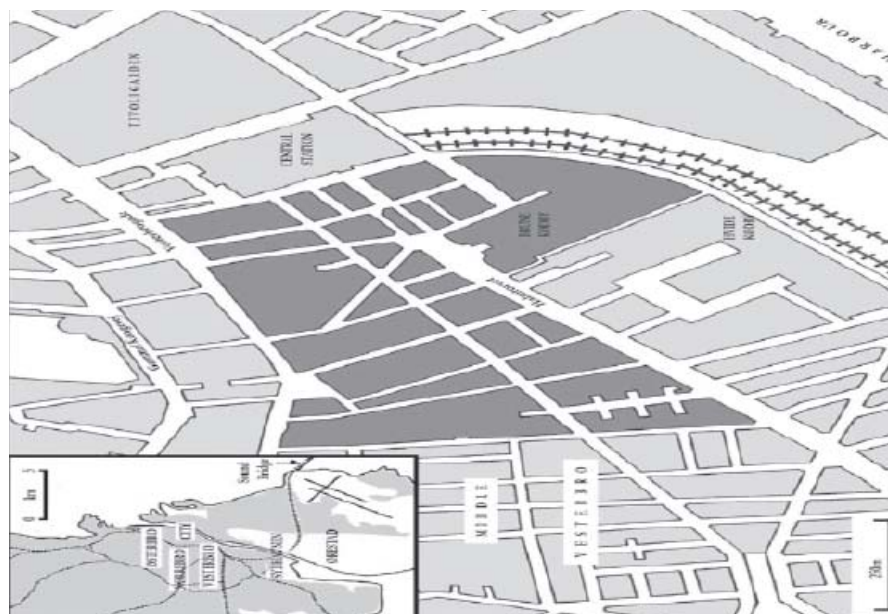


Figure 16 The Inner Vesterbro Urban renewal area, download from usj.sagepub.com at Royal Institute of Technology, 2011

based on Copenhagen Municipality declaration were the 20 to 30 year old long term unemployment and the younger of those receiving pension for social and medical reasons, the prostitutes, the mentally ill and the immigrants (1990). The aim of the project was to keep the majority of dwellings suitable for singles, couples without children and families (See Fig 17). The rent of houses in the district rises because of urban renewal project but it was estimated that reduction of heating expenses and individual rebates could balance these increases. However, the attraction of the district decreased because of difficulties affording the rent for smaller group of socially and economically weak tenants. There were controversial discussions in Copenhagen Council to define a rent ceiling. It was a compromising attempt by the city council to introduce a deflecting mechanism beyond the rent rebates by law in the urban renewal. This plan has addressed many deprivations and social exclusion in the district after years despite that creating young and elderly friendly housing was in the policy paper of the city council to attract those population groups that were underrepresented in the district to stay there (Copenhagen Municipality, 1990). Increases high and middle salary of wage earners and employment rate and in the other hand the unemployment drops between 1997 and 2005 shows that upgrading Vesterbro as an upward urban project was successful. (See Table 1). Very few houses demolished but the old tenements presented themselves with refreshed facades, solar panels and gardens. All flats are facilitated by the district heating system and are furnished with toilets. Urban life of Vestrebro became modernised; working class pubs became replaced by upmarket restaurants, cafes and wine bars.



Figure 17. Housing in Vesterbro, 2008

Source: wikimedia

Table 1. Age and standard of basic amenities in pre-renewal Inner Vesterbro housing, 1989

	<i>Inner Vesterbro</i>	<i>Vesterbro</i>	<i>Copenhagen</i>
Housing units (number)	3 368	20 188	278 649
Pre-1899 (percentage)	88	49	16
1900–19 (percentage)	11	33	20
1920–39 (percentage)	1	10	35
Post-1940 (percentage)	0	8	29
Without central heating (percentage)	64	55	21
Without own toilet (percentage)	11	8	4
Without own bath (percentage)	70	61	30

Source: København and SBS (1989).

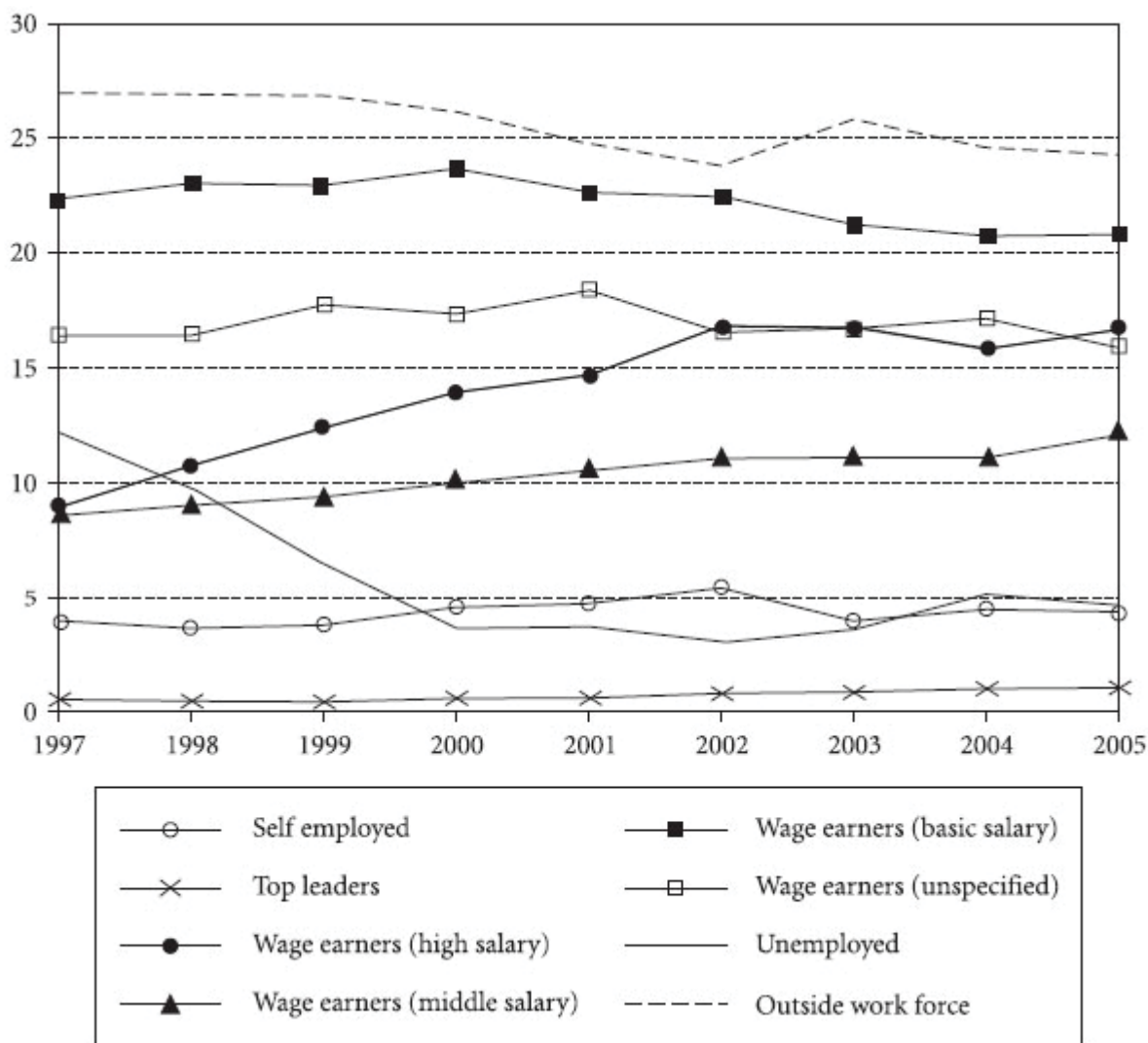


Table 2. Socioeconomic changes in Inner Vesterbro, 1997–2005 (percentage of the total population aged 16–66)

Downloaded from usj.sagepub.com at Royal Institute of Technology

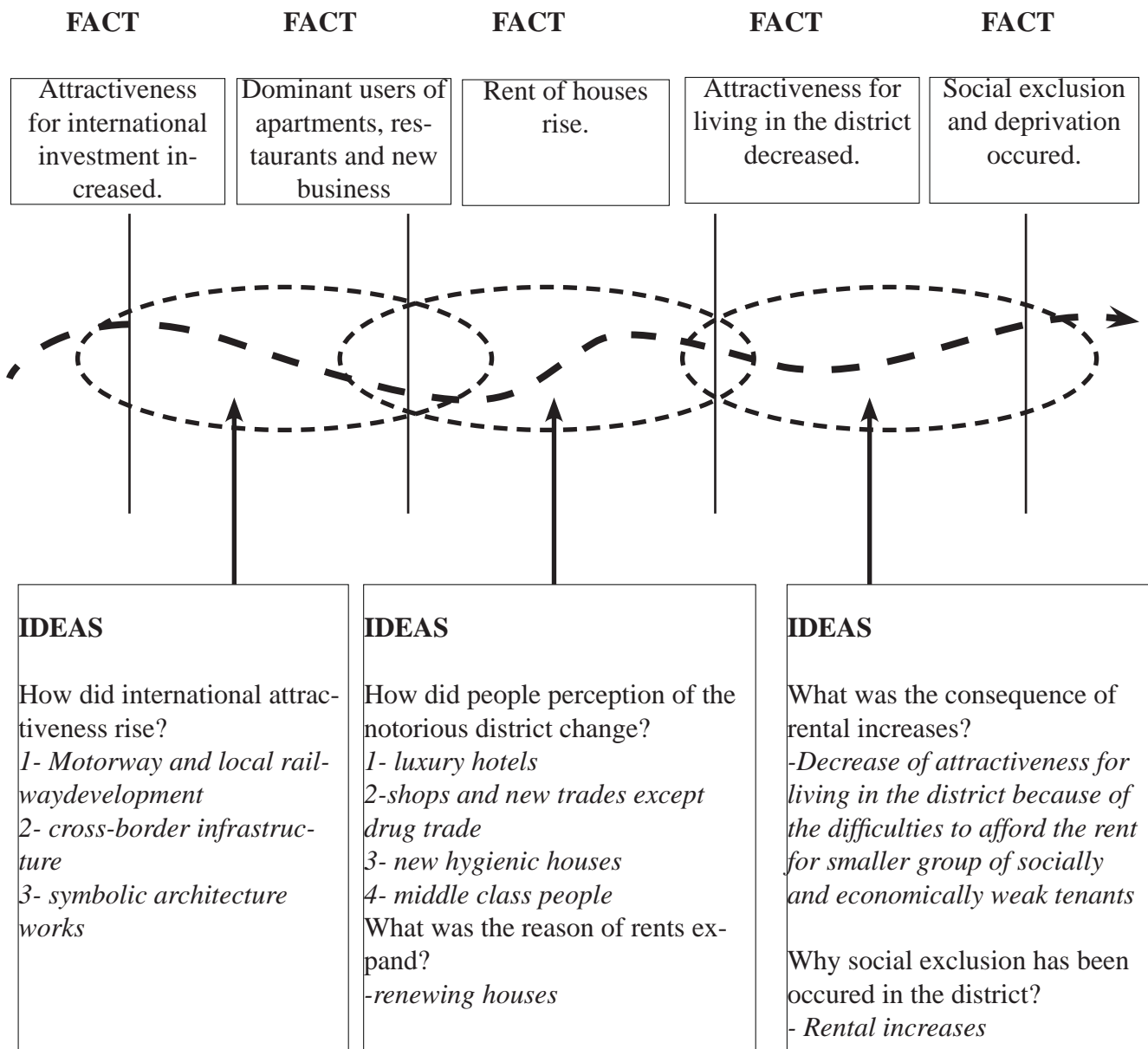
This project policy originates at social dimensions and middle class gentrification accompanies to urban renewal process. 20 percent unemployment in pre-renewal Vesterbro dropped to 12 percent by 1997 and reduced to affect 5 percent of the working age population in 2005 (See Table 2). General Danish economy recovery since the mid 1990s was related to this dramatic drop. Statistics of employment, education and salary show the achievement of the city project goal in terms of ‘social uplift’ (Larsen and Hansen, 2008, p. 15). Number of immigrants who had been living in Vesterbro decreased to a lower range of the average of Denmark. These show that gentrification has traumatic consequences for the individual and the city society.

Rents were increased due to renovation costs in Vesterbro by approximately 50 percent since the renewal process (Henriksen, 2002; Copenhagen Municipality, 2005b). The plan provides ceiling rent to facilitate the gentrification gently. In the short term, pre-renewal in



habitants afford to stay in the area; however, in long term, some of them had to move because of higher rent and inability of paying for it. There is no clear data of the movements due to non-registered new addresses of some of the people who were forced to move (Lund Hansen, 2003). In some cases the gradually increasing rent affects socioeconomic vulnerable groups in a very traumatic way (Lentz, 2002). Traditionally, the housing stock in Vesterbro has been characterized by private rental rather than owner occupied housing. After 1997, the dominant ownership of Inner Vesterbro housing has become co-operative as in between rental and owner occupied housing with exemption from property taxes and favorable state-guaranteed loans, tenants have acquired inexpensive housing (Larsen and Hansen, 2008). The price gap between owner-occupied and co-operative flats is rapidly closing (Erhvervs- og Byggestyrelsen, 2006) due to sharing mortgage owned by members has legalized by government. These shares were lower than the potential market price. Co-operative price increased six-folds over eight years, in this way (Copenhagen Municipality, 2008). The consequence of this market plan of co-operative housing was rather enriching the existing inhabitants and preventing dwellers to become dislocation. Co-operative mechanism gently but highly effectively lends a hand to middle class gentrification in the district (Larsen and Hansen, 2008).

The renewal of Inner Vesterbro municipality's policy has aimed to keep the existing inhabitants and social uplift through an influx of stronger socioeconomic groups. This plan on building renovation has direct influence on marked shifts of the district of residents' social status in terms of key indicators such as education, income and unemployment which have lifted the district close or above to the average of Copenhagen. Culture has an impact on the process of gentrification as well as urban policies (Larsen and Hansen, 2008). This environment transformation has similar trend to the building stock. Statistics are issued by the Copenhagen municipality shows social uplift and the population of the district that become sustainable in the more straightforward economic terms by the adopted housing policy. Finding of this study are based on the defined theoretical framework which has been focused on social inclusion. It follows in a narrative model (See Fig. 18)



### Findings from Inner Vesterbro renewal project

The most effective components of environmental transformation of Inner-Vesterbro which have been defined in the primarily programme of urban renewal project are:

- culture
- urban policy
- residents' participation in planning and implementation of the renewal project
- new regulation of ownership
- increase of attractiveness for international investments

Figure 18. Facts and Ideas in relation to searching for the ideas that explain gentrification consequences in Inner-Vesterbro, Copenhagen  
The Narrative Model After diagram of Wang, 2002

- infrastructure development for e.g. motorway, local railway and symbolic architecture work
- luxury facilities for tourists
- renew houses
- attract middle class inhabitants to stay in the district

Consequences of the Inner-Vesterbro renewal process on the society of the district which are shown as facts in narrative model are:

- traumatic gentrification
- social exclusion
- social deprivation
- replacement of low-income groups and decrease of attractiveness to live in the district
- safe circumstance
- increase of international businesses

Ideas in this model are discussed about the reason of renewal project effects or how it occurs in Inner-Vesterbro. As it is shown in the narrative model, gentrification has traumatic consequences for individuals and the city despite the municipality's aim to gentrifying the district gently.<sup>7</sup> The ensuing transition from rental to privately owned flats simultaneously with the major renovation of the built environment would impose a change in population (Lund Hansen et al, 2001). Many deprivation and social exclusion have been addressed in this plan regardless of creating young and elderly housings in the policy paper of the city council. Middle-class inhabitants are now replacing the socioeconomically vulnerable people who characterized Inner Vesterbro before the urban renewal. Finally, Inner-Vesterbro is a secure district, ethnic restaurants and shops contribute to the economic values generated by gentrification (Lund Hansen et al, 2001).

<sup>7</sup> Henrik Gutzon Larsen and Anders Lund Hansen, 2008, Gentrification—Gentle or Traumatic? Urban Renewal Policies and Socioeconomic Transformations in Copenhagen

### **3.2.2. Hammarby Sjöstad**

“Hammarby Sjöstad is the largest urban development project that Stockholm has seen for many years. “ (Örjan Svane, 2008, p. 1)  
Hammarby Sjöstad is a transformation urban project in a former industrial brown field area around Hammarby Lake in Stockholm, Sweden adjacent to the downtown, which is one of the biggest ventures in Europe (Vestbro, D., U.). It is the best example of implemented

sustainable urbanism in the world (Beatley, 2000). The project Henrik Gutzon Larsen and Anders Lund Hansen, 2008, *Gentrification—Gentle or Traumatic? Urban Renewal Policies and Socioeconomic Transformations in Copenhagen* planned to be completed in 2012 in 200 hectares and will accommodate approximately 30,000 people in 9,000 new apartments. It comprises also 400,000 sqm of new floor area for businesses; new canal and quays, a water-lock, several bridges and a tramway. Furthermore, this district provides a wide range of educational, cultural and recreational programmes (Dastur, 2005). The sustainable development plan for Hammarby Sjöstad was a part of far-reaching environmental programme of the 1996 Stockholm bid for Olympics 2004. However, after that Sweden did not win the bid, the municipality concentrated on accomplishment of the sustainable industrial waterfront redevelopment project.

The strategies expected for the Hammarby Sjöstad which all eleven phases of it, are about to become completed in 2012; environment, functions, neighbourhood and governmental policies of properties in Swedish context are comparable to Frihamnen area in Gothenburg. So, an identification of elements, both supportive and hindering, to the achievement of visions and aims of the Hammarby Sjöstad programme is valuable in further discussions of Frihamnen future plan. In order to understand to what extent the sustainable urban planning of Hammarby Sjöstad reaches social comprehensive aims which were defined as a goal of project, a qualitative case study based on ‘how’ and ‘why’ was used for this study. These questions were developed in cooperation with key urban policies involved in the planning and redevelopment of the district with studying literature and later discussed with a local planner in the city of Stockholm and a study excursion. To discuss about the consequences of development in Hammarby Sjöstad, I have interviewed via email and telephone conversation with Björn Cederquist, architect, and Malena Karlsson, information officer in Glashuset in Stockholm. In addition, I skimmed real states’ papers and some statistics<sup>8</sup> issued by those organizations and the city of Stockholm for some comparison data which are coming in the facts part of the material analysis.

<sup>8</sup> <http://www.usk.stockholm.se/internet/omrfakta/tabellappl.asp?omrade=sdo12&appl=Omradesjmf&resultat=Antal>, November 2011

**Background:** After the First World War, south part of Hammarby Lake started to develop for industrial activities. In 1917 when the City of Stockholm bought the land, construction of it launched with blasting a canal through the mountain of Danvik, so making the area

accessible for long distance transport by connecting it to Baltic Sea. Previously, the south shore was a meadow and wood where workers from Södermalm in north part of the lake used it for picnic. An attractive pavilion, an artist's collective and farm was also there (Bodén 2001; 2002). The US car producer General Motors was one of the first factories built in this area to use the facilities and opened a sale office there. Luma bulb factory was built on a small hill along the southern shore in the end of 1920s. Rail lines were built to facilitate the area to booster such these heavy industries (Vestbro 2005). Small and large-scale industries integrated with office buildings and harbor activities were located in the major part of the Hammarby Harbour. Informal small-scale activities developed in the peninsula of Lugnet which some of them were semi-legal or illegal. This area has been heavily polluted since toxic substances were dumped into the ground or the water, (Bodén 2001; 2002) (See Fig 21).



Figure 19, Pre-industrial use  
 Figure 20, Industrial use  
 Source: Unknown



Figure 21. An odd industrial area. Lugnet. March 1997.  
 Source: Hammarby Sjöstad, Stockholm City

**Urban Policy:** A strong demand for housing in Stockholm increased dramatically and economic boom, in the early 1990s, led to redevelop Hammarby Sjöstad as part of the build inward strategy (Dastur, 2005) instead of promoting further urban sprawl and encroachment of green spaces (Stadsbyggnadskontoret, 2000; Inghe-Hagström, 2003). This area considered by planners as an unattractive place in several ways because of noise, heavy car traffic and rapid economic changes; however, it was attractive for residential purposes because of being adjacent to city centre. When this plan started to

work out for the residential purposes, most of the businesses in Hammarby Sjöstad were active. Nevertheless, keeping the small portion of industrial activities and developing houses were decided. The city of Stockholm paid compensation far above the market price to the companies that threatened to appeal against expropriation decisions of demolition their contract. The city of Stockholm owned most of the land. The fact of soil and water pollution in some parts was considered as a good reason to effectively treat the contaminated soil and remove the toxic substances in spite of seeing it as a big obstacle (Vestbro, 2005).

All the politicians in Social-Democrats, Moderate, Liberals, Left Party, Green, Christian Democrats, the Centre Party and the Local Stockholm party in Stockholm have some components of green policies and they may enforce a greener policy than the election results justify (Vestbro, 2005).

The Swedish suburbs which consist largely of big blocks of flats (million homes programme 1965-1975) were considered as anti-urban. The idea about urban revival gained momentum with the downfall of classical modernism as a leading town planning doctrine (Vestbro 1998, Andersson 1997, Magnuson 2004, Bodén 2004). At the time of planning Hammarby Sjöstad all the parties supported traditional urban qualities such as combination of squares, narrow streets, services, workplaces and housing (Vestbro, 2005) (See Fig. 22). The mixture

Figure 22, Bird view  
Source: City of Stockholm



of commercial, residential and workplace is expected to provide for lively street and around the clock uses which is in order to comprise elements of crime prevention. This pattern became the prominent in further debates so much because of women's safety to compare with the crime level. Another important motive behind the inner city idea is creating high physical density in turns accommodate more people per hectares. The average number of inhabitants in Hammarby Sjöstad is 133 per hectare which is higher than the suburban perimeter blocks (34 inh/ha) and lower than the old inner city blocks (163-273 inh/ha) (Magnuson 2004). Desire for water view and gain sunshine in apartments and courtyards is important urban factors which made a conflict. In Hammarby Sjöstad six or seven story blocks built which means fewer hours of sunshine in children's playgrounds (Vestbro, 2005).

Along the plan for combination of services and houses blocks, Sickla shopping centre in Nacka municipality just outside Hammarby Sjöstad has developed. This centre with low prices and variety of goods and services has affected on the use of the local shops in neighboring district. It also expected to constitute a threat to the idea of limited car use.

The other controversial issue between left and right parties is land ownership in Stockholm. After 1998, the land portion allocated to municipal housing companies have reduced from 40 to 18 percent, while the condominium percentage increased to 82 percent. However, selling advertised condominium and therefore planned condominium converted to rental because of changes in real estate market which were causes of difficulties for selling those. The red-green majority policy allocated 50 percent of lands to companies with rental tenure to make facilities to build new houses affordable for people who cannot pay big loans. In practice plan, phases 4 and 5 have got almost 100 percent rental accommodation (Magnusson 2004).

Rapidly raising construction costs and the gradual removal of housing subsidies since the 1980s obstructed the aim to avoid social segregation in Hammarby Sjöstad<sup>9</sup>. The student housing construction subsidies and the integration of several group apartments for those who have mental disabilities was an effort to counteract social segregation. Creating some new cheap houses is also another attempt by red-green coalition in this regard; furthermore, they have planned for more public services like schools, daycare centres and a library (Magnusson 2004).

<sup>9</sup> Apartments built during the first phase were sold for SEK 8,000 per sqm, while those sold later were costing up to 30,000 per sqm (SEK 2.7 million for a 2-bedroom flat of 90 sqm) (Wærn, 2003)



Figure 23, Conserving nature and creating new green public spaces

Source: Hammarby Sjöstad, Stockholm City

**Environmental vision:** The government at the time of making decision, in 1995, about Hammarby Sjöstad development was red-green coalition that sets a high environmental ambitious programme to reduce half of the amount of emissions (See Fig. 23). Creating an environmental friendly district as an international model of sustainable development was set out by the City of Stockholm. “It is the expressed objective of the city that this project serves as a model to other large-scale sustainability projects – and the systems, technologies and processes used in this case are being considered for their contributive value to re-planning and retrofitting other city areas” (Dastur, 2005, p.10).

Hammarby Sjöstad as the largest redevelopment project in Sweden is conceptually based on the UN’s Agenda 21 Human Settlement Objective 7.5; it has been adapted at the Swedish national scale to help guide sustainable development on social, cultural, economic and environmental terms. In 2002, Swedish Ministry of the Environment has created The Eight Core Strategies for achieving sustainability. “It is focused on the future, limitations on climate change, population and public health, social cohesion, welfare and security, employment, economic growth and competitiveness, and community development.”

The environmental goals of Hammarby Sjöstad which were debated by politicians were such as preservation of valuable natural features of the area, existing green corridors and recreation new green spaces; decontamination soil and removal toxic substances on land and in the water, reuse the previously underuse lands, building at high density which was highly affected by the idea of “compact city” and reduce car uses. These purposes are moreover followed by provision for public transport, noise reduction along big traffic routs, environment friendly building materials, recycling programme for water and waste. Finally, an environmental education centre which is open for public established to promote sustainable lifestyle<sup>10</sup>. However, people moved to Hammarby Sjöstad because of living in an attractive area, close to the city centre and easy accessible to nature with interesting view of water landscape (See Fig. 24). An interview study in 2001 showed appreciation of inhabitants for environmental facilities in the district but they prefer their comfort ability rather than achievement of environmental goals (Axelsson, Delefors, Söderström 2001; Magnusson 2004). In Hammarby Sjöstad, more apartments are designed oversized in relation to functional requirements (See Fig. 25).

<sup>10</sup> <http://hammarbysjostad.se/>, November 2011





Figure 24. Lanscape  
Source: Author, 2011



Figure 25. Oversized Apartment  
with large windows  
Source: Author, 2011

“In this sense the Hammarby Model cannot be said to fulfill high environmental standards.” (Vesterbro, 2005, p. 9). Findings of Hammarby Sjöstad study are based on the defined theoretical framework which has been focused on social inclusion. It follows in a narrative model (See Fig. 26)

### Findings for Hammarby Sjöstad Sustainable Development

I have found in literature and during an excursion in the district that Hammarby Sjöstad has become an attractive place because of the proximity of the district to the city centre of Stockholm and the architecture. However, some of the operational goals of the programme has not achieved so far.

Figure 26. Facts and Ideas in relation to searching for the ideas that explain sustainable urban development in Hammarby Sjöstad in Stockholm. The Narrative Model After diagram of Wang, 2002

**FACT**

At the time of planning Hammarby Sjöstad all the parties supported traditional urban qualities.

**FACT**

Lack of enough customer for retails in the district.

**FACT**

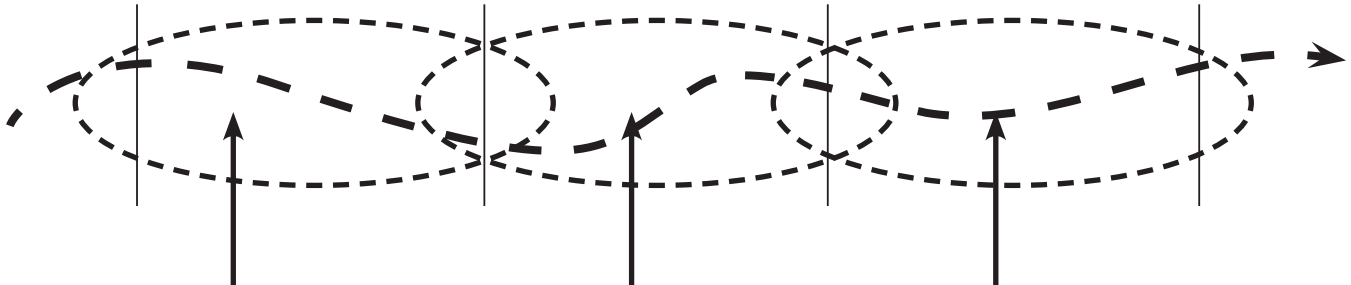
Rent of houses has risen.

**FACT**

The majority of inhabitants is upper middle-class.

**FACT**

The aim to avoid social segregation in Hammarby Sjöstad has obstructed.

**IDEAS**

Which elements of traditional urban quality were supported by all politician parties in the district planning?

- *Creating a mixture of commercial, residential and work places*
- *High physical density area in turns accommodate more people per hectares*

Which quality of this kind of urban design was considered by the decision makers?

- *Providing lively street to comprise elements of crime prevention*
- *Women's safety to compare with the crime level*

What is the reason why the aim of providing services by combination of shops and houses in the district has not achieved?

- *Because of the short distance from the inner city and a large mall in ten minutes south of the area which are competing with the retail stores*

**IDEAS**

What has been the reason why properties' rents expanded?

- *Demand for housing in Stockholm, especially in the centre, has risen.*
- *Economic boomed in 1990s*
- *Desire for having water view increased.*
- *Houses quality and good landscape*

Why has been the district gentrified?

- *Attractive high quality apartments for upper middle class residents*
- *50 percent of lands allocated to companies with rental tenure to make facilities to build new houses affordable for people who cannot pay big loans*

**IDEAS**

Why social segregation has occurred in the district?

- 1- *Rapidly raising construction costs in inner-Stockholm*
- 2- *Gradual removal of housing subsidies since 1980s*
- 3- *Lack of enough rental apartments because developers are not interested to invest on rental properties anymore*

What was the effort of politicians and planners to counteract social segregation?

- 1- *Student housing construction subsidies*
- 2- *Integration of several group apartments for those who have mental disabilities*
- 3- *Building some new cheap houses*
- 4- *Planning more public services like schools, daycare centres and library and elderly nursing*
- 5- *Building +55 apartments<sup>1</sup> for group living*

<sup>1</sup> Apartments for those who are older than 55

The most effective components of urban renewal project of Hammarby Sjöstad are:

- Widening variety of activities
- densely populated area
- rental accommodation
- student housing construction subsidies
- affordable places to live
- public services like schools, daycare centres and libraries

Consequences of the Hammarby Sjöstad renewal project on the society of the district which are shown as facts in narrative model are:

- traditional urban qualities and mix of different activities
- social segregation
- gentrification
- rental increase

Ideas in this model are discussed about the reason of renewal project effects or how it occurs in Hammarby Sjöstad. As it is discussed in the narrative model, the high density urban planning of Hammarby Sjöstad promotes social interaction and cultural enrichment as well as architectural and urban elements such as Gunilla Bandolin sculpture (See Fig. 27) at Sickla canal that provides silence for the dwellers to be away from the fast pace of surrounding city life (See Fig. 28). Although, the aim of combining local shops and houses to provide services in the district and reduce transportations because of shopping has not attained due to the short distance from the inner city and a large mall in ten minutes south of the area which are competing with the retail stores. It seems that lack of enough customers in the local area is the cause of lots of changes in the ownership of shops in short term. On the other hand, Parking space standard as other concerns of Hammarby Sjöstad set 0.7 per household which is equal with the number of cars that people use currently (Cederquist, 2011, Letter interview) probably as a result of proper public transport in the district and in connection with the city transportation system.

Last but not least, the desired goal of Hammarby Sjöstad to achieve a ratio of 50 percent rentals to ownership apartments has not been achieved yet. Likewise, the value of rental apartments is lower than the others. For instance, rental apartments do not have direct view to the water (CABE, 2007). Nonetheless, Hammarby Sjöstad is attempting to counteract social segregation by constructing subsidies student housing and group homes for the mentally challenging people. In addition, Björn Cederquist the local planner in the Stockholm



Figure 27, 28, 29, 30. Landscape of Hammarby Sjöstad  
Source: Author, 2011

City declared that population of the residents is upper middle-class and their incomes are well above the city average level with the most well situated area in the centre; the proportion of unemployment is lower than the half of the Stockholm average (2011).

### 3.2.3. HafenCity, Hamburg

Hamburg as the second largest city in Germany with 1.8 million inhabitants is located in northern Germany by the river Elbe. The city has one of the largest container ports in Europe with the highest GDP per capita in the EU (UNECE, 2010). Historically, Hamburg's economy is based on the port, trade, industry and associated manufacturing and finance (Grossmann, 2005). Hamburg is divided into two zones, designated "Inner City" and "Outer City" (Friedrichs, 2007). The port of Hamburg is one of the largest attractions of city for living, industrial and logistics centre. The harbour consists of ship museum, floating church, bars, restaurants, theatre and hotels as a backdrop for modern culture and history. In order to revive the core city, revitalize abandoned port areas and address social polarization, Hamburg is involved with a large-scale city-renewal and –development projects (Grossmann, 2005; Zukunftsrat, Stadt, Entwicklung, 2002).

In recent decade, the interrelatedness of economic, societal and political change has been gained in project of urban renewal in Western countries (Dekker, Kempen, 2002; Carmon, 1999) which is reviewed in this study. With the intention of understand the "how" renewal changes of adaptation to climate change in Hamburg affect on social integration of inhabitants.

**Background:** After World War II, trends for houses increased rapidly and many areas in West Germany were planned for large public housing. In 1971, the federal parliament enacted Urban Improvement Act (Stadtebauförderungsgesetz) to change policies and specified regulations for urban renewal. Local jurisdiction established a renewal area and a social plan for residents to receive the federal grant. Citizens participated in both processes (Einem 1982; Gewos 1982). The local jurisdiction has three typical goals consist of improving housing conditions for lower class residents of the inner city, attract middle and upper class people to inner city housing areas and improve the infrastructure of those areas (Prognos 1978, p.32,35).

**Process of Urban renewal in Hamburg:** The population aging and shrinking, suburbanization and migration are the reasons of population loss which seems to reach 100,000 until 2015 and a more pronounced population decrease after that in Hamburg (Empirica Institute, 2001). Housing improvement and job opportunities in new economic sectors are expected to help the city sustain the population and maintain human capital (Clark, Lloyd, Wong, Jain, 2002; Leidelmeijer, Marsman, Kamp, Hollander, 2003). During the eighties, the traditional industries which were port-related industries and shipping declined dramatically (La`pple, Deecke, 1996). In the following decade, service sector, new media and information communication technology (ICT) industries grew rapidly (La`pple, Kempf, 2001). The city has not yet established a competitive base on new sectors such as modern education, employment in high-tech services or R&D expenditure (Parkinson, Hutchins, Simmie, Clark, Verdonk, 2004). However, many fundamental reforms of education systems, the establishment of a professional business environment for new sectors and a new airport for intercontinental flights outside Hamburg proposed that is required cooperation with a neighbouring Federal State (Hall, 1997; Hubbard, 1995)

**Urban development:** HafenCity project is at the heart of Hamburg development which is considered to be the largest city development in Europe built on 155 ha of former port area to extend the inner city by 40% (See Fig. 31). HafenCity development will be branded by a metropolitan and maritime mixture of living, culture, leisure, tourism,



Figure 31. Site model of Hafen City  
Source : Woudstra, 2010

business and trade with flats for up to 12,000 inhabitants and office space for more than 20,000 jobs. HafenCity construction has started and scheduled for completion around 2025 (Hoja, 1999).

Harburg in Hamburg's south has been developed as an attractive place for living and new sectors such as biotechnology, new media, communication technologies and consulting. The district's neighbour to the North, the river-island Wilhelmsburg combines a central location with large green and water areas (Grossmann, 2005). Elbinseln district consists of Wilhelmsburg, Harburg and Veddel established through an overall development and housing plan because of the structural weaknesses and social problems in Wilhelmsburg (Wilhelmsburg, 2002).

**Urban Policies:** The programmes of promoting migration of young Germans to Hamburg's Inner City comprise demolition, modernization, new construction, improvements in physical environment and some additional infrastructure. This project was also opposed to conversion of residential use into office space. The predominant reason for Outer City residents to migrate to Inner City were the size of the new apartment, leaving bad neighbourhoods, monthly rental price, the equipment by which the apartment was furnished and its centrality of location (Friedrichs, 2007).

Public participation of residents as the new forms of regional governance, which have been established in German regions like Stuttgart and Hannover (Salet, Thornley, Kreukels, 2003; Walter-Roog, 2004) has still missed in Hamburg (Hamburg, Stadt, Entwicklung, 2002). The Regional Development Concept (Notteboom, Winkelmanns, 2000) has only achieved very limited actual changes in decision making (Walter-Roog, 2004). The government of Wilhelmsburg and investors in Harburg collaborate in some ways.

**Environmental Situation:** Deepening the Lower Elbe from not more than 2.5m in parts to 15.3m over the last 180 years (Gewässerökologische Studie der Elbe, 1984) and heightening dikes have inflicted the port profoundly by changes on the river basin ecosystems. The Lower Elbe river basin is internationally important because of the large number of valuable habitat (Grimm, Die Landschaft, 1982-3). One of the significant environmental changes ascribed to river construction has been natural flooding. "Elbe deepening measures account for approximately 20% of the rise in higher

high water, dike building for 66% and flood barrages in the Lower Elbe's tributary streams for about 13%. Dike building after the disastrous flood of 1962 resulted in a loss of 47.9% of flood plains on the Northern and 74% on the Southern river bank relative to 1900. Shallow water areas have decreased by 33% on the Northern and 8.5% on the Southern bank, saltwater and freshwater mudflats by 7% and 25%, respectively. Naturally flooded areas were reduced by 75% over the last 50 years" (Grossmann, 2006, p. 41).

## **Three scenarios of Hamburg**

### **1. The Water City:**

2004-2010. In this scenario, developing the economy of the city based on ICT and other high-tech or advanced service industries, in particular new media, were supposed to take place. The withdrawal supports of the Federal leads to the rapid decline of the port and restructuring of Hamburg's economic landscape and its socio-cultural identity (Grossmann, 2006).

The location of choice for advanced technology and service industries in addition to the HafenCity and Channel Harburg is the abandoned port area southwest of Wilhelmsburg. A council similar to 'Verband Region Stuttgart' (VRS) is established for city development and the support of the tasks in economic development, transport planning, education and job training. A modern version of public-private transport to the HafenCity, the Docks and further south to Wilhelmsburg and Harburg, technology and company formation centres and promotion agencies are established. The construction of an attractive artificial water area between these three parts as beach and new landmark for the city become enable by additional public-private resources. A museum-port, new bridges and walkways, frequent ferry connections to the new city quarters like houseboats, barges, tour boats and sailing boats are added to water area's functions.

The Middle and Upper Elbe are included in the establishment of retention areas and the opening of summer dikes as a new Federal German flood protection law (Federal Ministry for the Environment).

2010-2020. Hamburg ranks among the economically most successful cities in Germany because of particular growth of new economic factors. The unemployment rate has dropped below the level of the late 90s and the population has increased specifically in younger age groups (Grossmann, 2006).

2020-2030. Hamburg with a high quality life and being among the lowest unemployment rates, very good education system; vastly better housing conditions and the city's cultural identity and international image as well as the presence of green and water areas in the city will remain attractive to young people (Grossmann, 2006).

## **2. Port as all costs**

The core assumption of this scenario is expansion of Hamburg port and the combination of it and other industries. Through modernization and the construction of new container terminals in Steinw-erder and later in Moorburg the turnover capacities are increased. Establishment of professional business environment for technology and service-oriented companies in HafenCity and Chinese cluster building are postponed. However, the Chinese trade centre in Chan-nel Harburg attracts trade businesses as well as Chinese residents, shops and restaurants successfully. As a result of fund reduction for Wilhelmsburg the gardening exhibition which is planned to become completed in 2013 will be rather Federal than International. This part of the city suffers also from the construction of the port transit route across this city quarter and its ongoing usage as container stor-age area. Therefore, the number of German citizens, higher income classes and new tenants attraction has decreased (Grossmann, 2006). 2010-2020. The predominant containerships are to and from Asia. Hamburg begins to lose market shares for cargo from East Asia and transshipment to Baltic and Eastern Europe because of additional costs and transit delay which happens due to the tidal window. Con-sequently, Hamburg encounters to loss of jobs (Grossmann, 2006). 2020-2030. It is assumed that Hamburg lose a significant number of residents and the city will be faced to weak economic performance, suburbanization, abandoned houses in the city's core, an oversupply of office-space and population shrinking and aging. HafenCity is also affected because of its high price level.

By Federal supports, central housing areas are developed and educa-tion system is going to be modernized as an effort to counter the trends of losing jobs and attraction for inhabitants (Grossmann, 2006).

## **3. Collaboration**

“The core assumption of this scenario is re-orientation of Hamburg's economic and city development strategies and emphasis on regional cooperation.” (Grossmann, 2006, p.44). Wilhelmshaven has become



the main container-hub and given priority in the Federal traffic plan. Trade, roads, rails, transshipment and the other sectors which receive effective promotion are medical technology and life sciences, nanotechnology and new media. Farming and tourist representatives, environmental NGO's and flood protection authorities and succeeds to improve the communication between these different parties are included in the commission. Accordingly, the sensitive issues like dike relocation can be approached (Grossmann, 2006).

2010-2010. Travel connections from Northern Germany to the US, Asia and South America is expected to become improved by the intercontinental airport outside Hamburg. The city receives an international recognition due to the presence of new economic sectors combined with elements of culture, leisure, tourism and trade in a maritime environment (Grossmann, 2006).

2020-2030. Hamburg is a city with population increasing record among other German cities. Urban renewal, tackle social problems, effective education system reform and a lively, interesting living environment in the HafenCity and finally the economic re-orientation encourage more people to accommodate in Hamburg. In addition, the species that inhabited the Lower Elbe river basin before the river construction will probably be reinforced by establishment of Lower Elbe biosphere reserve (Grossmann, 2006). Findings of HafenCity study are based on the defined theoretical framework which has been focused on social inclusion. It follows in a narrative model (See Fig. 32)

### **Findings of city redevelopment in Hamburg**

HafenCity (Harbour City) as one of the largest ones in scope and size, located immediately adjacent to the current city centre of Hamburg. The most effective components of environmental transformation of HafenCity which have been defined in the urban renewal project are:

- high quality housing
- middle-class inhabitants
- infrastructure development
- widening variety of activities
- education and job training
- international recognition

Consequences of the HafenCity renewal project on the society of the district which are shown as facts in narrative model seems to be:

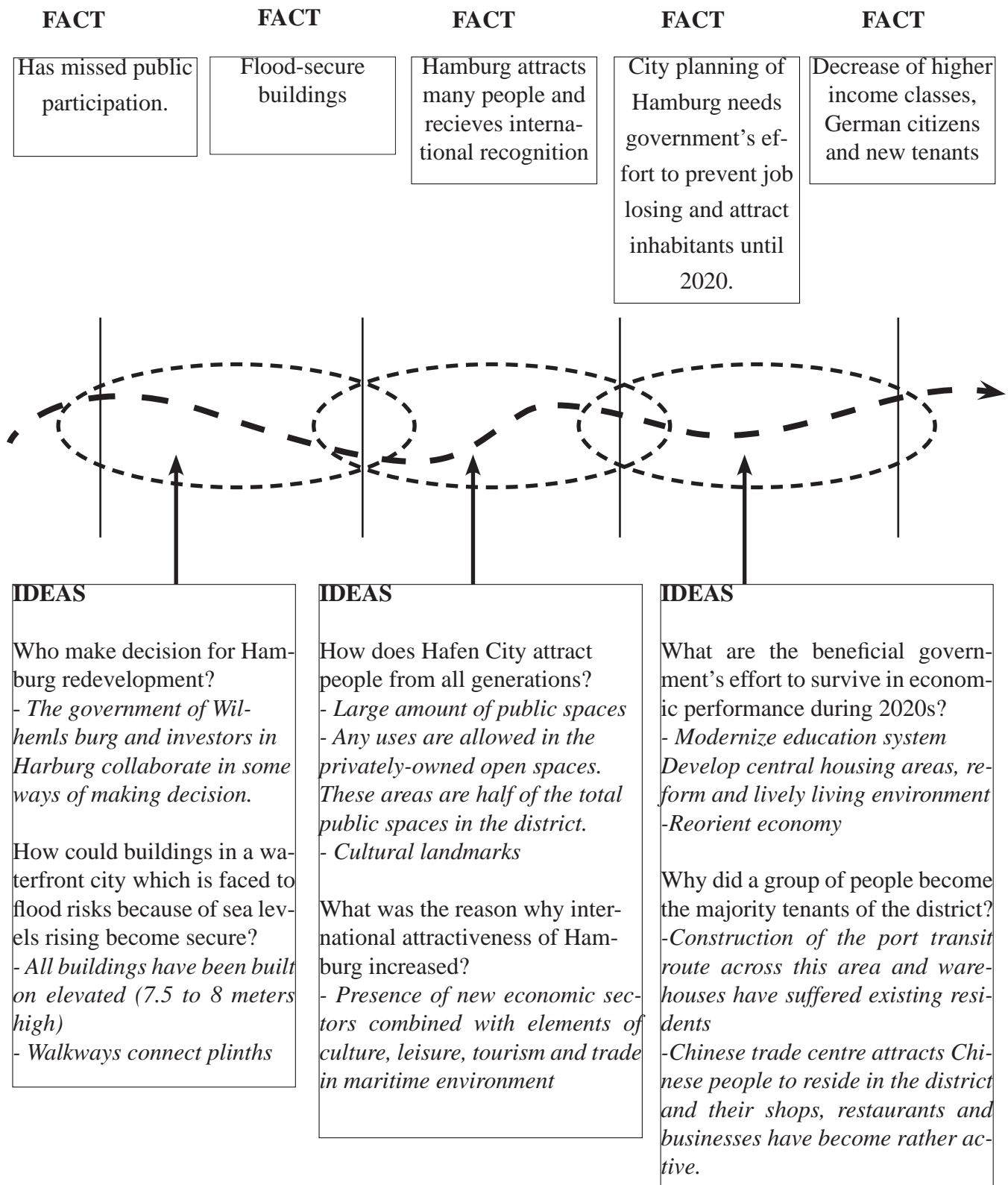


Figure 32. Facts and Ideas in relation to searching for the ideas that explain sustainable urban development in Hafen City, Hamburg The Narrative Model After diagram of Wang, 2002

- missing public participation in some scenarios
- attracting people from all generation
- receiving international recognition
- gentrification

Ideas in this model are discussed about the reason of renewal project effects or how it occurs in HafenCity. The redevelopment plan divided the area up into ten quarters which are designed for independent development for more flexibility to make more adaptability in the financial markets. In Hamburg, the water level changes by as much as 6 to 7 meters between low and high-tide, there is the ever-present risk of flooding which will increase in the future with sea levels rising (Woudstra, 2010). All buildings have been built on elevated, (7.5 to 8 meters high) to be flood-secure. Buildings are attached by the elevated walkways which connect plinths (See Fig. 33). Streets will be covered in case of flood and in absence of flood; the spaces below the walkways provide additional open spaces (Woudstra, 2010) (See Fig. 34). Public spaces take up 40 percent of the total surface area in the new HafenCity which half of it is private-owned (See Fig. 35). Any uses such as journalistic, political or even begging are allowed in the privately-owned open spaces. This young part of the city attracts many people (Woudstra, 2010). Cultural landmarks are the other attempt of this port city redevelopment (See Fig. 36). Hamburg is a contemporary model of inner city port revitalization for Northwestern Europe as a district which is largely financed privately.

“In recent years, urban development projects have almost without exception been based on a vision of diversity, density, user-participation and sustainability. Despite the words being the same, the results are far from the same. This can, in part, be explained by the different use of steering documents and processes.” (Gehl Architects; ‘Kvalitetsstyring i byudvikling; Undersøgelse af styringsdokumenter, organisation og processer i HafenCity, Vastra Hamnen og Vauban)

City planners in the port cities have the opportunity to redevelop former port areas, for the most part, adjacent to city centres. These areas are attractive for residential, commercial, educational and also for tourists by representing former maritime activities. HafenCity is a witness to a new developer type. In this city, varietal proposals consisting of different combination of functions in a block are competing architecturally with respect to cost, quality and creativity.



Figure 33. Buildings sit on elevated plinths  
Source: Woudstra, 2010



Figure 34. Aerial view of the Marco Polo Terraces looking north. The terraces face west towards the evening sun and descend in gradual steps to the water. Source: T. C. Kraus; Source: HafenCity Hamburg GmbH



Figure 35. Panorama of the Magellan Terraces.  
Source: Photo by Roland Halbe; via Enric Miralles - Benedetta Tagliabue | EMBT Architects



Figure 36. The new Unilever building  
Source: Woudstra, 2010

## Summing up academic findings of urban studies

Effective components in social inclusion/exclusion systems and relations between the components are figured out during studying and analysing three urban renewal cases for further discussion in the following chapters to interpret academic findings into design criteria. I made bullet lists in order to summarize findings of urban studies which were based on the employed theoretical framework for this research. Relations between effective components which were formed in four sub-questions on first main question and analysed through the narrative model will be explained briefly here.

Social Exclusion Unit in 2001 defined the effective components to intensify social inclusion in societies which are:

- urban policies
- income and health equity
- education
- social integration
- access to mainstream of financial services

Safe neighbourhood, trust and social inclusion have direct relationship together (Social Exclusion Unit 2001). Deprivation increases anti-social behaviour and crimes in societies; for example, in deprived areas burglary is three times higher (SEU, 2000). The impact of deprivation is on prosperity of the region in the ways of poor participation of tax-payers. Housing investment would be destroyed in an unsafe area (SEU, 2000). Economical problems are the main cause of neighbourhood decay included lack of appropriate skills, unemployment, drugs and poverty; also, family breakdown, poor health and disaffection of youth as social problems are effective on liveability parameters of an area (SEU, 2000). Social Exclusion Unit (SEU) issued an international framework for encouraging new businesses, keeping and spending money in the local and supporting businesses to revive local economics. The key ideas for reviving communities are also listed by Social Exclusion Unit which are to:

- prevent racist crimes
- introduce neighbourhood warden
- reduce abandoned places
- create public interaction areas for more communication of residents
- create schools and educational areas
- support for families and young people

-manage neighbourhood to make better coordination of policies and services

The other effect of urban renewal on the studied societies was gentrification. Middle and upper class people who acquire or rent property in low income communities are the most effective component to gentrify an area (Grant, 2003). Along with the positive effects of gentrification to increase property value, great economic benefits for the local, employment and education; it has also negative effects (Ebenezer O. Aka, Jr). Displacement is probably the most notorious drawback of gentrification (London and Palen, 1984). This has effect on neighbourhoods of developed regions with focus on an area and neglects the other one and coercive movement of some residents (Larsen and Hansen, 2008).

In some ways, adaptation to climate change strategies force to build high-tech structures in Frihamnen (Gothenburg Municipality, 2008). These constructions possibly become an opportunity to attract tourists who are interested in new types of structure; however, high-tech infrastructure could be a reason to increase the price of high quality spaces in this area. Higher expenses are a struggle to create a liveable area where all generations from different social classes could contribute and communicate; It seems like a threat for the concept of social inclusion in the future of the adapted to climate change Frihamnen. It seems that augment of the demand of occupation in these buildings and rental prices will increase in the future Frihamnen because of:

- high quality houses
- being close to the city centre
- easy accessibility of facilities

These factors probably produce gentrification with traumatic consequences for the city. This urban renewal apparently lessens social inclusion and integration of residents. Adaptation to sea levels rising gives an opportunity to protect existing built environment in the area and prevents moving into the city and changing place (ICE); however, added price of costly adapted to climate change structures is supposed to deprive participation of some groups of people in this area. High-technology structure, high quality living areas and low operational costs are assumed to increase the demand for occupying the planned buildings which are located close to the city centre. These reasons are supposed to affect on social integration in the area.

# Results



It is suggested that one way of securing greater policy effectiveness in environmental policy (Grant et al. 2000) might be to integrate consideration of social exclusion into policymaking.

Wyn Grant, 2001, Environmental policy and social exclusion, P. 1

## 4. Results

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In this chapter preceding analyses of urban renewal cases will be used to explore the first question of this thesis which is “How can social inclusion be promoted in coastal areas which are about to be adapted to climate change?” (Chapter 4.1) through social exclusion system approach (Chapter 4.2) and social inclusion system (Chapter 4.3).

### 4.1. Approach

To approach the first questions “How can social inclusion be promoted in coastal areas which are about to be adapted to climate change?” I have studied the renewal urban cases based on the defined theoretical framework for this study. Facts, “distinct tacit agreement”, and Ideas, “statement of interference or hypothesis”, have figured out to explain consequences of redevelopment in reviewing three urban renewal cases in the previous chapters through the narrative model. Hammarby Sjöstad in Stockholm and Inner-Vesterbro in Copenhagen are studied as two Scandinavian renewal projects. HafenCity redevelopment process in Hamburg is also reviewed as a large port in North Europe. The consequences and effective components of the renewal processes in the mentioned cities are figured out through narrative model in the Materials and Analyses chapter. In the last part of previous chapter, effective components and relation between them are summarized to become utilized in systems thinking which have been developed to approach the second question “What design criteria could be recommended in order to enhance social inclusion in



coastal areas?” to interpret academic findings into a useful format for e.g. planners and architects.

To better understand the systems structure of social exclusion/inclusion, they are illustrated in a graphical diagram as a casual loop (See Fig. 38). Systems show the relationships among the effective components of social exclusion/inclusion in an area. In these diagrams, the short descriptive phrases represent the components which make up the sector, and the arrows represent the influence between these components. For example, examining the right hand side of the social exclusion diagram (See Fig. 37), we see that, “Public interaction” is directly influenced by “Combination of various functions” and “Vivid public spaces”. In turns “Public Interaction” influences “social exclusion”.

In this thesis, this diagram has been employed to presents the relations that are difficult to verbally describe because normal language presents interrelations in linear cause and effect chains, while the diagram shows that in the actual system there are circular chains of cause and effect. Consider, for example, the “Gentrification” component in the centre of social exclusion diagram. It is obvious in the diagram that “Gentrification” influences “International Brand” which in turn influences “International Investments”. To this point in the analysis, there has been a linear chain of cause and effect, but to continuing the diagram, it shows that “International Investment” influences “Gentrification”. That is, the chain of cause and effect forms a closed loop, with “Gentrification” influencing itself indirectly through the other components in the so-called feedback loop. For additional information to the feedback loops in social exclusion/inclusion systems notation signs (either + or -) on each link have been added to diagrams. “These signs have the following meaning:

1 Positive (Reinforcing) Feedback Loop: A causal link from one component A to another component B is positive (that is, +) if either (a) A adds to B or (b) a change in A produces a change in B in the same direction.

2 Negative (Balancing) Feedback Loop: A causal link from one component A to another component B is negative (that is, -) if either (a) A subtracts from B or (b) a change in A produces a change in B in the opposite direction.” (Kirkwood, 1998, p.7)

## 4.2. Social Exclusion System

According to the description of social exclusion in the theoretical framework of this research, it is a systematic trend of deprivation which has blocked individuals or entire communities of people from rights, opportunities and resources, e.g. housing, employment, health care and civic engagement, democratic participation. These rights are normally available to members of societies and defined as the key to social integration. In social exclusion process, detaching groups or individuals prevent of fully participation in the economic, social and political life of the society in which they live (Silver, 2007). There are no definition of social exclusion components as a scientific measurement. However, in some reports it has been discussed that there are some components like poverty, lack of education, unemployment, poor future prospect and inability to participate in community activities which are variable in different societies. The likely social exclusion in the adapted to climate change coastal areas and the relationships between effective components on those have been explained in this chapter. It has been also illustrated through a graphical casual feedback diagram of systems thinking. (See Fig. 37)

In the diagram of social exclusion three significant loops, Gentrification, Public Interaction and Urban Policy are shown. Gentrification as a significant component of reinforcing social exclusion will be influenced directly by Infrastructure Development, International Recognition and International investments components. Gentrification will be supported by middle-class inhabitants. Increase of each of mentioned components has effect on improving gentrification in the district. Developing the area as a sustainable city is an aim of the adaptation to climate change project which is another important component to influence indirectly on gentrification. Sustainable city component has formed a positive loop which reinforces changes of eco-system, economy and society. It has also a dependence relation with flourishing businesses. Gentrification seems to have negative effects on the future of the society which is expected to include all inhabitants.

Eco-system, symbolic architecture works, cultural landmarks and finally creation of a sustainable district which will include high quality houses in an area near to the city centre are expected to attract inhabitants to reside there. Demand for living in those houses seems to increase because of the nice landscape, quality of

# SOCIAL EXCLUSION SYSTEM

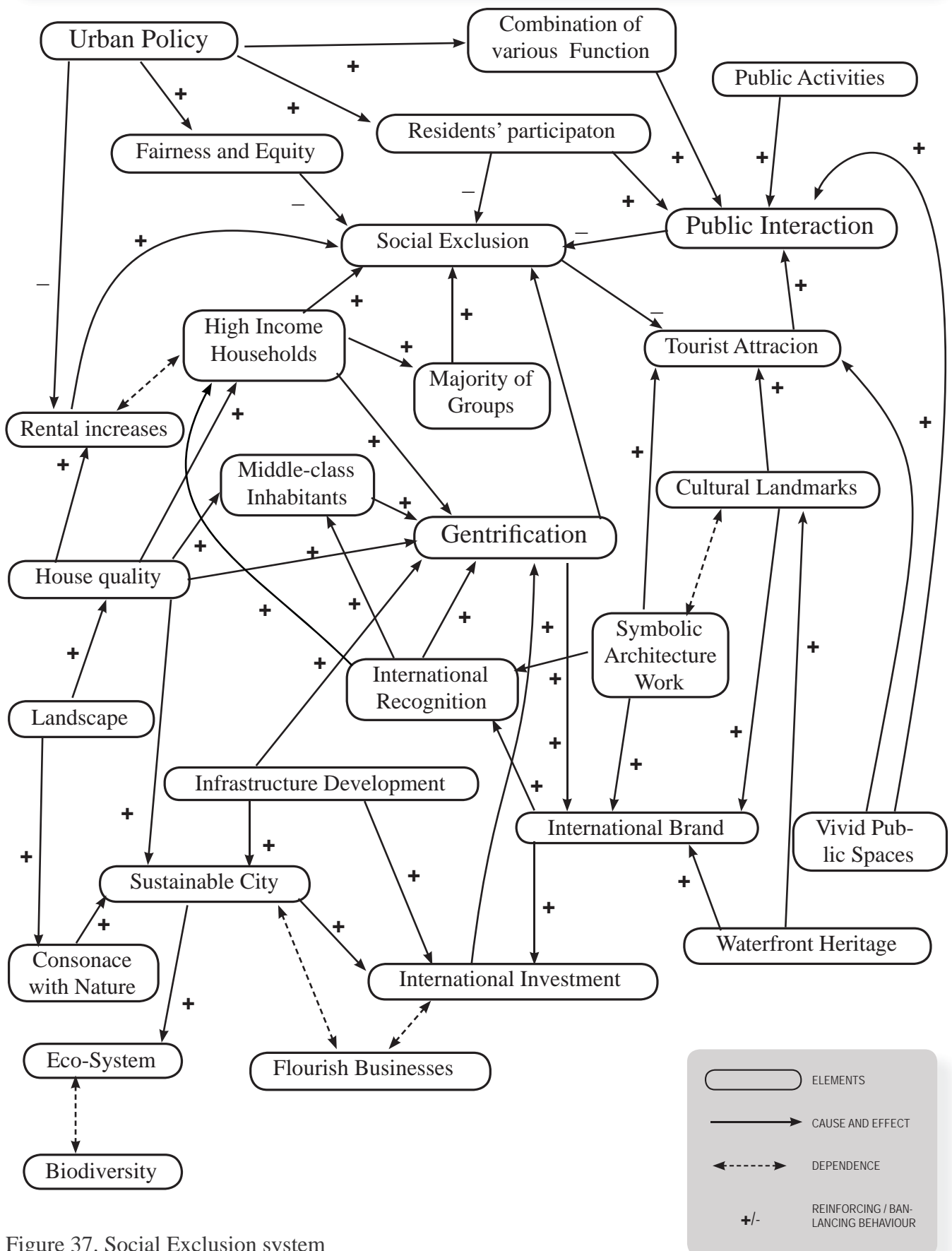


Figure 37. Social Exclusion system

apartments and easy accessibility to public transport. In future, people who can afford to live in this kind of districts are likely from the middle-class even upper middle-class. Consequently, the majority of high income households will occupy in newly built apartments in these areas for e.g. in Frihamnen. These wealthier residents play an important role to gentrify and rehabilitate the district besides infrastructure development and international recognition. Gentrification as one of the most effective components of social exclusion system is expected to affect international brand of this former inner-port and the possibilities of attracting international investors. Flourishing businesses has dependent relations with international investments and the sustainable city components.

Public interaction is another significant component of this system which could be affected by different activities that will take place in an urban renewal project. Patterns of various functions' combination and public activities in vivid spaces, active participation of residents in design and implementation of policies are effective components to enhance public integration and prevent the probable social exclusion in this area. Physical attractiveness of the area is a factor to attract more tourists who are playing important roles in social and economical activities.

Urban policy is an important effective component of social exclusion system which influences directly the Fairness and Equity, Residents' participation in the community and properties' rents. It influences indirectly social exclusion in the society. Urban policies depending on the content of them can be the most effective component of this system which defines systems of properties ownership, likely rents ceilings and functions of public and private areas. Providing tax abatement for rehabilitation, devoting community development funds to rehabilitation and to improving public services in the neighbourhoods could offer by governments and decision makers. These could increase fairness and equity and, subsequently, social exclusion will decrease in the society.

Social exclusion as a conceptual phenomenon is in stark contradiction with the aim of sustainability. In the objectives of the adaptation to climate change pilot project it has been defined that all inhabitants could be included in the central part of Gothenburg. Adaptation to climate change is a component which has effect on the aim of creating a sustainable city. This component is added to the social exclusion/inclusion systems related to the Adaptation to climate change, pilot

project by Mistra Urban Futures, in Frihamnen, Gothenburg. This component is as the “engine” of systems because of being the aim of the pilot project. Adaptation to climate change has direct reinforcing influence on Waterfront Heritage, Eco-system and Sustainable City components of the social exclusion system.

### **4.3. Social Inclusion System**

Social inclusion is affirmative consequence of actions to change the circumstances and habits that lead to social exclusion. In another word social inclusion is the opposite of social exclusion. According to the definition of Social Exclusion Unit (2001), urban policies, income and health equity, education, employment, social integration and access to financial resources are lead to reinforce social inclusion in communities. As it is mentioned in the previous section it is difficult to measure social inclusion scientifically because it is quite relative, sensitive and variable. Definitions of social inclusion varies from country to country. Some efforts have been made to measure social inclusion/exclusion in European Union, e.g. risk of financial poverty has been defined as the benchmark. To discuss about how social inclusion will be promoted in the adapted to climate change coastal area, it has been explored and relationships of its effective components are illustrated through a graphical diagram of system thinking (See Fig. 38).

In the diagram of social inclusion, the components which have direct effect on it are shown, besides, the significant casual feedback loops are presented. On top of this system, direct relations of the primary components of social inclusion has been shown. Health, education and income equity growths directly reinforce social inclusion in the society, moreover, employment and financial services and how inhabitants have access to these resources are the other effective components in the trend of social inclusion.

Social inclusion affects on making neighbourhood safe. Social inclusion and Safe neighbourhood have balancing effect on anti-social behaviours component. It is expected that anti-social behaviour will decline in a safe and all residents included area. In a secure and gentrified neighbourhood, trust could become improved and it has significant consequences on residential and commercial blocks' circumstances and also to attract investors and developers.

# SOCIAL INCLUSION SYSTEM

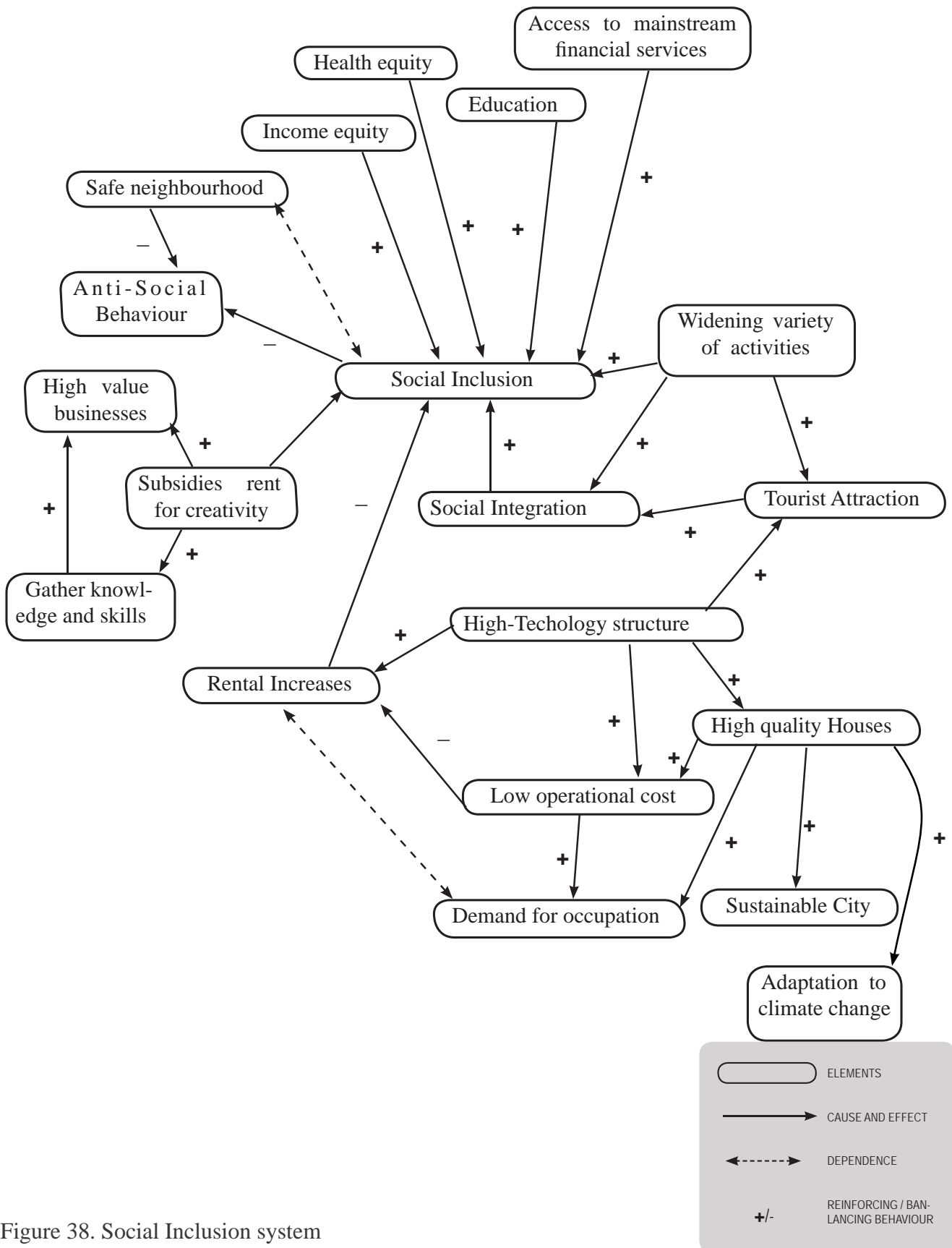
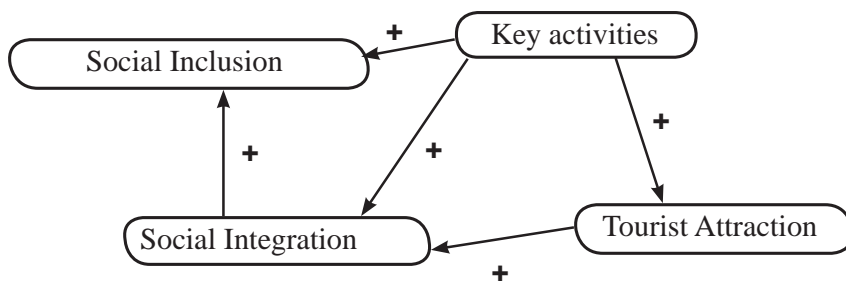


Figure 38. Social Inclusion system

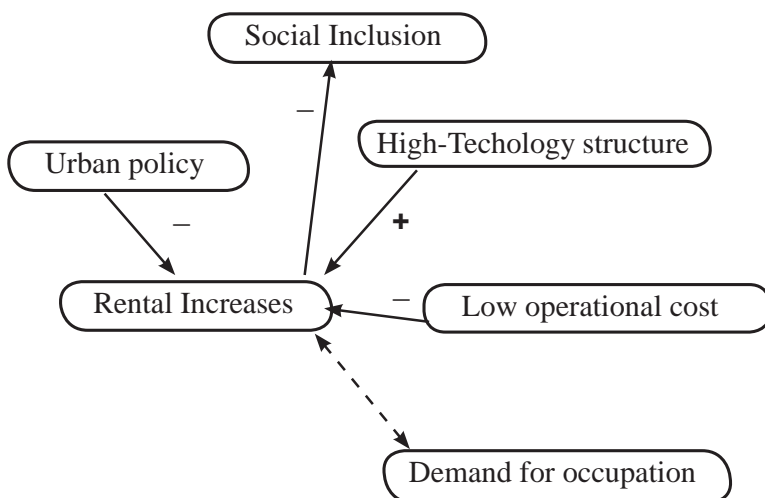
Social unity and integration has also influence on social inclusion. Participation of residents and including all which is defined as a task in the future strategy for Frihamnen could increase people integration in the communities. High variety of activities is an important component which will be defined by decision makers and urban planners and probably will consist mixture of hotels/hostels, restaurants, cafes, houses, schools, offices, commercials, cultural centre, rock bands, parks and green spaces. It could affect social unification and integration positively. Also, activities of the area influences on tourist attractiveness, besides the symbolic architecture works. (See Fig. 39). Tourists could play an important role in integration of people in the district because of the related business to them and the area's environment that could be change by these activities. A branded to adaptation area could increase attractiveness for tourists, also.

Figure 39. Social Inclusion, Social Integration and Key Activities loop



On the bottom of this system, rental increase component and the other components related to it are shown. (See Fig. 40). Rents of the spaces in the adapted to climate change coastal areas could be affected by high technology structure, high quality of houses and low operational costs. It is also dependent to the occupation demand components. Rental increase seems to have negative feedback on social inclusion.

Figure 40. Social Inclusion, Rental increases and Urban Policy relations



Low-energy houses as a predicted strategy for residential construction decreases operational expenses, and by the other favourable factors; possibly, raise demand for occupying in these buildings. However, rental increases as a result of high demand for occupation in the renewed districts have some reduction effects on social inclusion in the neighbourhood. High income households and businesses seem to become the majority of the area's occupants. The added price for the future buildings of Frihamnen possibly will increase along development strategies. On the other hand, urban policies have probably effective influence on rental increases trend to balance it by combination of private ownership and rental properties, therefore, lower income people could possibly inhabit in the newly built apartments in Frihamnen in the future. Dwelling makes the nearby area a vivid and lively environment where different generations integrate.

To develop businesses and high-value companies, gathering knowledge and skills are assessed as the effective components. Affording subsidies for creativity probably has effect to establish innovative firms. Contribution of several employees of large and small companies of different social classes seems to affect inclusion of wide variety of people in this area.

### **Summing up**

Social inclusion and social exclusion as two opposite phenomena have been explained through systems thinking in above. There are several common components in both systems. Therefore, I have combined social inclusion system's components and the social exclusion system to show the relation between these two systems clearer and emphasize on "how social inclusion can be promoted in an area adapted to climate change?" (See Fig. 42). Critical components have been defined as the most effective components for including residents to have full participation in the community. (See Fig. 41)

Gentrification loop shows effects of different components related to gentrification process and how it can increase inhabitants exclusion; however, it could have reinforcing effects on some of the factors which have been considered in social inclusion system. In the discussed strategies for adapted to climate change Frihamnen positive influences of gentrification have been expected.



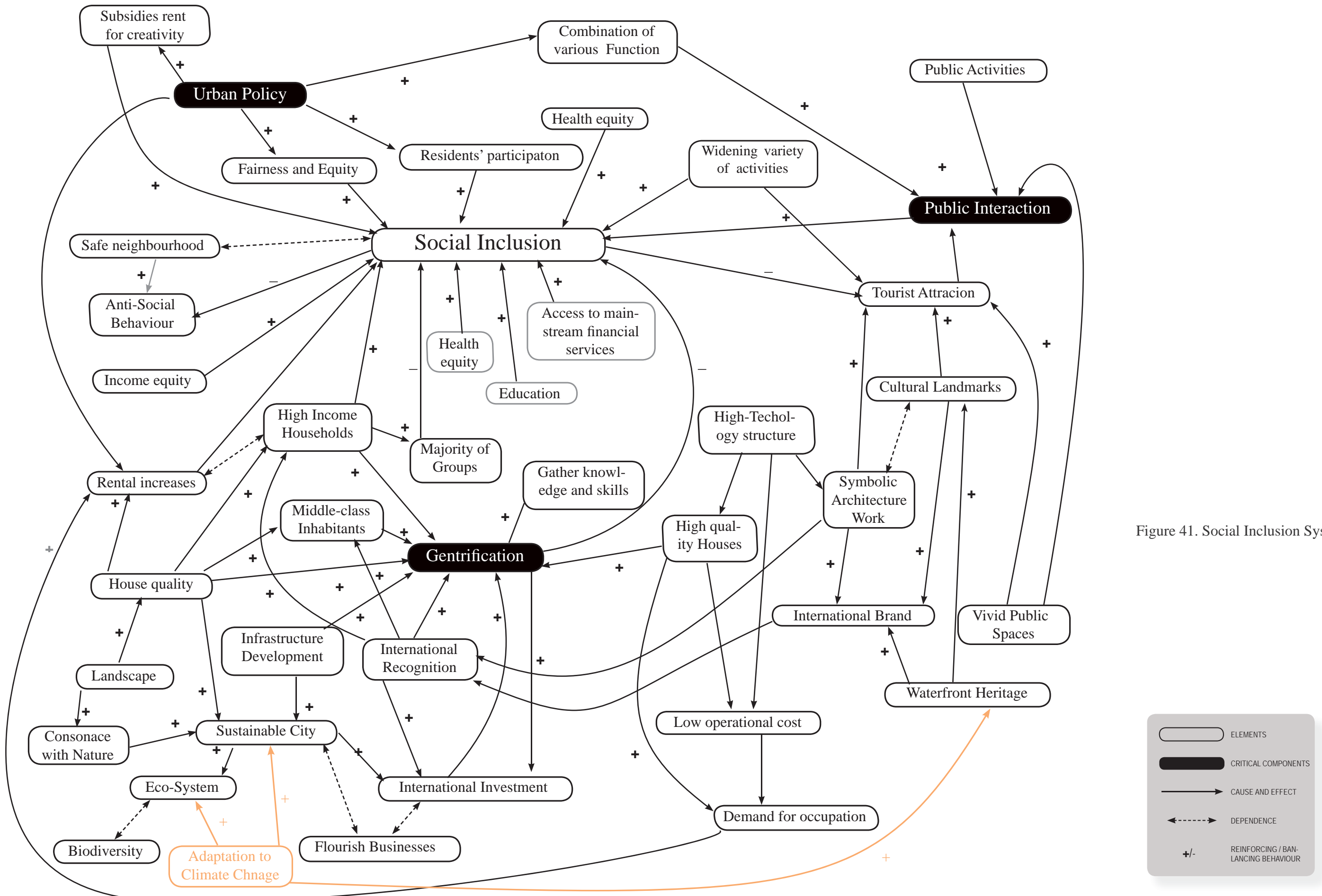


Figure 41. Social Inclusion System

Public interaction and public integration elements have common related components in both social exclusion/inclusion systems. These elements show ‘how combination of different activities in the area will affect social exclusion/inclusion.’

Urban policy is another critical component in this system. It has shown that ‘how an appropriate policy could be effective to mitigate social exclusion in the adapted to climate change Frihamnen’. At the time of doing this research, there are no defined urban policy for the future of this area, however, making decision for including all inhabitants in the central Gothenburg is under discussion in the municipality of Gothenburg.

# Discussions



## 5. Discussion

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This part of thesis concludes the findings and constructs a proposal for a concept of design for sustainable urban development in the future based on the analyses. This study starts out with a question based on studying the pilot project of Mistra Urban Futures “A City Adapted to Climate Change: Scenarios for Future Frihamnen“ The research oriented objective of this research has been to inquire about effective components of social inclusion to discuss:

“How can social inclusion be promoted in coastal areas which are about to be adapted to climate change?”

and the practice oriented question of this thesis has been:

“What design criteria could be recommended in order to enhance social inclusion in these areas?”

The first question as the academic one has been explored through using a simple theoretical framework. I have reviewed three urban renewal cases of the districts Inner-Vesterbro in Copenhagen, Hammarby Sjöstad in Stockholm and HafenCity in Hamburg based on the defined theoretical framework. To link knowledge and experience in these cities with Frihamnen in Gothenburg I have developed a narrative model. I have also analysed consequences of redevelopment projects through facts and ideas by answering the ‘how’ and ‘why’ questions for each cases in order to define components of systems thinking which have employed for interpreting academic inputs into

practice outputs. The academic output of this research came out and analysed during systems thinking to reach the practical output of this study. In this regard, I have combined social inclusion and social exclusion systems in the Result chapter to show “How can social inclusion be promoted in coastal areas adapted to climate change?” by the reinforcing loops related to social inclusion. As it is shown in the combined system, the critical components are Urban policy, Gentrification and Public interaction. Relations of the critical components with the other effective components are also illustrated through this system (See Fig. 41).

Effective and critical components which are emerged during analyses will discuss in this chapter to recommend design criteria for promoting social inclusion in the future urban project and specifically for Frihamnen.

## 5.1. Critical Components

The critical components come out from system analyses and will discuss here to recommend design criteria for future urban planning. These components are in three groups:

**1. Urban Policy** has influence on different factors in city planning. Creating sustainable city is the initial concept and expected programme which is followed in this research. In this research, social effects of adaptation to climate change have been considered, nevertheless, they have not been independent from the other fundamental aspects of sustainability. Low-energy houses as a component of sustainable buildings, environment and active economy in the district are components of sustainability which are effective on social relation in some ways. In this research, the urban policy which has been considered is the programme of including all in the adapted to climate change coastal areas. In the programme for Gothenburg, it is defined in terms of ‘Including all in the City’. This urban policy defines various functions in different ways of combination in the city planning as I have found in the reviewed urban renewal cases in this research. As it is mentioned before, urban policies for the future of Frihamnen at the time of doing this research has not published and it is under process. Urban policies are related with social inclusion/exclusion from different points of view. It has an important role in social interactions, control and balance rental increases and including all people in the

community. Moreover, residents' portion of education, health care, income and access to the mainstream financial services are influenced by these policies. In this research, different activities' role in relation to social integration are explored during analyses through systems thinking. Besides the concept of city for all, gathering a wide variety of knowledge and skills has come out. Diversity of businesses and institutions are another section of this system which effects the circumstance of the area. In planning the future of Frihamnen residents' participation has already organized by the municipality of Gothenburg and it is an ongoing project by Centrala Älvstaden.

**2. Gentrification** components like generation of the potentially gentrifiable neighbourhoods and production of the potential gentry is in many ways dependent to urban policies. The demand for inexpensive housing in inner-city is an existing need in most of the cities. In the lack of an appropriate contribution of private ownership and rental apartments, the majority of high income households will increase in the district. Therefore, deprivation in some cases is expected to become causes of social exclusion. However, the probability of displacement as a result of gentrification in Frihamnen is small because the population in this district is sparse. On the other hand, a gentrified district where is recognized internationally attracts more investors and possibly enhance international brand of the area.

**3. Public Interaction** refers to the relationship between two, three or more individuals. It could have balancing effect on social exclusion to interact threat of some social deprivation by creating public spaces which gives equal opportunities and rights for all people. Houses, schools, elderly apartments and daycare centres are included in the proposed strategies by focus groups for the future Frihamnen<sup>11</sup>. Thus, all generations will be included in the area. These combination of different activities in the area could provide inhabitants' needs. Commercial spaces are expected to consist work places, restaurants, shops, etc which will gather many people daily. Widening variety of activities which are alternatively expected to take place and create a combination of those in the future of Frihamnen regarding to the contiguous emergent strategies, are similarly included in the three urban renewal cases that are studied before in Materials chapter of this study. Furthermore, residents' participation as it was described before is an important component to increase social interaction in the society.

<sup>11</sup> It has been explained as the 'Liveable City' strategy by focus groups -ecological, socio-cultural and politico-economical- in the Background chapter of this thesis.

## 5.2. Recommendations

Next to the last sections, in the following, some concise outlines will be given using the knowledge gained from this research, that could be considered as suitable and appropriate recommendations for the promotion of social inclusion in adapted to climate change coastal areas and specifically for Frihamnen. During this part of the study I attempt to respond the practice oriented question of this thesis which is “What design criteria could be recommended in order to enhance social inclusion in these areas?” through six recommendation.

1. The urban policies and programme for including all in the city which is related to city planning of Frihamnen should take combination of different functions in the district. This would create an area for young, middle and old generations and increase social integration. Combination of different functions would consist of houses, schools, daycare centre, elderly homes, shops, restaurants, cafes, work places, cultural centres, etc.

2. Extensive public spaces should include and encompass a wide variety of activities. For instance, building on the maritime culture of this former working harbour area and symbolic architectural works, cultural landmarks and open spaces are expected to attract visitors. Besides, annual events and exhibitions present additional public activities in this district. My suggestion for combination of different activities for the future Frihamnen is including hotels/hotels, cultural centres, restaurants, cafes, schools, offices and multi-functional open spaces regarding the residents' interests which will become exhibited by their participation in planned events by Central Älvstaden, the city of Gothenburg.

3. Contribution of land ownership should comprise combination of condominium and rental tenure. Therefore, low income groups would reside in the apartments as well as high income households; student apartments, elderly housing and people who have mental disabilities. Building some cheap and group houses could be another effort to prevent social segregation in the district. Furthermore, Lindholm Science Park, Ericsson Company and Chalmers IT campus are located in the adjacent district to Frihamnen. Collaboration between these technological centres affects future identity of Frihamnen. Through

an appropriate policy of private ownership and rental spaces in the area people from different social classes could have the benefit of this urban development.

4. Subsidies for creativity and rental work places for young entrepreneurs should also be provided in order to create forthcoming opportunities for innovative businesses and knowledge intensive communities and people. New institution for researchers should be addressed by scientific park or campus which specializes in sustainable products, water management and climate change. Frihamnen could highlight these qualities as an adapted to climate change area on an international level.

5. Design should be performed with relation to the historical identity of the city in which redevelopment and climate adaptation happen. Design also should be performed regarding city's residents outstanding characteristics. This could establish an intimate space which will present comfortable area for all, beside the advantages that it will offer to the area.

6. Design for adaptation to climate change in Frihamnen should be based on combination of three strategies - retreat, defend and attack - to protect the area against sea level rising. This gives the opportunity to create various areas and different places. Consequently, variety of activities which will increase attractiveness of the area for all can take place. It will also balance expenses of protecting structures. By retreat strategy creating parks, green and open spaces with low demand of security could take place. Retreat strategy can be employed for low-lying areas. By this way these portions could be flooded without any damage to the infrastructure. HafenCity gives a good example of such areas which are covered by water in flooding events and added to the public space.

### **5.3. Conclusion**

It is the conclusion of the analytical findings that urban policy plays an important role to shift the effects of the redevelopment project towards social inclusion or exclusion. Different types of activities, grants for creativity and lands ownership will be defined by the city decision makers. Urban policy influences public interaction which is



an effective component to promote social inclusion in the community. In addition, it could affect gentrification process in the area to prevent social exclusion.

According to what is already discussed and explained above, we can conclude that creating a mixed blend and variety of urban environments can cause having wider group of people involved. Moreover, if land ownership can emerge into different concepts, e.g. condominium and rental tenures, more people from broader social classifications can reside in areas with high demand for occupation. Development of public spaces can cause more variety of activities causing advent of more audience.

Additionally, providing more facilities to young entrepreneurs resulting advent of smaller ventures, could represent opportunity of cooperation of small companies in parallel to larger organisations in the region.

Finally, a unique identity linked to the history of the harbour can be achieved by developing the water front as a combination of historical maritime culture with adaptation technology.

#### **5.4. Suggestion for further studies**

Based on the analyses of adaptation to climate change effects on Frihamnen area, the conclusion is that the pilot project of Mistra Urban Futures “A City Adapted to Climate Change: Scenarios for Future Frihamnen“ still requires more engagement to social aspects of sustainability. Few of the intentions related to the historical identity of Gothenburg harbour are to be found in the documents of Mistra Urban Futures. The development could be excellent, if it does not fail to fully engage the characteristics of the city. More efforts are required for this region to identify and customize climate adaptation strategies specifically tailored for this area which are a bit too general at the moment.

#### **5.5. Questions for the future**

- How can gender equity be promoted in the future Frihamnen?
- How does Frihamnen advantages intensify due to social inclusion?

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