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Exploring the Possibilities for Implementing Collaborative Consumption Within Hammarby Sjöstad, Stockholm

Going Beyond the Visions of the Citizen Initiative HS2020

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ABSTRACT

This is a futures study based on the citizen initiative HS2020 in Hammarby Sjöstad, Stockholm. The initiative has the vision to “Renew a new city”, and further develop Hammarby Sjöstad’s environmental profile towards a sustainable development until 2020.

The aim of this study is to explore the possibilities for HS2020 to also work with Collaborative Consumption, which involves the sharing of goods, services, and space, as a contributing factor to the sustainable development of Hammarby Sjöstad. This study uses an explorative scenario approach together with backcasting, a normative scenario approach to create future images of Hammarby Sjöstad in 2020. These images explore the possibilities for HS2020 to also work with Collaborative Consumption in six of their sub-projects. The futures images were generated based on three workshops with participants connected to HS2020’s work, and also on the literature study and the collected background information.

The future images of Hammarby Sjöstad mediate how HS2020 could further develop the existing sub-projects, by focusing more on Collaborative Consumption. The solutions presented in the theory could be implemented in Hammarby Sjöstad. They could be for anyone, restricted to members, within an apartment building or a small group of people that could also own and maintain the sharing solution. Other important actors are private companies, the municipality and non-profit organization that could initiate, own and maintain these sharing solutions. The future images show that they could contribute to increased sustainability in different ways.

Key words: Futures studies, explorative scenario, backcasting, sustainable urban development, HS2020, Hammarby Sjöstad, Collaborative Consumption

SAMMANFATTNING

Detta är en framtidsstudie som baseras på medborgarinitiativet HS2020 i Hammarby Sjöstad, Stockholm. Deras vision är att "Förnya en ny stad" med det huvudsakliga syftet att vidareutveckla Hammarby Sjöstad miljöprofil mot en hållbar utveckling fram till år 2020.

Syftet med denna studie är att undersöka möjligheterna för HS2020 att också arbeta med Collaborative Consumption, som innebär delning av varor, tjänster, och utrymmen, som en bidragande faktor till hållbar utveckling av Hammarby Sjöstad. Denna studie utgår från en explorativ scenario metodik tillsammans med backcasting för att skapa framtidsbilder av Hammarby Sjöstad år 2020. Dessa framtidsbilder utforskar möjligheterna för HS2020 att också arbeta med Collaborative Consumption i sex av deras delprojekt. De genererade framtidsbilderna baserades på tre workshops med deltagare kopplade till HS2020's arbete, samt på teorin och bakgrunden.

Framtidsbilderna av Hammarby Sjöstad förmedlar hur HS2020 ytterligare kan utveckla de befintliga delprojekten genom att arbete med lösningar som baseras på Collaborative Consumption. De lösningar som presenteras i teorin kan implementeras i Hammarby Sjöstad. Dessa lösningar kan vara för vem som helst, begränsas till medlemmar inom ett bostadshus eller en liten grupp människor; som också kan äga och underhålla dessa lösningar. Andra viktiga aktörer som kan initiera, äga och underhålla dessa lösningar är privata företag, kommuner och ideella föreningar. Framtidsbilderna visar också att dessa lösningar kan bidra till ökad hållbarhet på olika sätt i Hammarby Sjöstad.

Nyckelord: Framtidsstudier, explorativa scenarier, backcasting, hållbar stadsutveckling, HS2020, Hammarby Sjöstad, Kollaborativ Konsumtion

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Thank you,

Stockholm, May 2015
Anna-Maja Jöhnemark

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LIST OF SWEDISH-ENGLISH TERMINOLOGY

Elbil2020	Electric car 2020
Hammarbybacken	The Hammarby slope
HS2020	Hammarby Sjöstad 2020
HS2020Energi	Hammarby Sjöstad 2020 Energy
Interaktivt IKT	Interactive ICT
Kungliga Tekniska högskolan (KTH)	KTH, The Royal Institute of Technology
Lappis Områdesförening	Lappis Tenant's Association
Norra Djurgårdsstaden	The Royal Seaport
Sjöstadens grannsamverkan	The Sjöstad's Neighborhood Watch
Sjöstadsföreningen	Hammarby Sjöstad Association
Sjöstadsodlarna	The Sjöstads Farmers
Stockholms Kooperativa Bostadsförening (SKB)	Stockholms Cooperative Housing Association
Sveriges Tekniska forskningsinstitut (SP)	The Technical Research Institute of Sweden
Trafikkontoret	The traffic office
Återvinning	Recycling

A GLIMPSE OF EVERYDAY LIFE FOR THE RESIDENTS OF HAMMARBY SJÖSTAD IN THE YEAR 2020

It is the year of 2020 and every resident in Hammarby Sjöstad is connected to the mobile citizen communication platform, some use it on a daily basis and others use it now and then. The platform has, among other things, enabled exchanges of services and goods between the residents through Hammarby Sjöstad's very own online marketplace. This has led to transactions between residents happening on a daily basis in the district, where someone's trash becomes valuable to others. When it comes to exchanges of services the Time bank app is also a popular tool amongst the residents. This app enables people to share services that are exchanged for time instead of money between the residents.

Through the specific marketplace for exchanges of services the Anderson family; Celine and Emilia and their three children Kim, Alex and Robin found Alfred and Marie an old couple who were offering to help younger families with babysitting. Now Alfred and Marie have been helping the family pickup their three children from daycare and school twice a week for over a year. The family has offered Alfred and Marie money as payment for their service, but they do not want anything in return as they are just happy to help and spend time with the children. However, the family often invites them for dinner every other weekend, and thus far Alfred and Marie haven't turned down a single dinner.

Two years ago, Celine started a new business, a co-working space, in Hammarby Sjöstad. Its customers are people living in Hammarby Sjöstad who want to work from home or are self-employed. She doesn't only offer a desk and office material, as there is also space for workshops for artists and the entire space is also used as a gallery for artists to exhibit their art.

Sara, a 21 year old student, is a frequent user of the service section of the marketplace as she offer her services and skills several times a week. For instance, she is tutoring five children that come to her once a week to get help with schoolwork. At first, Sara could only help two children because her apartment is too small to fit in more people but then the condominium association[1] decided to redesign their common room to fit in a variety of functions so now she is able to use the room instead and can therefore help three more children at the same time. Sara is also happy to help people who are in need for carrying heavy objects, computer support and all types of different services. She has become a sort of handy woman known throughout Hammarby Sjöstad and many of the people that she has performed services for call her again with another request.

The marketplace is also very popular when it comes to trading unwanted or unused products between residents. Last week, Tim bought a perfect painting for his empty bedroom wall from another resident in Hammarby Sjöstad. Through the communication platform Tim also found out there is a physical

[1] A Condominium association is a type of legal entity and economic association. The association owns and manage the real estate i. e. the building or buildings. The purpose of the association is to grant its members the right to occupy and use the condominiums in the association for an unlimited period of time (Bolagsverket, 2012a).

second hand marketplace in Hammarby Sjöstad. The physical second hand marketplace is partly a so-called "rental wardrobe" of which Tim instantly became a member. The membership includes access to unlimited borrowing of clothes found in a 30 sq. second hand store against a fee. He likes to referee it to as his own "walk-in-closet". When Tim wants get rid of clothes, furniture or something else in his possession he uses the "mobile container" app to locate where the local recycling container is located this week. If Tim is feeling lazy, as he usually is, he just puts in a request for the container to be located near his building the coming week.

The communication platform also offers a variety of other functions such as a general discussion forum where the residents can discuss and connect with each other, another forum for all the condominium, tenant, and cooperative rental associations, local businesses and organization in Hammarby Sjöstad. On this platform you can find almost all information there is about Hammarby Sjöstad and what's going on in the area.

Within the apartment buildings in Hammarby Sjöstad, the sharing of space and products is becoming more common than ever before. In the condominium association Båtbyggaren the Yang Family is one of six households that share one car and a carrier bike together. The Yang family also shares a boat together with two other households. The car, carrier bike and boat are also rented out during specific periods of time to other residents in Hammarby Sjöstad when none of the households are using them. This is also done through the marketplace on the communication platform.

In another condominium association, Slusstornet, the Petersen family – Tom and Mehmet – is one of 8 households that have started a solar cooperative together and have been allowed to cover the association's rooftop with solar photovoltaics. Now they are using their own produced renewable energy. Mehmet also wanted to move the bikes from the specific bike storage room to the car parking garage to be able to use the bike storage room for another purpose. Now this space is a metal/wood workshop equipped with some basic tools that the residents can use, for example, when they need to repair their belongings or just want to be creative, Mehmet and many of the other residents of Slusstornet are frequent users of the former bike storage room.

Last year Tom started a new business, a cafe, in Hammarby Sjöstad. First he had difficulties finding a space to rent, but then he got in contact with a neighbor called Celine who had a business with idling space. They decided to start a collaboration, where Tom opened a café as a part of her co-working business. Last year the real estate owner of the building decided to redesign the rooftop to make it useful and accessible for the tenants. Among other things a greenhouse was built on the roof. Tom was lucky enough to be able to rent a section of that greenhouse so now he also grows all the vegetables and herbs locally on the roof that he uses in the menu at the cafe. Celine and Tom's business now includes co-working space, workshops, a gallery and a café.

In a cooperative rental association[2], Maltet, a resident named Amira had a bookshelf she didn't want anymore. She had heard from a friend living in another building that they had started to share a set of tools located in their common room. When Amira was down in her laundry room she thought that maybe the bookshelf could be more useful to her and other resident there instead. So she carried the bookshelf down to the laundry room and put her washing powder into. But she thought it look a bit too empty, so she also brought down a couple of books she had no plans of re-reading anytime in the near future. Before she left the laundry room, she also left a note next to the books saying "store your washing powder and take a book if you like". After three weeks it was time for Amira to go and do her laundry again. To her surprise the bookshelf was almost full of both washing powder and also with new books and a correction to her previous note that stated "take a book if you like" and now with a continuation "and give away another". Now the laundry room is also used to store a couple of basic tools for every resident to borrow and there is also a sewing corner in the laundry room, since another household thought their sewing machine was just collecting dust in a closet and thus decided to put it in the laundry room for everyone to use.

These are fictional future images that explores how the residents and local actors of Hammarby Sjöstad could utilize the existing resources more efficiently through different forms of sharing in 2020. It is a preview of the results of this futures study, which is written from a popular scientific view and it illustrates a possible future.

[2] A cooperative rental association is a cooperative that rents out at least three apartments to its members. The association is the landlord and the tenant is a member of the association. It is an intermediate between regular tenancy and a condominium. The tenant's right to use the flat is about the same as a regular tenancy (Bolagsverket, 2012b).

1. INTRODUCTION

The average private consumption in Sweden is far from being considered environmentally sustainable (Naturvårdsverket, 2014). Sweden has the 10th largest ecological footprint per person in the word, ranking higher than oil nations like Canada and neighboring countries like Finland. As such, we are also one of the largest consumers of natural resources per capita in the world (WWF, 2014). At the same time the world is urbanizing faster than ever and is expected to continue to do so for decades to come. The current urban planning ideals and concepts can no longer meet the needs of the majority of urban inhabitants without compromising needs of the future generation. Therefore, the current urban planning ideals needs to be transformed and focus on sustainable urban development (UN-Habitat, 2009).

One well-known example of sustainable urban development is a district located in Stockholm, Sweden, called Hammarby Sjöstad. It is a former industrial harbor that is being transformed into a residential district. Early on, it got worldwide recognition for its ambitious environmental goals (Pandis & Brandt, 2011). In order to meet the goals, six different focus areas – land use, energy, building materials, water/sewage, waste and transportation – were incorporated in the plans for the district (Stockholm stad, 2011). However, evaluations of the project have shown that there are goals that were not met (Pandis & Brandt, 2009). The district is not yet fully completed, but approximately 20 000 people live in the area already, and it houses about 7 000 workplaces (HS2020, 2013).

In 2011, a citizen initiative was founded, named HS2020, with the aim to "Renew a new city". The purpose of this initiative is to create a network of actors to enable a continuation and further development of Hammarby Sjöstad's environmental profile towards a sustainable development until 2020. It has resulted in nine ongoing projects that are initiated or operated by the initiative (HS2020, n. d.). Most of these projects are focusing on new technical solutions and improvements to reduce energy use and climate impact. The initiative has already been proven to be successful, since a reduction of energy use and climate impacts can been realized when realizing the projects visions (Svane & Evliati, 2015).

However, new research emphasizes that new technical solutions and improvements are not enough to redirect the current development towards a sustainable one. It is therefore necessary to think outside the boundaries of technology as the only solution. There is a great need to utilize our existing resource more efficiently (Steffen et al, 2015; UNEP, 2010). Another way of contributing to sustainable urban development could be to focus on using the maximum potential of existing resources through the sharing of goods, services and space (Botsman & Rogers, 2010). This concept is called Collaborative Consumption. It is a socio-economic model that focuses on access rather than ownership and is set to change how we consume, where experience are valued over material possessions and *mine* becomes *ours* (Botsman, 2013).

1.1. AIM

The aim of this study is to explore the possibilities for HS2020 to also work with Collaborative Consumption, as a contributing factor to the initiative's sustainability work that mainly focuses on technical solutions and organizational development. Furthermore, two assumptions are formulated in order to explore the aim of this study. These assumptions are that HS2020 will be successful in realizing their current visions until 2020, and that the initiative also want to go beyond their current visions to include Collaborative Consumption in their work.

1.1.1. RESEARCH QUESTIONS

The overall research question is as follows: What if HS2020 also focused on Collaborative Consumption as a means for contributing to sustainable urban development, what could be done as extensions to their existing projects?

- What services, goods and spaces could be shared in the district?
- For whom are they implemented?
- Who could provide, own and maintain these sharing solutions, what actors in the existing networks could contribute and could new actors be involved?
- How could these sharing solutions contribute to sustainable urban development in Hammarby Sjöstad?

1.2. DELIMITATION

This study is geographically delimited to the city district of Hammarby Sjöstad in Stockholm, Sweden. It is delimited to Hammarby Sjöstad since it is a case study based on the citizen initiative HS2020 that aims at supporting a continued sustainable urban development of the district. HS2020 is a unique initiative that takes a bottom-up approach to renew a relatively new city district that is still being built. The study focuses on the residents who live there and the local actors such as businesses and organizations that are either located or active in the area. In the report several examples of initiatives and businesses are presented. However, these examples do not represent all organizations and businesses located or that are active in Hammarby Sjöstad. The initiative consist of nine different ongoing sub-projects. Six of these sub-projects were selected for this study. These six sub-projects were assessed to have the most potential to incorporate ideas based on Collaborative Consumption, because of their specific aim and focus area aligns with these ideas based on sharing.

Since this is an ongoing urban development project only assumptions are made on how HS2020 also can work towards a sustainable urban development through implementing ideas based Collaborative Consumption in Hammarby Sjöstad. This is a futures study that explores what is possible, in terms of

what can happen. Other futures studies often focus on what is most likely when analyzing trends and prognosis for the future. This study starts at assuming that HS2020's visions will come true in 2020. Then it goes beyond their visions to explore other possible contributions to sustainable development. These ideas and solutions based on Collaborative Consumption are seen as possible rather than being the most likely outcome. It is necessary to find as many solutions as possible which contribute to sustainable urban development, since attaining a sustainable future is a great challenge and the time is running out (IPCC, 2014; Steffen, 2015).

1.3. DISPOSITION

The first chapter introduces the topic and the aim, and is followed by the research question and the delimitation of the study. The next chapter presents how the study was conducted, and explains how the study was treated as a futures case study that takes an action-oriented participatory scenario approach. The third chapter presents the background of the case. The material was collected to get an understanding of Hammarby Sjöstad's history, what is going on today and what the citizen initiative HS2020 has done this far and their vision for the future. The following chapter gives a theoretical framework for this study to give the reader an understanding of sustainable urban development. This is followed by theories on Collaborative Consumption to give the reader the basic understanding of the concept, what it is and how these ideas work in reality. The fifth chapter presents the results of the study. This includes an analysis of existing collaborative initiatives and businesses in the area and the future images of Hammarby Sjöstad in 2020, which are based on the literature, background information and the conducted workshops. The proceeding chapter presents firstly, an evaluation based on Hammarby Sjöstad's environmental goals and the Swedish environmental quality objectives, secondly a discussion around the social benefits of sharing, HS2020's work and their challenges, and the concept of Collaborative Consumption its challenges. The last chapter presents the conclusions that are drawn from the research questions and the findings of the study.

2. RESEARCH METHODOLOGY

This research is a case study of the citizen initiative HS2020 in Hammarby Sjöstad and how the initiative could work with Collaborative Consumption as a means to contribute to sustainable urban development of the district. To investigate this, background material was analyzed on Hammarby Sjöstad and the HS2020 initiative. Then a literature study on current sustainable development and the concept of Collaborative Consumption was performed. Lastly, a description of how the elements from the research tradition of futures studies and its methodology explorative scenarios and backcasting were used to create future images of Hammarby Sjöstad in 2020.

2.1. CASE STUDY

A case study seeks to explain and understand a small section of human activity, limited in time and space, yet comprehensive in its context and in all its complexity (Stake, 1995 & Johansson, 2005). It examines a complex, ongoing or contemporary phenomenon in its natural environment, which means that a case study cannot be repeated and obtain the same result; people change their minds with time, so do other circumstances as well. Unlike experiments and statistical studies, a case study deals with the unique, the unknown, and the educational (Flyvbjerg 2006).

HS2020 is an ongoing project that was studied in its natural environment and can be described as a small section of human activity. It is also unique as the initiative originates from laity, local residents, and the organization needed to implement HS2020's visions does not exist but must be created. It is unique because the purpose is to improve a relatively new urban area. Although all of this is unique and no one can repeat exactly what they do, there are opportunities for others to learn from this unique urban development initiative (Svane 2005). Furthermore, Flyvbjerg (2006) and Stake (2005) argue that it is fully possible and reasonable to generalize from specific and unique cases. However, the purpose of this study is not to generalize. This futures study explores the possibilities for the case of HS2020 to work with Collaborative Consumption as a means to further develop the sustainability of Hammarby Sjöstad.

As background material to the case study, the main source used for collecting information about HS2020 was “Förnya en ny stad – vad kan vi lära oss av medborgarinitiativet i Hammarby Sjöstad?” (2015) by Örjan Svane and Maria Angeliki Evliati. There was also a variety of other sources used such as municipality documents, grant applications, websites, newspapers and research literature on Hammarby Sjöstad and HS2020 in order to get a wider perspective and updated information.

2.2. LITERATURE STUDY

The literature was used to create a theoretical framework for the study, and to implement and develop a methodology for the research. The aim of a literature study is to describe previous research conducted, review the current scientific debate and explore key issues in the subject. A literature study is also a way

for the author to argue for the relevance and choice of research strategy for the study (O'Leary 2009). The literature study is divided into two sections, the first being about sustainable urban development and the other section presents theories of Collaborative Consumption, which is based mainly on the book "What's Mine Is Yours: The Rise of Collaborative Consumption" (2010) by Rachel Botsman and Roo Rogers.

2.3. FUTURES STUDIES

It is hard to know beforehand if the HS2020's initiative would be more successful if they also focused on implementing ideas based on Collaborative Consumption within Hammarby Sjöstad. However, the future is not completely disconnected to the present, as the future is shaped by the decisions made today (Myers & Kitsuse, 2000). In this study, a futures studies approach is used to create images of the future of how the initiative could work with Collaborative Consumption as a means to contribute to continued sustainable development in Hammarby Sjöstad. Futures studies is a multidisciplinary discipline which aims at studying the most likely, possible and desirable futures (Bell, 2003). It is used as a tool to create different scenarios that can go beyond forecasts and "business as usual" (List, 2004). It can be divided into three categories; predictive, explorative and normative scenarios. Predictive scenarios aim at providing answers to the question "*what will happen?"*. The second category is explorative scenarios, which are used to look at "*what could happen?"*. The last is normative scenarios, which explores *how a certain target could be reached* (Wangel & Gustafsson, 2011).

The scenario approaches used in this study were explorative and normative scenarios. Normative and explorative approaches both have their advantages and disadvantages. Scenario developers from both sides have acknowledged the added value of either type of scenario process and thus the approaches to scenario development are highly complementary (Kok et al. 2011). Therefore, it is argued that there is an added value in combining them in this study.

Explorative scenarios illustrate plausible futures, showing the implications of several external drivers (Börjeson et al., 2006). It is situations or developments that are regarded not as predictable, but rather as what may happen (Shearer 2005; Börjeson et al. 2006). Explorative scenarios are often developed using participatory methods and can be either qualitative or quantitative (Van Notten et al. 2003). For this study, the most important feature of explorative scenarios is their aim to describe different plausible futures. Showing different developments of social, economic and environmental factors, and exploring what is possible, given the limitations due to the extensive and drastic change that is necessary.

This study also seeks to explore how to achieve the most desirable futures using elements from the transforming normative scenario approach called backcasting. A transformative scenario is used when the current state needs to be changed completely to be able to reach the desirable futures (Börjeson et al., 2006). By creating futures scenarios based on the backcasting approach it is possible to influence

the decisions made today to achieve a more desirable and in most cases a necessary outcome (Robinson, 1988). This is done through exploring images of desirable futures and from there moving backwards to examine what could be done today for the desirable futures to become a reality (Quist & Vergragt 2006). This study followed the 4-step backcasting method used by Svenfelt et al (2010) that originates from Höjer and Mattsson (2000), and which includes the following steps:

1. Problem definition, establishment of criteria and targets
2. Analysis of current trends and forecasts.
3. Development of future images.
4. Discussions on realization of the images in stakeholder groups.

The first and second steps are presented in the background and the theory chapters. In order to explore futures images of Hammarby Sjöstad two assumptions were formulated: the first being that HS2020 will be successful in realizing their existing visions until 2020, and the second being that they will also want to go beyond their existing visions and include Collaborative Consumption in their work. These assumptions are not limited by the most likely outcome, but rather what is possible.

The third and fourth steps were based mainly on ideas from three workshops held with different stakeholders such as active members of HS2020 and real estate developers. First, an explorative scenario of Hammarby Sjöstad was created based on the question; what would a future look like if the assumptions were realized? The starting point is where HS2020 is today and what they can do to go beyond their current visions by implementing ideas based on Collaborative Consumption. As the final step, the scenario was analyzed based on the present and what can be done today for the desirable future to become a reality in 2020.

2.3.1. Action-oriented participatory scenario approach

A participatory scenario approach was chosen for this study and resulted in three workshops with different stakeholders to create a future scenario of Hammarby Sjöstad in 2020 (Wangel, 2011). Therefore, the participants played a central part in shaping this study. The ideas that the participants came up with during the workshops were used as input to the explorative scenario and were also supplemented with ideas from the literature study and the collected background information. The main purpose was to collect stakeholders to introduce them to the concept of Collaborative Consumption and engage them into action (Carlsson-Kanyama et al. 2008). Therefore, the scenario for Hammarby Sjöstad in 2020 involves an action-oriented approach.

Due to time limitations for conducting the workshop and difficulties coordinating a date and time for one workshop when the intended group of participants were available, the workshop was divided into three different occasions. The first and second workshops were held on the 9th of April, and the third was held on the 14th of April. All three occasions lasted for approximately two hours. The participants

in the workshops were active members of HS2020, representatives from partners such as real estate developers, municipality, research institute and other local organizations. There were a total of ten people participating in the workshops.

The workshops were intended to be divided into four parts, with the following setup; first the participants are given a short presentation of the thesis and Collaborative Consumption. Then the participants are asked to brainstorm around what kind of goods, services and spaces could be shared based on the previous presentation. During the third part of the workshops the participants are asked to concretize these ideas in a Hammarby Sjöstad context year 2020. For every suggestion made the participants are also asked to name for whom they would serve and possible actors who could provide, own or initiate these sharing solutions. In the last part the participants are asked to comment upon which of these solutions would be easiest/hardest to implement from an actor perspective. The structure and findings from the workshops is summarized in the table below. However, this setup could not be realized due to some of the participants wanted a more open discussion.

Short presentation of Collaborative Consumption, futures studies and backcasting	***The participants brainstorm around what kind of goods, service and spaces could be shared***	***The participants concretize these ideas in a Hammarby Sjöstad context in year 2020. Then continuing on with going backwards asking the question; what can be done today for it to become reality in 2020?***		
		What?	*For whom?*	*By whom?*
Going beyond HS2020 visions. *Do not think in terms of what is most likely, but what is possible.*	Goods/services/ space	Goods/ services/space	Businesses/ Everyone/ within a condominium association/those who share the same entrances within an apartment building	Private company/municipality /condominium association/residents

TABLE 1: SUMMARIZING TABLE OF THE WORKSHOP SETUP

In the first workshop the participants were Sten Bergman, Bertil Stockhaus and Anders Johnson. Since there were only three participants, they expressed that a more free discussion on the subject would be more appropriate. Therefore, a more focus-group oriented discussion was carried out. The participants were able to express themselves more freely based on the topic and were able to reflect on how HS2020 could work with Collaborative Consumption. The low number of participants also contributed to a lack of diversity in terms of the backgrounds of the participants. Since both Sten and Anders focus on traffic and mobility in their work and research the discussion tended to circle around that area of expertise.

The second workshop was conducted with two persons from the board of Sjöstadsodlarna, Hilkka Suomalainen and Gunnel Brandkvist. First, the participants described their organization from when they

started to where they are today. Following this, a more discussion-oriented conversation was carried out based on the thesis topic.

The last workshop's participants were Allan Larsson, Irena Lundberg, Cecilia Liljedal, Christer Lindoff and Kerstin Blix. Similar to the first workshop, some of the participants wanted a more open discussion. To some extent, they also did not feel like they could offer new ideas beyond the ones presented in the introduction. This resulted in a more focus-group oriented discussion where the participants were able to express themselves more freely based on the topic and how HS2020 could work with Collaborative Consumption. The ones that sought to change the setup for the workshop were also the ones who later on influenced the discussion the most.

The results from the workshops are presented as future images of Hammarby Sjöstad in 2020, exploring how HS2020 could work with different ideas and solutions based on Collaborative Consumption that were discussed during the workshops. The ideas from the workshop were also supplemented with additional ideas that emerged during the compilation of the background information and the literature study on sustainable urban development and Collaborative Consumption. Due to the changed setup of the workshops the ideas from the literature on Collaborative Consumption played a bigger role in generating the future images of Hammarby Sjöstad. There is also an actor analysis of existing collaborative businesses and initiatives in Hammarby Sjöstad's. These examples are not connected to HS2020's work today, but were assessed to have the potential to be a part of the initiative in the future. The businesses and initiatives were either brought up by the participants during the workshops, or discovered through following a local online group called *Hammarby Sjöstad* on the social network platform Facebook.

3. BACKGROUND

This chapter presents background information about Hammarby Sjöstad: its history and what is happening today by examining the large scale citizen initiative HS2020. What the initiative has done this far and what their visions are until 2020.

3.1. HAMMARBY SJÖSTAD

The city district of Hammarby Sjöstad is an ongoing urban development project that is located in the central part of Stockholm, expanding the inner city to the south. The area is a former brownfield development, where industrial businesses and a harbor were located (Stockholm stad, 2011). The new development is not yet fully completed, but the district houses already approximately 20 000 residents and 7 000 workplaces (HS2020, 2013). When the area is completed, which is estimated to be in 2018, there will be approximately 11 500 apartments, accommodating about 26 000 inhabitants with a total of 36 000 people living and working in the area.

FIGURE 1: AN OVERVIEW MAP VISUALIZING HAMMARBY SJÖSTAD AND HOW THE DISTRICT IS EXPANDING THE INNER CITY OF STOCKHOLM TO THE SOUTH BY CONNECTING WITH SÖDERMALM (EDITED PHOTO FROM WHITE: HTTP://WWW.WHITE.SE/PROJEKT/15-HAMMARBY-SJOSTAD/BILDSPEL?SLIDE=0)

Being one of Stockholm's larger new urban developments, its planning history can be traced back to the 1990s. In the beginning, the main idea behind the district was to showcase a unique opportunity to expand the inner city with a focus on nearness to water, at the same time as an old industrial and harbor area would be transformed into a modern urban district (Stockholm stad, 2014). However, the plans for the district took a new direction when the City of Stockholm wanted to host the Olympic Games in 2004

suggesting Hammarby Sjöstad as a site for the Olympic Village. Inspired by the call for environmental focus in the applications by the International Olympic Committee, policymakers in Stockholm wanted Hammarby Sjöstad to become an environmentally sustainable urban district. Therefore, an environmental program was created to guide the development of Hammarby Sjöstad towards becoming a sustainable urban district with very high environmental ambitions and goals for its time (Pandis & Brandt, 2011). However, when Athens was chosen in 1997 to be the host for the Olympic Games, there were some uncertainties whether the planning process should continue with its environmental profile. After some discussions it was decided by the City of Stockholm to retain the environmental ambitions in the planning process of the district (Pandis & Brandt, 2009).

The overarching goal for the environmental program was to reduce the total environmental impact by half compared to an urban area built in the early 1990s. To be able to reach the goals set in the program, six focus areas were incorporated in the program with separate sub-goals. These sub-goals are presented on the next page.

The City of Stockholm's environmental goals for Hammarby Sjöstad:

1. **Land usage**: sanitary redevelopment, reuse and transformation of old brownfield sites into attractive residential areas with beautiful parks and green public spaces.
2. **Transportatio**n: fast, attractive public transport, combined with carpool and beautiful cycle paths, in order to reduce private car usage.
3. **Building materials**: healthy, dry and environmentally sound.
4. **Energy**: renewable fuels, biogas products and reuse of waste heat coupled with efficient energy consumption in buildings.
5. **Water & sewage**: as clean and efficient as possible – both input and output – with the aid of new technology for water saving and sewage treatment.
6. **Waste**: thoroughly sorted in practical systems, with material and energy recycling maximized wherever possible (Stockholm stad, 2007).

One part of the solution to achieve the goals for the environmental program were a new eco-cycle model for the area's infrastructure system, the Hammarby model. This model focuses on three main aspects namely: energy, waste, and water/sewage. These aspects are connected to one another, creating an eco-cycle within the district. For example, waste is used to heat buildings and biogas is extracted from sewage sludge to be used by buses. Other examples are a test treatment plant for wastewater to evaluate new technology, incorporating solar panels to locally produce renewable energy, and green roofs to collect rainwater and function as insulation to reduce energy consumption in the buildings. Today there are a few examples of buildings with green roofs or solar panels on the rooftops, therefore, there is limited renewable energy that is produced locally in the area. The waste treatment and heating plant were built to support the Stockholm region, not specifically Hammarby Sjöstad. (Stockholm stad, 2011).

Because of the ambitious environmental program the district has gotten worldwide recognition of being an example of sustainable urban development. There are thousands of international visitors coming every year to see and learn how Hammarby Sjöstad was built and planned (Svane & Evliati, 2015). However, evaluations of the planning process and the existing built environment prove that the district has only been partially successful in reaching its objectives. For example, the goal that 80% of commuting trips is done by public transportation, walking or biking has been achieved, while goals connected to renewable energy production and energy use have not been met. The evaluations of the project are also incomplete due to a lack of reliable data (Pandis & Brandt, 2011).

Today, Hammarby Sjöstad is far from being considered sustainable in terms of energy sufficiency, mainly because of the lack of renewable energy production and the limited success in reducing energy use of the buildings in the district (Pandis et al. 2013). Furthermore, questioning has been made by Wangel (2013) on how sustainable Hammarby Sjöstad is from a holistic perspective. According to Wangle's research, many of the residents of Hammarby Sjöstad have unsustainable lifestyles based on their consumption habits. The majority of apartments in Hammarby Sjöstad are condominiums that only high income household can afford. This has created a segregated district only for the wealthy. The flats are comparatively spacious in their design contributing to a higher energy consumption per person than apartments in the inner city. The focus areas presented in the environmental program are mainly addressed by new technical improvements to reduce the environmental impact (Wangel, 2013). From this follows another question, whether only technical solutions are needed to achieve sustainability. Recent research indicates that relying on only new technical solutions and improvements is not enough to actually achieve sustainability. There is a great need to also use our existing resource more efficiently (Steffen et al, 2015; UNEP, 2010).

In the following chapter, the citizen initiative HS2020 in Hammarby Sjöstad is presented. This specific initiative is one of the main, if not the main actor who is influencing the current sustainable urban development in Hammarby Sjöstad. The initiative aims at realizing the goals in the environmental program that were not achieved and to continue develop Hammarby Sjöstad to maintain the role model status as an example of sustainable urban development (Trafiknät Stockholm, 2012).

3.2. HS2020 - A CITIZEN INITATIVE IN HAMMARBY SJÖSTAD

The citizen initiative HS2020 is an ongoing citizen initiative in the city district of Hammarby Sjöstad with the vision to "renew a new city" until year 2020, by developing a network of actors involving citizens, research institutes, private companies and public authorities (HS2020, n. d.). Its members want to rethink the traditional concept of urban development, in which the urban area is seen as finished and a completed project by the time the planned buildings are built. They argue that regardless of whether or not the area is seen as finished, that does not mean it cannot be further developed to become more sustainable. They also point to the fact that existing urban areas need to be further developed at the same

time, as there is a lot of potential to change existing areas to become more sustainable. What is missing is an organizational structure that can identify the potential, clarify what kind of organization forms that are needed to utilize the potential and also to create these organizations. This is what HS2020 was created for (HS2020, 2013).

The initiative came together in 2011 and fairly quickly became part of the Sjöstadsföreningen, which is the condominium association's umbrella organization consisting of 39 different condominium associations and two cooperative rental associations within Hammarby Sjöstad. Sjöstadsföreningen was created in 2003 and has the aim to safeguard the resident's interest in the district. One of the main tasks is to contribute to strengthening Hammarby Sjöstad's profile as district for sustainable urban development (Sjöstadsföreningen, n. d. a). Both Sjöstadsföreningen and HS2020 are mainly dependent on voluntary participation by the residents in the district. In HS2020 most of the active members are senior residents that have long professional experience, which has proven useful throughout the establishment of the initiative. Initially, HS2020 lacked support from other organizations, but during the first three years, an extensive contact network was been built up with both academia and businesses. This development has made it possible to concretize the main vision behind the initiative which is to "renew a new city" through different projects. Each of these projects have visions and programs developed and adopted for the specific organization created, and the contacts that has been established with businesses, financers and governments (Svane & Evliati, 2015).

Currently, there are nine different ongoing projects that were initiated or are operated by HS2020. The overall aim of these projects is to advance Hammarby Sjöstad's environmental commitment towards sustainable urban development (HS2020, n. d.). Six of these nine projects have been chosen for this study to be analyzed based on the literature used in the report. These six projects were chosen because they had the most potential to incorporate ideas based on Collaborative Consumption. The selected projects are presented in the following chapter.

3.2.1. Ongoing projects operated or initiated by HS2020

The selected projects for this report are the following; ElectriCITY, Elbil2020, HS2020Energi, Interaktivt IKT, Återvinning and Nya Hammarbybacken. A short description of each project and their aims and visions until 2020 are presented below in the following sub-chapters. The other three projects were assessed with least potential to incorporate ideas based on Collaborative Consumption. One of these projects focus on new technology to improve water quality, the second project enables live streaming premieres of Metropolitan and other world stages, and the third project aims at making Hammarby Sjöstad an export and investment platform (Sjöstadsföreningen, n. d. b).

3.2.1.1. ELECTRICITY: A LOCAL AND INTERNATIONAL KNOWLEDGE AND INNOVATION CENTER

This project is based on “open innovation” with a focus on electro-mobility, energy efficiency, smart and renewable energy, recycling, water and IT/communications (Larsson, n. d.). In 2014, it became an economic association that functions as an umbrella organization for all HS2020 projects (Svane & Evliati, 2015).

ElectriCITY also has the ambition to develop Hammarby Sjöstad into an "Urban Living Lab" area. A lab that attracts researchers not only from Swedish colleges and universities but also from leading universities worldwide. Hammarby Sjöstad should be the first choice as a Swedish example in EU projects for studies of sustainable and "smart" cities (HS2020, 2013). There is currently an ongoing research project initiated by ElectriCITY and conducted by White Architects. The project aims to strengthen the civic engagement in the future renewal of Hammarby Sjöstad. This study explores attitudes and opinions among the residents of Hammarby Sjöstad. It will answer the following questions; what do the residents of Hammarby Sjöstad think of sustainability? What do the residents of Hammarby Sjöstad think of consumption, lifestyles and transportation? What is Hammarby Sjöstad’s identity? This project contributes with a new angle by focusing more on the social aspect of HS2020’s sustainable urban development efforts (ElectriCITY, n. d. a).

The vision for the project until 2020 is:

- an economic association and innovation platform,
- a brand, and
- an active and supporting partner for all the different sub-projects initiated by HS2020.

(Svane & Evliati, 2015)

3.2.1.2. HS2020ENERGI: UNDER 100 KWH PER M² IN ALL BUILDINGS

This project is a competence and innovations center for more efficient energy use in the buildings. The main focus is to reduce the energy use in all buildings to be under 100 KWh per m^2 a year and to improve indoor climate in the housing estates. HS2020Energi work with engaging the condominium associations and their energy managers (Larsson, n. d.). The goal is for the energy use in all buildings to be under 100 KWh per m^2 a year, which has yet to be met (Pandis & Brandt, 2009). Based on a report by HS2020/Energi (2013), where all the existing buildings were mapped out in the district, resulted in a confirmation of the previous statement (HS2020/Energi, 2013).

The project also aims at testing new solutions for smart and renewable energy sources that are produced locally such as geothermal heating and solar power. HS2020Energi is also participating in an EU project called *CIVIS* which is conducted by KTH and a number of other universities in Europe. Sweden provides so called “living labs” and Hammarby Sjöstad is therefore serving as a testing area to investigate how ICT can be used to reduce energy-use in buildings. With all these ventures combined this project can

serve as a Demo city district for energy including energy efficiency technologies, and smart and renewable energy (ElectriCITY, n. d. b).

The vision for the project until 2020 is:

- the maximum energy use for all condominium associations is 100 kWh/m^2 a year,
- climate impacts have been reduced due to the decline in energy use,
- new solar technology has been established on top of buildings in Hammarby Sjöstad,
- Hammarby Sjöstad is known as Demo City Energy, and
- energy companies are able to demonstrate their demo projects for energy efficiency, local energy production and smart lightning.

(Svane & Evliati, 2015)

3.2.1.3. INTERAKTIVT IKT: SJÖSTADEN IN THE MOBILE PHONE

This project started as a collaboration between Sjöstadsföreningen and one of the leading media companies called Stampen AB to develop the future's local and mobile news- and communication system. The aim was to create a platform for the residents to easily access all information, news, community information and commercial information within Hammarby Sjöstad (Larsson, n. d.). This collaboration resulted in a feasibility study of the concept for a communication platform for local communities that was finished in 2013 by Sjöstadsföreningen and Stampen AB.

The concept includes three elements which are;

1. A concept for local communication that collects information from news media, condominium associations, other types of associations in the area and local businesses enabling internal communication,
2. a technical platform that offers all components needed for a mobile service to function in a satisfying way for all users, and
3. a business model based on advertising and other commercial revenues are funding the project.

The conclusions of the aforementioned feasibility study were that this kind of new communication based on a mobile site in a local community has great potential for;

1. collecting and making information available in one place,
2. providing new opportunities for different types of economic associations and non-profit organizations to reach out and communicate with and between its members,
3. providing commercial companies new ways to quickly and cost-effectively reach both new customers in a larger market and special groups such as loyal customers, and
4. providing an opportunity to strengthen the district's profile and local cohesion

(Sjöstadsföreningen & Stampen AB, 2013).

At the same time as the feasibility study on "Sjöstaden in the mobile phone**"** was conducted, KTH together with the City of Stockholm and IBM created an environmental data system, called Smart City SRS for another district currently being built, called Norra Djurgårdsstaden. The aim for this project is to create an information platform for the residents based on real time data related to the district. This will provide opportunities for those who live and work in the area to more easily make sustainable decisions in everyday life (Brådenmark, n. d.). The intention is now to develop this project along with the HS2020 project "Sjöstaden in the mobile phone." This has resulted in a new collaboration with KTH, the media technology company Adeprimo, and Staden i Mobilen AB, where they have applied for a grant from research and development founder Vinnova to be able to research and implement a pilot project. The districts of Hammarby Sjöstad and Norra Djurgårdsstaden are listed as first in line for conducting the pilot project.

The pilot project aims at testing three new business models which are the following;

1. The city in the mobile phone.
2. The environment in the mobile phone.
3. The market in the mobile phone.

These three business models are all intended to be connected by a common digital platform called the Citizens' Communication Platform (ElectriCITY, n. d. c).

The vision for the project until 2020 is:

- "Sjöstaden in the mobile phone" has improved the possibilities for persons, organizations and businesses to take part in information and communication in a local mobile site,
- the project is a role model for Norra Djurgårdsstaden, Hökarängen and other local communities.

(Svane & Evliati, 2015)

3.2.1.4. ÅTERVINNING: UPGRADES AND A CONTINUATION OF TECHNICAL DEVELOPMENT

An important part of the environmental program of Hammarby Sjöstad is the Hammarby model. It has a project that conceptualizes an eco-cycle where waste can be recycled and reused (Stockholm stad, 2011). This project focuses on upgrading the existing vacuum waste system in Hammarby Sjöstad, to increase the sustainability in the district and test new technical solutions. The main collaboration partners are Trafikkontoret and Envac (ElectriCITY, n. d. d).

The vision for the project until 2020 is:

- an overall approach for recycling has been established. It combines optimal waste management with what is rational for the residents, and
- Hammarby Sjöstad is a demo city for an environmental friendly waste management.

(Svane & Evliati, 2015)

3.2.1.5. ELBIL2020: SUSTAINABLE TRANSPORTATION

This project focuses on the transition to more sustainable modes of transportation. The included modes of transportation are cars, buses, trucks, ferries and bikes (Svane & Evliati, 2015). In 2013, a feasibility study was released in collaboration with Volvo and Elbil2020 (2013). The project aims to take a holistic approach to support a transition to electric vehicles for all the modes of transportation included in the project. It is both a large-scale demonstration project and part of a research project to make Stockholm the leading city in the transition to an electric vehicle fleet (Elbil2020 & Volvo, 2013). The project is set to continue in collaboration with the University of KTH, the research institute SP, and Elbil2020 to demonstrate the development of electric vehicles and the infrastructure needed to support the transition.

This transition is supported by the following sub-projects:

- Stockholm's test panel for electrical vehicles
- Stockholm's demo fleet of electric vehicles
- Electrical charging stations in Hammarby Sjöstad and Sickla Shopping Center
- Demo line for chargeable hybrid buses
- Transition from heavy transports (From garbage trucks to electrical vehicles, for example)
- Transition of ferries in Hammarby Sjöstad to be electric driven
- Electricity – Hammarby Sjöstad Innovation

(Elbil2020, n. d. a)

In collaboration with Sjöstadsföreningen, a plan for public transport called "Bussplan Stockholm – för tyst och ren trafik i innerstan" was presented in 2014 to show how Stockholm can replace 330 old buses in the inner city with electric buses within the next ten years (ElectriCITY, n. d. e.; Bussplan Stockholm, 2014). Another collaboration with ElectriCITY has resulted in a "Laddplan Stockholm – för tyst och ren biltrafik" which is a plan that aims at contributing to the City of Stockholm's ambitions to be the leading electric vehicle city worldwide. The plan includes an action plan to make Hammarby Sjöstad a demo city district for electric vehicle charging stations. It also includes a proposal for a roadmap of how the entire City of Stockholm can, by 2025, extend the needed infrastructure for electrical vehicles to become the first choice whether one intends to buy, lease, share or rent a car. Elbil2020 together with ElectriCITY has also collaborated with the Center for Sustainable communication (CESC) at KTH to develop a traffic plan for the entire city of Stockholm (ElectriCITY, n. d. e).

Another collaboration partner is Sunfleet which is a carpool company offering access to several cars that are located in different spots throughout the district, and other spots in Stockholm and Sweden for their members. Their fleet includes fossil fuel and electric vehicles (Elbil2020, n. d. b). Elbil2020 is also collaborating with one of the local grocery stores, ICA Supermarket Sjöstaden, providing them with electric charging infrastructure and an electric car that is used to deliver groceries to the resident's homes.

The vision for the project until 2020 is:

- a demo platform for knowledge accumulation has been established,
- a demo environment for cars and car companies has been established,
- the use of fossil fuels for transport has decreased,
- the users have participated in the development of electric vehicles, and have tested new vehicles with electric technology, by the test panel, and
- there is a plan for the conversion of the entire inner city vehicle fleet to be driven by electricity.

(Svane & Evliati, 2015)

3.2.1.6. NYA HAMMARBYBACKEN: SKIING YEAR-AROUND

This is a collaboration with Sjöstadsföreningen. The project aim is to further develop the existing ski center in Hammarby Sjöstad called Hammarbybacken to become a ski center with ski tunnels for skiing year-around. This center will encourage physical activity and health not only in terms of skiing but also other activities such as swimming and athletics. New technology provides an energy system that is carbon-neutral, cost- and energy-efficient (ElectriCITY, n. d. f).

This far the project has been lacking support from politicians but the Swedish Ski Association is interested in collaborating to further develop this idea (Svane & Evliati, 2015). In the beginning of 2015, Sjöstadsföreningen handed over a request to the sports commissioner of the City of Stockholm to initiate a feasibility study for this project. The request stated they want the city to gather stakeholders, such as organizations, businesses and financiers to investigate the technical, organizational and financial issues that need to be clarified to establish a qualified foundation for deciding whether or how the project could be implemented (Sjöstadsföreningen, 2015).

The vision for the project until 2020 is:

- Hammarbybacken offers skiing year around.

(Svane & Evliati, 2015)

4. LITERATURE STUDY

In this chapter, literature that focuses on the current state of the sustainable development progress is presented. After that, the concept of Collaborative Consumption is summarized, and the three sub-categories are described and combined with examples of solutions based on sharing are presented.

4.1. SUSTAINABLE DEVELOPMENT

There is yet no “true” definition of sustainable development. Different researchers and institutions have come up with different definitions that are more or less known and used by others (MIT, 2008; NATO, 1997). However, the most commonly used definition is the United Nation's Brundtland Commission's definition, which states that sustainable development is "development that meets the needs of the present without compromising the ability of future generations to meet their own needs" (Brundtland, 1987). The report further defines this concept by dividing it into three issues concerning economic growth, social development and environmental protection, and the importance of maintaining them simultaneously.

The idea that it is possible to maintain a sustainable growth rate forever was argued against already back in the 1970s when the book “The Limits to Growth” was first published. The authors stated that the earth is finite and if we continue with the “business as usual” scenario, and do not take serious action on environmental and resource problems, the scenario predicted we can expect a collapse of society within a timeframe of approximately 100 years (Meadows et al, 1972). According to follow-up research and other recent research, the current development is following “the business as usual” scenario (Meadows et al, 2004 & Hall, 2009).

With raising concerns of threats such as a warmer climate and sea level rise caused by climate change there is evidence that the predicted aftermath of the “business as usual” scenario can come true in the near future (IPCC, 2014). Climate change is one of the nine “planetary boundaries”, a concept that describes the impact human activity has on the earth in terms of the capacity limits of the earth’s systems and processes. The capacity limit is identified by how much load from human activity the system can handle before it collapses and goes into a new undesirable and irreversible phase (Rockström, 2009). Four out of nine planetary boundaries have been crossed, one of them being climate change (Steffen, 2015). To be able to decrease climate change EU has set up a "two-degree" goal for its member countries based on the UN climate convention recommendations. This two-degree goal means halving greenhouse emissions by 2050 compared with 1990 numbers globally (EU Climate Change Expert Group 'EC Science', 2008). In order to reach this goal a major trend shift is needed in terms of both new and improved technology solutions and behavioral changes, as well as a common global agenda in which the world's countries can work together to reduce greenhouse emissions. This means that both individuals and businesses must rethink their lifestyle and activities (Åkerman et al., 2007).

The two-degree goal has been incorporated in the Swedish environmental system that consist of a generation goal, 16 environmental quality objectives and 24 milestone targets. The generation goal guides the environmental work on all levels of the Swedish society by giving direction for the societal shift that needs to take place within one generation. The milestone targets are viewed as "steps in the right direction" in reaching the generation goal and the environmental quality objectives. The environmental quality objectives include for examples reduced climate impact; in which the two-degree goal is specifically addressed, a good built environment and clean air. They describe the desired state of the Swedish environment that the environmental work will lead to. These goals also deals with the social aspect of sustainability (Naturvårdsverket, 2013).

However, the de Facto report from 2010 highlights one aspect that has not been getting much attention in the Swedish environmental system, which is how the Swedish consumption have a negative impact on the environment in other countries (De Facto, 2010). Our material over-consumption is one of the main contributing factors to the increased ecological footprint[3], which in turn, contributes to climate change (WWF, 2014). For the environmental and health impacts to be reduced to sustainable levels we need to change our lifestyles and consumption patterns. It is not just a matter of what we consume, but also how we consume. There is a need to create better conditions to support more sustainable behavior (Naturvårdsverket, 2014). According to WWF's living planet report (2014), if everyone in the world would live in the same fashion as the average Swede, 3.7 planets would be needed to match the demand. That puts Sweden in the top ten list of highest ecological footprint in the world. Earlier data reveals that the average Swede's ecological footprint has increased year by year and thus it seems as if the development is not going in the right direction either (WWF, 2014)

Today more than 54% of the world's total population lives in urban areas. The urban population of the world has grown rapidly since the 1950s, from 746 million to 3.9 billion. The population growth and the urbanization are projected to add 2.5 billion people to the world's population by 2050. This means that approximately 66% of the world's population will be living in urban areas by 2050 (UN, 2014). This puts great pressure on urban sustainable development. Therefore, the concept of sustainable urban development will be forced to change from being growth-oriented to focus more on the local economy and resource management. This way of looking at sustainable urban development would mean a drastic change in the approach compared to today's planning ideal and the "business as usual" scenario (Bradley, 2011). The challenge is to transform our cities to stay within the limits of a sustainable footprint, while they simultaneously sustain a socially and economically favorable situation for the residents within the city (Svane et al. 2011).

[3] The ecological footprint measures the area, in hectares, required to supply the ecological goods and services we consume and use (WWF, 2014)

In the current sustainable development debate, there is a lot of faith in new and improved technologies to resolve the issue of climate change. A rapid development of technical improvements has contributed to for example energy savings. However, this has also led to making material goods and services cheaper. Therefore have technological improvements indirectly encouraged us to consume more, which, in turn, has had a negative environmental impact. This is known as the rebound effect (Sanne, 2012). To ensure that our use of natural resources does not stress earth's critical system process – by causing climate change or biodiversity loss – to the point that earth is pushed out of the stable state, actions needs to be taken. New technological improvements and solutions, are still needed, but are not alone enough to steer current urban development towards a sustainable level of resource use (Raworth, 2012; Steffen, 2015).

According to UNEP (2010), our choice of lifestyle plays a key role in climate change, biodiversity loss and inequality. Lifestyles are shaped by a number of factors, such as cultures, politics, economics and social norms. Therefore, in order to live more sustainably people need to rethink the way that most westerners live today, and how they consume and organize their everyday lives. It is about changing how people build relationships with each other, exchange knowledge, share, educate themselves and build identities. It is about transforming today's society to live in harmony with the environment. Everyone, whether they are at home or at work, makes choices that are constantly affecting energy use, transport, food, waste, communication and solidarity. All these factors can contribute to more sustainable lifestyles if the "right" choices are made. The "right" choices are often very dependent on the existing infrastructure, and need to be enabled and encouraged by the social and technical systems, and institutions in our society. For example, people will only swap their car for public transport if there is an efficient and cost-effective public transport system. Social interactions are also key to encouraging sustainable living. These interactions are called 'social capital' and have as much influence on a society's productivity as 'physical capital' (the tools that help you complete a job) and as much as 'human capital' (a person's skills and ability) (UNEP, 2010).

Social capital is part of the social sustainability concept. However, there are several aspects to the concept of social sustainability. Social sustainability is about justice in general, and respect for human rights on an overall level (Sanne, 2012). It is also related to welfare, which is about our society and whether or not people are given equal opportunities to get a "good" life regardless of employment, income, education, housing etc. (Olsson, 2012). On an urban level, one social aspect of equality is segregation, where people are divided in different districts depending on their income level (Fainstein, 2010). There is also another aspect of equality other than segregation, which deals with social injustice, patriarchy and the oppression of women (Sanne, 2012).

However, one part of the solution to reduce our environmental impact is to fundamentally shift away from our current way of consuming towards a new consumption paradigm – a paradigm that does not risk the stability of the earth systems and processes. The overconsumption lifestyles of today's western society creates an enormous amount of waste. The implication of waste is that consumption takes a far larger toll of resources or pollution than what is gained from the act of consuming. It is simply inefficient in relation to the satisfaction derived. There is scientific evidence that indicates that higher consumption does not improve happiness ratings above a certain income. More relevant to happiness are other factors such as social relationships and a stimulating job (Sanne, 2005).

This study is based on the previously mentioned reports and articles that argue that earth's resources are already overexploited. This means that the environmental situation in the world is very serious and that we already passed the capacity limits of Earth's key systems. At the same time, this study also assume that if action is taken immediately, it is possible to avoid the worst consequences of climate change. These reports also argues for the importance of behavioral changes in how we consume and travel is needed to redirect the current development towards a more sustainable one and contribute to the temperature stays under the two-degree goal (IPCC, 2014; UNEP, 2010; Rockström et al., 2009; Steffen, 2015; WWF, 2014; Åkerman et al., 2007).

The following chapter presents the concept of Collaborative Consumption. This is an economic model that is set to transform businesses, consumerism, and the way we live to become more fulfilling and more sustainable by utilizing resources such as products, services and space more efficiently through different forms of sharing (Botsman, 2010).

4.2. COLLABORATIVE CONSUMPTION

I believe also, our generation, our relationship to satisfying what we want is far less tangible than any other previous generation. I don't want the DVD; I want the movie it carries. I don't want a clunky answering machine; I want the message it saves. I don't want a CD; I want the music it plays. In other words, I don't want stuff; I want the needs or experiences it fulfills (Botsman, 2010).

To reduce our ecological footprint we need to alter the way we perceive material goods and instead focus on the services that these goods provide, and how these services can be distributed. We do not need cars, we need transportation. We want access to the news but we do not need the paper that it is written on. Goods are only a means to an end (Costanza et al 2012). One alternative solution could be to base our society on more Collaborative Consumption, enabling a society where people consume enough to meet their needs and live meaningful lives without undermining the life-support systems of the planet. The desire to own things for stature becomes a thing of the past, and people have realized that the culture of materialism is a failing ideology that does not lead to happiness (Dietz & O´Neill 2013).

Collaborative Consumption has recently been widely recognized as a force to be reckoned with in our everyday lives. It is an economic model based on sharing, swapping, trading or renting products, services and spaces enabling access rather than private ownership. The term got worldwide attention when the book "What's Mine Is Yours: The Rise of Collaborative Consumption" was published in 2010 by Rachel Botsman and Roo Rogers. However, these ideas, based on collaboration, have been around since the start of civilization. The reason it has become an emerging model is mainly due to increasing community interactions and new possibilities to communicate through using online network technologies (Piscicelli et al, 2014). The main idea behind this model is to present an alternative way on what and how we consume. It can be viewed as a more sustainable way of consuming since Collaborative Consumption could enable people to share resources and reduce their ecological footprint without sacrificing their quality of life. This is because it enables people to consume and share the same assets and thus reduces the need for owning these assets that are rarely used, or are only used during special occasions (Botsman, 2010).

An example is the case of when someone needs to make a hole in a wall and decides to purchase a drilling machine. Firstly, for producing that machine raw materials are needed, then there is also the manufacturing efforts and transportation costs. When the drilling machine has been used it is usually placed in storage, taking up space, maybe being used once or twice every year, if even that, until it does not function anymore. Then the machine will most likely end up at a landfill, or at best be turned in for recycling, wasting the resources and manufacturing efforts it took to produce it (Csikszentmihalyl, 2000). This is how most products end up in today´s economy. Using Collaborative Consumption, that drilling machine could bring utility to not only one person, but to many others. It could also result in the machine being regularly maintained thus expanding the life span of the machine. The need for a person to actually buy and own a completely new drilling machine would be strongly reduced by schemes of sharing, swapping, lending, trading renting or gifting, which would save scarce resources and energy (Botsman, 2010).

Other research has also proven that economies that are based on sharing can lead to highly cooperative and mutually supportive communities. In these systems the act of sharing will function as a way of creating and maintaining social relationships (Boyle & Simms, 2009). Collaborative Consumption is therefore not only about reducing our negative environmental impact on the planet, but also about creating communities with stronger social relationships between their members (Botsman 2010).

Continuing with the example of the drilling machine, an example of implementing solutions based on Collaborative Consumption is that a tool pool for residents could be implemented within an apartment building. This way each resident does not need his/her own tools, which both take up space and cost money. Instead one set of tools could be shared within the apartment building, resulting in a more efficient utilization of resources. More specialized tools could be rented or borrowed from a local

hardware store. Depending on the setup of the sharing scheme it could also make people interact with each other within the apartment building (Botsman & Rogers, 2010). Implementing ideas based on Collaborative Consumption are also driven by other benefits for the users such as increased convenience and decreased monetary investment (Owyang et al, 2014).

Applying these ideas within a city or a district is one way of doing it, but it is also possible to apply them at a micro scale, within an apartment building as the example above demonstrates. Applying a sharing scheme within an apartment building could be beneficial due to one of the keys to make it work is trust in people. If it is implemented within an apartment building there is a greater chance that people trust their neighbors, even if they have not spoken to them before. Another example is utilizing empty or underused spaces within the building such as laundry rooms or other common spaces. These could be turned into common space for different kinds of activities. For example, turning the space into a larger dining area where the residents can cook together, or into a workspace that could be utilized by the residents when they are working from home, or into a mini library consisting of only a bookshelf creating a system where the residents can lend or give away books. These functions do not need to rule out one another (Botsman & Rogers, 2010).

Botsman and Rogers identify four main principles of Collaborative Consumption in their book What's Mine Is Yours: The Rise of Collaborative Consumption (2010). The first principle is Critical mass, which is a sociological term used to describe the driving forces that make a system self-sustaining. The second principle is Idling capacity, which refers to the potential of underused goods, spaces and skills. The third principle is the Belief in the commons, which is based on resources that belong to everyone. It can be anything from parks and streets, to air and water, to culture and knowledge. The fourth and last principle is Trust between strangers. Since Collaborative Consumption takes out the middleman and the transaction often happens online and person-to-person, it requires trust among the users.

To summarize this introduction, an overview illustration of the different forms of sharing are presented on the following page with examples of initiatives and businesses, which are based on these different forms of sharing.

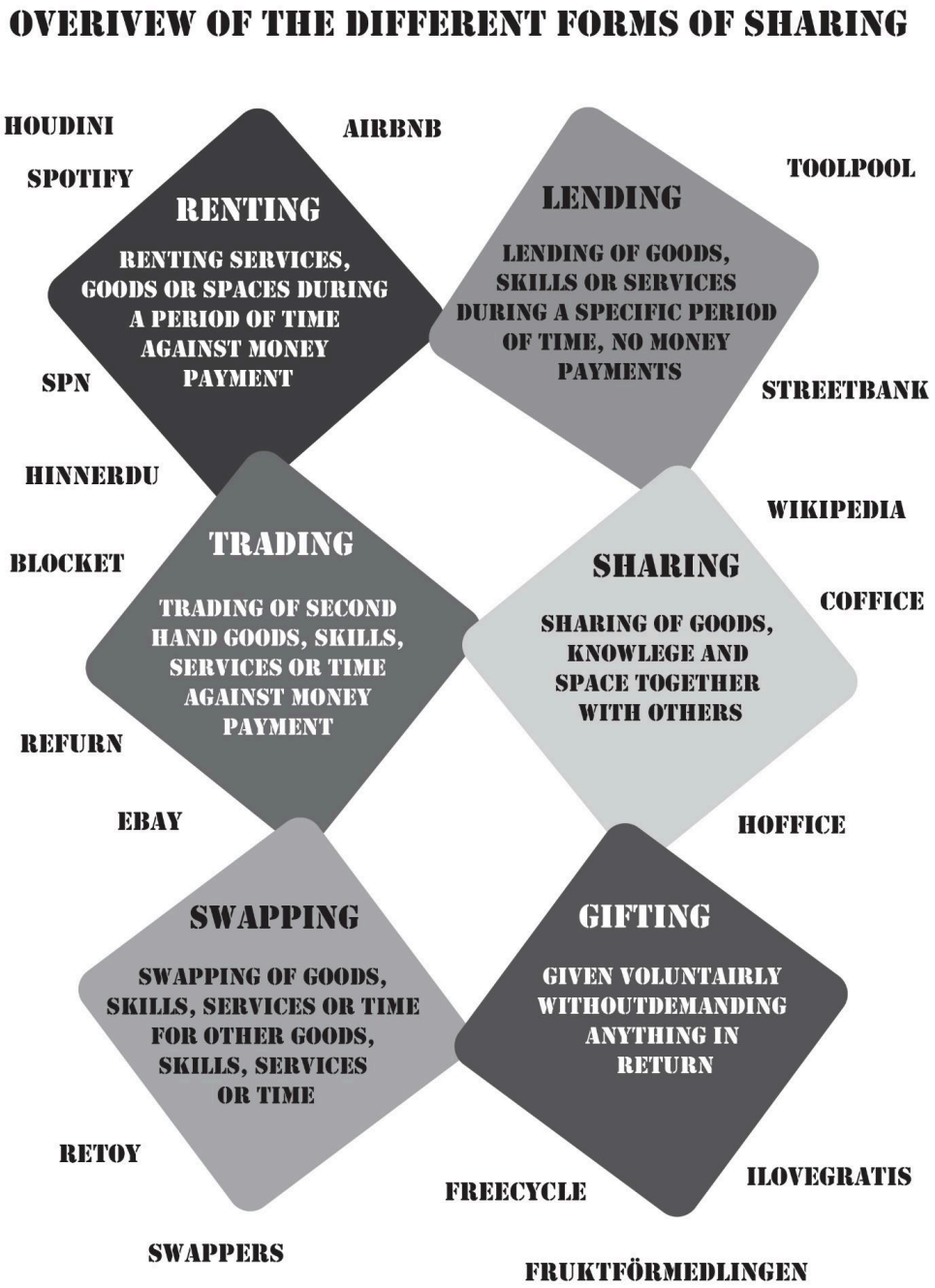

FIGURE 2: OVERVIEW OF THE DIFFERENT FORMS OF SHARING BASED ON LITERATURE FROM BOTSMAN & ROGERS (2010)

4.2.1. COLLABORATIVE LIFESTYLES

Botsman and Rogers also identify three sub-categories to make it easier to separate different types of Collaborative Consumption in their book (Botsman & Rogers, 2010).

The first sub-category is *collaborative lifestyles* which is based on non-product assets such as space, skills and money that are exchanged or shared in new ways. One important aspect of making these collaborative lifestyles work is having trust between people because interactions and communication between people are vital for it to work. On the other hand, participation in collaborations could also be seen as a means to creating more and stronger relationships among people and thus creating, trust over time (Botsman & Rogers, 2010). Examples that are categorized under collaborative lifestyles include co-working, social lending, social food networks, shared studios/workshops/businesses, shared gardening, all types of skill sharing, peer-to-peer travel etc. (P2P foundation, 2011a)

An example of co-working is Hoffice which is an online network and a platform that connects people who have space to offer with other people in need of a working space. The network enables access to workplaces by creating possibilities for people to share and use an underutilized resource in our cities during daytime: our homes. It is not only beneficial from an economic perspective but also from a social perspective where the idea is based on creating interactive and creative working environments and where every individual can use the collective's support and knowledge (Hoffice, n. d).

Another example of sharing space for businesses is Coffice which is a café that also provides workspace to consumers. They also offer meeting rooms that can be rented per hour; or a monthly membership that includes a free storage box, access to a kitchen, a printer/scanner, and preferential access to a work desk and a discount for renting the meeting rooms (Coffice, n. d.). Another example of shared workshop is called Bike Kitchens. This is a place for people to repair bikes, learn safe cycling, and make biking more accessible to create a sense of community and to support sustainable transportation by getting more people into biking. Most of the bike kitchens have tools, parts, mechanics and a community of knowledgeable cyclists. The Bike Kitchen concept is also known as bike church, bike collective or bike coop. Recently these kinds of bike facilities and movements have emerged all over the world, including in Sweden (Johnson, 2014).

An example of a skill sharing service is HinnerDu which is a social platform online found in Sweden where people can request or offer to help others with daily errands such as carrying heavy objects, grocery shopping, pet/babysitting, cleaning, gardening etc. in exchange for money (HinnerDu, n. d.). Another type of skill sharing could be offered through a Time bank that links people to share their time and skills. The difference with the HinnerDu model is that you pay with your own time. This function such as, when helping someone for one hour, that hour is saved in the Time bank and can later be used when you get help from someone else. Therefore, no money is exchanged (Timebanking UK, 2015).

Examples of businesses and networks categorized as collaborative lifestyles		
What is shared?	***For whom?***	***By whom?***
Space (Homes)	Members of a network	Individuals (Hoffice)
Space (Office/café/Gallery)	Anyone/membership optional	Private company (Coffice)
Space (Bike workshop)	Anyone	Private company/individuals (Bike kitchen)
Services (unspecified)	Free membership	Private company/individuals (HinnerDu)
Services (unspecified)	Free membership	Private company/Individuals (Time bank)

TABLE 2: SUMMARIZING TABLE OF BUSINESSES AND NETWORKS CATEGORIZED AS COLLABORATIVE LIFESTYLES

4.2.2. REDISTRIBUTION MARKETS

The second sub-category is *redistribution markets,* which are based on the redistribution of unwanted or underused goods. These markets could also include products that need to be repaired or remade before being valuable to others again (Botsman, 2013).

An example is Stockholm Stadsmission's second hand business that accepts the gift of unwanted or underused goods so they can redistribute these goods through their stores. They also have a newer business model which is called Remake where they collect ripped clothing or other fabrics that do not function in their current state to repair and remake them into different things that function just as good as other newly produced fabric products. For example, two ripped t-shirts could become a cushion cover or a pair of stained jeans could become a handbag. In the beginning, the remake business model started out with focusing on only fabric but now also includes the remake of furniture (Stadsmissionen, 2015).

There are also larger scale marketplaces online as well as more specific sites that enable the gifting, requesting and swapping of books, toys, clothes, media etc. between different people and without an exchange in money (P2P foundation, 2011c). One example of an online platform that enables neighborhood exchanges is Freecycle. It is a social network consisting of over 5 000 groups and with almost 9 million members around the world. It is an entirely non-profit movement of people who are giving (and getting) all kinds of products for free in their own neighborhoods. Each local group is moderated by local volunteers and the membership is also free (Freecycle, 2015). This kind of marketplaces also exists in physical form. One example is Kostnix which is a "free store". Here people can take whatever they want or find useful and leave goods they do not need any more, with no exchange of money. This non-commercial store is part of Lappis Områdesförening, which is a tenants' association in an area in Stockholm. The space is provided by the tenants' association and the activity is completely run by volunteers. It is only open during one evening every week. The concept has also evolved into a place for people to share tools, creating a sort of tool library. A group of volunteers have also started a

sewing club on Wednesday evenings where two sewing machines and an instructor are at hand, using the same space as the store. Besides Kostnix, the tenant's association also offers a combined metal and wooden workshop, a photo studio and a lab for the electronics club. In the store and the sewing club everyone is welcome, but to access the workshop a membership is needed (Lappis Områdesförening, 2015).

On another scale there are larger marketplaces online such as Tradera in Sweden and eBay in USA, where people and businesses can trade all types of unwanted or underused products with each other through online auctions or online shopping. Then there are online classifieds sites such as Blocket in Sweden and Craigslist in America. These can also be categorized under collaborative lifestyles since spaces and services are also requested and offered through these sites. Through all of these mentioned online platforms exchange of goods, services, space and money occurs on a daily basis and both nationally and internationally (P2P foundation, 2011c).

Examples of businesses and networks categorized as redistribution markets		
What?	***For whom?***	***By whom?***
Goods (unspecified, second hand, remake)	Anyone	Non-profit organization (Stockholm Stadsmission)
Goods (unspecified, gifting)	Anyone/membership optional	Social Network (Freecycle)
Goods (unspecified, gifting)	Anyone	Tenant's association (Kostnix)
Goods (unspecified, trading, auctions)	Free membership	Private company (Tradera/Ebay)
Goods, services, spaces (unspecified, trading, gifting)	Free membership	Private company (Blocket/craigslist)

TABLE 3: SUMMARIZING TABLE OF BUSINESSES AND NETWORKS CATEGORIZED AS REDISTRIBUTION MARKETS

4.2.3. PRODUCT SERVICE SYSTEM

The last sub-category is *product service system* (PSS) which is based on services that one pays for in order to use a product without owning it. This is a model that challenges traditional, individual, private ownership. Examples that are categorized under product service system includes car and bike sharing, ride sharing, solar power cooperatives, media sharing, all types of rental businesses; toys, tools, clothes and textbook rentals etc. (P2P foundation, 2011b).

An example of a PSS that offers media sharing is Netflix, which is an Internet television network. It offers access to over two billion hours of TV shows and movies per month to their paying members. It was founded in 1997 and has over 62 million members (Netflix, n. d.). Another media sharing platform is Spotify, which is a music streaming service. It has over 15 million paying subscribers and over 60

million active users (Spotify, 2015). These two companies are examples of collaborative businesses that have gone global and changed the way people access services and experiences through new innovative technology solutions, thus resulting in a reduced need for people to own material things (Botsman, 2010).

Another product that can be shared through renting is clothes. One example is the outdoor company Houdini. They offer specific pieces of clothing for rental, providing a repair service for used clothes. The clothes that have been rented out for a while and are getting worn, are then sold as second hand products with a lower price. They offer their customers travel tips and trips – where they advise people to think twice before taking that flight to Japan, instead showing options within Sweden that are easily accessible by train. When they opened a new store they chose a building that is going to be LEED certified, which has vertical plantations outside the store, and furniture and fittings that are primarily from other stores or bought second hand. Outside they also have a bike service station with a bike pump and a few other tools to encourage more people to bike (Houdini, n. d.).

There are also businesses that lend out different kinds of tools for hire. One example is Malmö Järnhandel, a hardware store that expanded their business concept a couple of years ago to also hire out tools. Now the concept has evolved to a so-called ToolPool where customers can borrow tools for free (Sykes, 2013).

The last example is solar panels that can be incorporated in a rental model. An example of a rental business for solar panels is SPN, the Solar Power Network. This business idea is based upon leasing unused rooftop space from building owners with a compensation plan for the owner. SPN stands for all costs when they cover the idle rooftop space with solar panels. Therefore, SPN functions both as a normal energy company and rooftop tenant (Solar Power Network, 2015).

Examples of businesses and networks categorized as product service system (PSS)		
What?	***For whom?***	***By whom?***
Service (Music, streaming)	Free/paid membership	Private company (Spotify)
Service (Movies/TV shows, streaming)	Paid membership	Private company (Netflix)
Goods (Sportswear, renting)	Anyone	Private company (Houdini)
Goods (Tools, renting)	Anyone	Private company (ToolPool)
Space (Rooftops, leasing)	Building owners	Private company (SPN)

TABLE 4: SUMMARIZING TABLE OF BUSINESSES AND NETWORKS CATEGORIZED PRODUCT SERVICE SYSTEM (PSS)

4.2.4. TRANSACTION MODELS

Botsman (2013) identifies three distinct transaction models which can be applied within Collaborative Consumption. The first one is *business-to-business* (B2B). This solution enables businesses to unlock and monetize the idling capacity of their existing assets (Botsman, 2013). An example is FLOOW2, which is a business that provides an online platform upon which companies and institutions can share equipment, services, and the skills and knowledge of personnel (FLOOW2, n. d.).

The second model is *business-to-consumer* (B2C). Here, the businesses own the inventory and facilitates transactions amongst the users (Botsman, 2013). One example of a business built around these transactions are Zipcar which buys, services and rents out cars to their members. Zipcar started with a B2C model, but now also offers their services to other businesses, thus providing a B2B model (Zipcar, 2015).

The third and last transaction model is *peer-to-peer* (P2P) where assets are owned and exchanged directly person-to-person without a middle hand (Botsman, 2013). One example is Airbnb, which is a platform that enables people to rent out their homes to others who are in need of a short term place to stay. Currently there are over one million places available to rent through this platform (Airbnb, n. d.). This study focuses on the two later models, business-to-consumer (B2C) and peer-to-peer (P2P).

FIGURE 3: ILLUSTRATION OF THE 12 MOST COMMON THINGS PEOPLE IN CANADA, US AND UK RECEIVED OR PROVIDED WHEN PARTICIPATING IN SHARING TRANSACTIONS ACCORDING TO A RESEARCH BY OWYANG ET AL (2014)

5. RESULTS

This chapter contains results from the futures study of HS2020 in Hammarby Sjöstad. The first section presents examples of the different collaborative businesses and initiatives that are active today in Hammarby Sjöstad. In the following section, future images of Hammarby Sjöstad in 2020 are presented for each of the selected sub-projects.

5.1. COLLABORATIVE BUSINESSES AND INITIATIVES IN HAMMARBY SJÖSTAD

As stated in the background chapter, the focus has been on new technical solutions and improvements in Hammarby Sjöstad both under the planning process and in the current development. However, there are some new emerging collaborative businesses and initiatives in the district that focus on resource efficiency through different forms of sharing. Hammarby Sjöstad is not a unique case as these new collaborative businesses and initiatives are emerging all over the world (Rinne, 2015). During the workshops, the participants brought up some of the following businesses and initiatives, while others have been discovered through following a local Facebook group called Hammarby Sjöstad.

5.1.1. SHARING OF SERVICES AND SPACE - COLLABORATIVE LIFESTYLES

The following businesses and initiatives that are presented can be categorized under collaborative lifestyles. The first business is a car sharing service that is offered in Hammarby Sjöstad which is called Flexidrive. It is a business idea based on connecting private car owners who are willing to rent out their car to others through offering a social platform on the internet. The service is only limited to whether there are private car owners in the area willing to rent out their cars. Currently there are two private car owners that rent out their private cars in Hammarby Sjöstad (Flexidrive, 2015). There is also a similar business idea offering a platform on the internet for connecting people who want to cook for others in their homes called Home Dining Club. This service is offered to everyone in Sweden, with people who offer to cook for others spread out through the entirety of the county, including Hammarby Sjöstad (Home Dining Club, n. d.). All of the above mentioned businesses were discovered through following the Facebook group Hammarby Sjöstad (Gustafsson & Nylander, 2015).

The previously mentioned Facebook group is an example of a platform where people share their thoughts, knowledge and services. This is a general Facebook group for “those of us who live, want to live or should live there”. Currently there are around 2500 members in the group. The posts are mainly about what is going on in Hammarby Sjöstad, where to turn to if you need help to find a certain business, what local businesses are selling, or for people to express their opinion on things they like or do not like within Hammarby Sjöstad. Even if this is not the main purpose of the group, there are also people who request or offer to help others in the district. Examples of services that have been requested or offered

by residents are watching over someone's pets for a short while during the day and also for longer periods of time. Other examples of services offered or requested are sewing, and supervising and helping children with homework (Gustafsson & Nylander, 2015).

Another citizen initiative is a neighborhood watch group made possible through an app called Trygve. This app is used to prevent crimes and create safer neighborhoods through a live information feed that is based on reports from other users. It also functions as a security alarm; when activated, it immediately sends out an alarm to all the users in the nearby area with the position of the phone who triggered the alarm. Through this app a group called "Sjöstadens grannsamverkan" has been created to connect people in Hammarby Sjöstad. The purpose of this group is for the members to be prepared to help each other if they feel unsafe and also to contribute to creating a safer neighborhood for all residents. There are currently 53 members of the group (Gustafsson & Nylander, 2015; Trygve, n. d.).

Another platform similar to the previously mentioned Facebook group Hammarby Sjöstad is the website Hammarbysjostad.info, which is a "news source and a meeting place" online for the residents in the district. This site integrates both a news feed with information regarding Hammarby Sjöstad and a discussion forum for the residents. The forum includes, among others, a "buy/sell and donation" section of products that has a similar purpose as the Facebook group. There are also people and businesses who request or offer different types of services such as babysitting, cleaning, dog walking etc. Besides these two focal points – the forum and news feed – there are also different types of guides to local businesses, guides advising visitors on what there is to do in the area, suggestions on activities and events, and a section for job opportunities in the area (Forsström, 2015).

Another example is a motel called Motel-L that can be categorized under collaborative lifestyles. Other than being a motel for people to rent accommodation, their lobby is both a café, a bar and a pop-up office. They welcome anyone to sit and use their lobby as a working area with free access to Wi-Fi. They are also starting a new concept, where they have a music lounge with live performances every Thursday during the summer (Motel-L, n. d.). The final example is a community garden called Sjöstadsodlarna. It is a non-profit organization created in 2013 to manage an urban gardening area in Hammarby Sjöstad, by and for its residents. The organization not only manages the urban gardening area, but also arranges social activities such as parties, courses and excursions. The land along with the soil, water and electricity is provided by the City of Stockholm. In 2015 the organization started a collaboration with a seed company to sponsor them with seeds and knowledge about gardening (Sjöstadsodlarna, n. d.). There are 126 members and circa 20 people queuing to get a gardening spot. The members are mainly a mix of elderly, students and families with children (Suomalainen & Brandkvist, 2015)

5.1.2. SECOND HAND MARKETPLACES – REDISTRIBUTION MARKETS

Some of the collaborative businesses located in Hammarby Sjöstad are trading second hand products. During the workshops a few local second hand businesses were brought up and are presented here. The first example is a clothing store called JOJO Second Hand which sells used children and maternity clothes, toys, books, games and other children related products on commission for people (Hammarbysjostad.info, 2013). Another second hand business is BB style, which also focuses on products for children (bbstyleab, n. d.). There is also a business called Kompanjonen located in Hammarby Sjöstad which is a department store that sells used or surplus building materials, lighting, and furniture (Håkansson, 2015).

There is also a furniture store called ReFurn located in Hammarby Sjöstad which collects old, unwanted and damaged furniture to redistribute to others. Anyone can leave furniture at the store or at the specific collecting stations around Stockholm. They also collaborate with the City of Stockholm to get access to Stockholm's recycling stations. Other collaboration partners are businesses who buy the estates of deceased individuals. Some of the pieces of furniture can be sold right away, while others are repaired or remade so they can function and be useful for others again (ReFurn, n. d.). The last example of a second hand business concept, which also focuses on repairing broken goods, is an organization called Fryshuset. This organization organizes all different kinds of activities and businesses such as education, events and other types of projects with a focus on youth. One of their projects is called Fryshuset MekaCykel and it is located in Hammarby Sjöstad. This business collects unused or broken bikes to repair and remake them and then the fixed bikes are put up for sale on their web shop (Fryshuset MekaCykel, 2015).

There is also a completely non-profit initiative in Hammarby Sjöstad, made possible through the social network platform Facebook. This initiative is created by a Facebook group dedicated to trading, swapping, donating and requesting goods within the district called Köpes/Säljes/Bytes/Bortskänkes i Hammarby Sjöstad. The group currently has 1,355 members and is used frequently with several posts written every day by people requesting, selling, buying, giving or swapping different kinds of underused goods such as clothes, bikes, furniture, toys etc. (Hagberg, 2015). All of the above mentioned business and initiatives can be categorized under redistribution markets.

5.1.3. RENTAL BUSINESSES – PRODUCT SERVICE SYSTEM

Then there are also examples of businesses which mainly or partly focus on rental services. These can be categorized under product services system. The first one is called Fix My Bike which is a bike store/workshop, where people can buy new bikes, bike parts and other bike accessories. They also offer bike services such as repairs and short term rentals of bikes (Fix My Bike, n. d.).

The other example is a car sharing business called Car2go, which is a city-wide car sharing service that features one-way point-to-point rentals. The cars are user-accessed wherever they are parked via a downloadable smartphone app. The app functions as a key to the car and through the app the nearest available car can be traced. The cars can be driven everywhere but need to be parked in their "home area" which covers the majority of the inner city and Sundbyberg. Through a recent expansion in 2015 the system now also covers Hammarby Sjöstad, Solna, Kista, Bromma and Arlanda Airport (Car2go, 2015).

5.2. FUTURE IMAGES OF HAMMARBY SJÖSTAD IN 2020

In the year 2020 HS2020 realized its overall vision, as well as all the sub-projects visions. Furthermore, from 2015 and on HS2020 also started implementing ideas based on Collaborative Consumption. The purpose was to make it easier for the residents of Hammarby Sjöstad to reduce their negative environmental impact and increase the social sustainability in the area. Asking the question, what could be done today to make the future images of a Collaborative Hammarby Sjöstad reality in 2020?

This chapter explores how HS2020 can incorporate ideas and solutions based on Collaborative Consumption within the current sub-projects that were selected for this study. These images of the future are based on ideas from the workshops and supplemented with ideas from the literature study, and the information collected of Hammarby Sjöstad and HS2020. The images of the future are neither forecasts nor prognoses that describe the most likely outcome of HS2020 work this far. They are rather explorative images that try to answer the questions; *what can change, who the change is for* and *who can make the change* today that could contribute to an increased sustainability in Hammarby Sjöstad by 2020. The following sub-chapters presents explorative images of the six selected projects, illustrating how HS2020 can incorporate solutions based on Collaborative Consumption in each and every one of the projects. They present images of the future based on the assumption that HS2020 will be successful in realizing their existing visions until 2020, and that the initiative also want to go beyond their existing vision to include Collaborative Consumption in their work. Therefore, let us assume that we look back from the year 2020 on these five successful years for HS2020. Against this background, we ask this fictive question: How did HS2020 contribute, by incorporating Collaborative Consumption in their work, to sustainable urban development in Hammarby Sjöstad?

5.2.1. ELECTRICITY

ElectriCITY initiated a collaboration with Riksbyggen, Familjebostäder, Wallenstam, SKB, Fabege, Sjöstadsföreningen, White and Tengbom Architects to further develop the concept of making Hammarby Sjöstad an "Urban living lab" focusing on ideas based on Collaborative Consumption. This concept was first developed by Tengbom and White architects who made a feasibility study based on an inventory of spaces and businesses in Hammarby Sjöstad, which could incorporate elements of Collaborative Consumption. The two focus areas consisted of buildings and outdoor spaces. Within the

buildings, the focus area included office space for businesses, common rooms, and other types of ancillary rooms such as laundry rooms, rooftop terraces, storage rooms, recycling rooms, car parking garages etc. Within the second focus area, outdoor space such as green areas, courtyards, the streetscape and all building exteriors were evaluated. For example, buildings' exteriors were assessed based on the possible ways that vertical spaces could be used, such as walls or inaccessible horizontal space such as roofs. All spaces were assessed on resource and space efficiency, and vacancy specific periods of time both long term (specific days or weeks) and short term (specific hours of the day). The feasibility study led to a visionary program was created visualizing a future collaborative Hammarby Sjöstad. This program included concrete suggestions on what and how to change a specific area, a building, a specific room or a business to incorporate elements of Collaborative Consumption.

Based on this visionary program, the real estate owners in Hammarby Sjöstad started to redeveloped the rooftops to fit in more functions and utlize the space more efficiently by incorporating solar photovoltaics, green houses, public space, private terraces or more apartments on the roofs. They also utilized the facades to incorporate vertical plantation or street art.

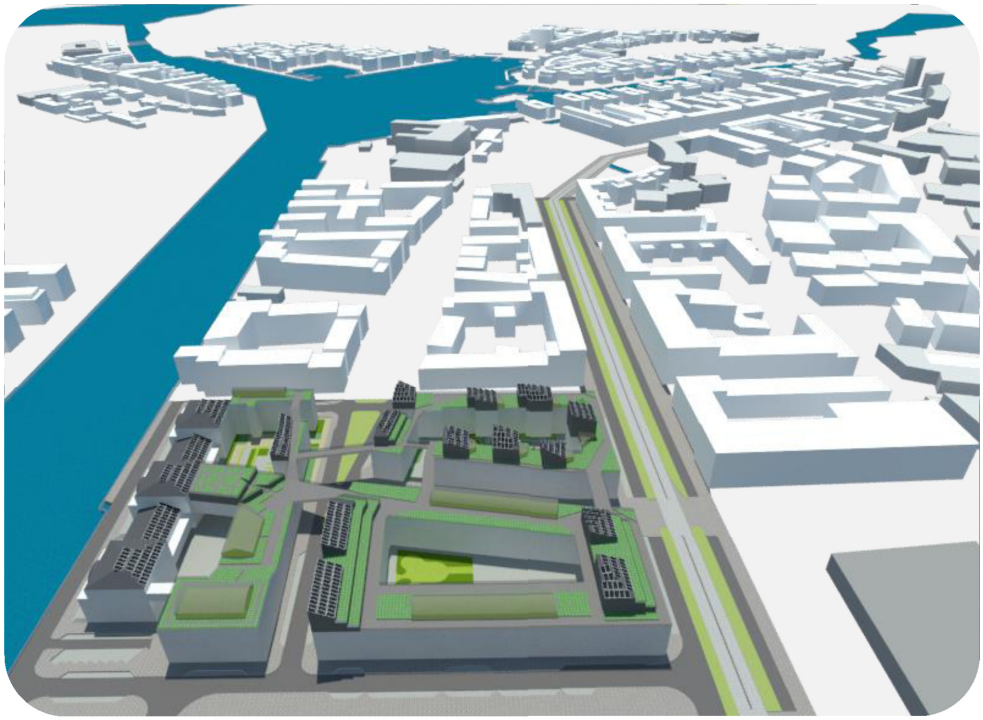

FIGURE 4: ILLUSTRATION OF A BLOCK WITH REDESIGNED ROOFTOPS, BY JÖHNEMARK 2015

By 2020, this led to increased locally produced food and energy, which resulted in a reduced environmental impact. It also led to an increased quality of life since the residents got access to more green and public spaces.

With support of local real estate owners, the traffic office of Stockholm redesigned the streetscape to incorporate a diversity of transportation options, and some streets were selected to be used for other purposes during specific hours of the day or on specific dates other than being used solely for transportation.

By 2020, the redesigned streetscape led to an increased share of trips by bike and walking within, and to and from Hammarby Sjöstad, which in turn resulted in a reduced environmental impact. It also allowed residents to use the streets for other purposes such as arranging bazaars and local businesses for temporary outdoor terraces etc. This, in turn, resulted in an increased quality of life for the residents.

To utilize the common rooms more efficiently, an app and a website for a rental scheme for the apartment buildings in Hammarby Sjöstad was developed, and commissioned by ElectriCITY. This scheme enables residents from one specific condominium, tenant, and cooperative rental association to rent a common room from another. The residents can therefore access a variety of common rooms. This rental service was also further developed to have a section devoted to enabling local businesses, organizations and other types of groups or clubs to lend or rent each other's vacant spaces.

By 2020, the residents used theirs and others' common rooms on a daily basis which resulted in an improved quality of life for the residents of Hammarby Sjöstad. It also resulted in organizations and businesses without access to permanent space being able to easily borrow or rent from other local organizations and local businesses in the area, both long term and short term. This sharing scheme, in turn, resulted in increased social sustainability in the area.

As part of the "Urban living lab" project and in collaboration with Riksbyggen, Wallenstam, and Sjöstadsföreningen, four condominium associations were selected to participate in a new sub-project. The purpose of this project was to test different types of sharing schemes of both space and goods within these associations, incorporating more functions into the residents' living environment.

Within one of the associations the board room was redesigned to also function as a party room during the evening and a co-working space during the day. To make the common room more accessible, the residents within the apartment building are able to access the room 24/7, also enabling the residents to use the room at the same time. If a resident want the room for themselves, then it needs to be booked in advance. In another association the bike storage room was redesigned to also fit in a small metal/wooden workshop. In the third association the residents did their own inventory of goods they owned. This resulted in unwanted or underused books, clothes, toys, sports' equipment, camping gear and tools are stored in their laundry room for everyone to share. The fourth and last condominium association redesigned the courtyard into a more park-like area with a proper BBQ corner, a playground and also an area for urban gardening, outdoors as well as indoors in the form of a greenhouse.

By 2020, these sub-projects within the condominium associations resulted in a decreased consumption of material goods, stronger bonds between the residents, and more usable and accessible common rooms that contributed to increased quality of life. This resulted in a decreased environmental impact and increased social capital in the area. When all of these pilot projects were realized they became widely appreciated by the residents, and the concept spread to other residents throughout Hammarby Sjöstad. The success of this project resulted in that similar sharing solutions were implemented in most of the apartment buildings in the district.

FIGURE 5: ILLUSTRATION OF A REDESIGNED LAUNDRY ROOM, BY JÖHNEMARK 2015

5.2.2. HS2020ENERGI

HS2020Energi expanded their solar power venture by collaborating with a company that sells photovoltaics. Together they created a business model that is based on leasing rooftops similar to the previously mentioned SPN for solar panels. The company offers real estate owners in the area to lease their rooftops.

HS2020Energi also collaborated with Sjöstadsföreningen, by starting to work with specific condominium associations and groups of residents giving them information and guiding tools on how to start solar-cooperatives. The photovoltaics are maintained and owned by the cooperative, and distributes the energy produced to its members. If the photovoltaics produce more energy than what is used, the surplus is sold to larger energy producers into their grid, to be distributed to their customers.

By 2020, this led to a decreased environmental impacts since it increased the share of renewable energy produced and used in Hammarby Sjöstad. The solar cooperatives also had a positive social impact similar to the vehicle pool, contributing to stronger bonds between the users, and creating a stronger sense of community in Hammarby Sjöstad.

FIGURE 6: ILLUSTRATION OF ROOFS COVERED WITH SOLAR PHOTOVOLTAICS, BY JÖHNEMARK 2015

5.2.3. INTERAKTIVT IKT

HS2020 further developed the concept of the "Citizen Communication Platform" which is based on the collaboration with KTH, the media technology company Adeprimo and Staden i Mobilen AB to merge Smart City SRS and "Sjöstaden in the Mobile Phone" to become even more of a "Citizen Communication Platform". This platform is based on three business models "The city in the mobile phone", "The environment in the mobile phone" and "The market in the mobile phone". More specifically, it is a website compatible with the mobile phone. There are also apps for specific purposes

incorporated in the concept. The section of the website that contains "The city in the mobile phone" was developed to include a news feed about Hammarby Sjöstad – what is going in the district, a general discussion forum, a forum for all the condominium, tenant, and cooperative rental associations in the district, information about local businesses and organizations. "The market in the mobile phone" includes an online marketplace focusing on enabling Collaborative Consumption and "The environment in the mobile phone" includes the Smart City SRS platform and a forum and guides that focus on sustainable development.

"The city in the mobile phone" section was developed, in a collaboration with Hammarbysjostad.info, to include a general discussion forum – an online meeting place for all residents of Hammarby Sjöstad. On this forum, the residents of Hammarby Sjöstad are able to share their opinions and knowledge with each other. The forum includes different types of sub-forums forming a hierarchy with specific access and purposes presented below.

Online profiles

To be able to interact on this citizen communication platform, use the apps and take part of individual data everyone is given a personal account that is connected to a specific household in Hammarby Sjöstad or a local company. The website is open for everyone, but to join and get an account, you have to be resident or working in Hammarby Sjöstad. This gives the accounts a validation of credibility that all accounts are real persons and are connected to Hammarby Sjöstad either by work or that the person live there. All accounts are connected with a profile consisting of optional personal details and can be connected with other accounts creating a network of validated accounts, for example family members, neighbors and colleagues.

One specific sub-forum is for all the condominium, tenant, and cooperative rental associations. Similar to the previously mentioned sub-forums there are also sub-forums for other active organizations such as Sjöstadsodlarna, businesses such as Refurn or other citizen groups such as Ica Sjöstaden Running Club etc. in Hammarby Sjöstad. Other than to function as a communication platform this section showcase all the active organizations and businesses in Hammarby Sjöstad at one place. These sub-forums also created possibilities to increase the collaboration and communication between and within the condominium, tenant, and cooperative rental associations, businesses and organizations in the area.

By 2020, the development of "The city in the mobile phone" as an online meeting place for all the residents of Hammarby Sjöstad led to creating more diverse and stronger social networks, both within smaller groups, such as an apartment building, and as a whole, within the entire district. This resulted in a stronger sense of community and belonging in the district among the residents.

Another section of the website was further developed as an online marketplace, with specific sub-marketplaces based on the business idea "The market in the mobile phone". One sub-marketplace is only dedicated to the collaborative businesses in Hammarby Sjöstad, where the business-to-consumer transaction model is applicable. This marketplace is divided into three sections. One section is for businesses that offer second hand goods, the second one is for rental businesses, and the third is for businesses that provide services. The other sub-marketplace is only dedicated to the peer-to-peer transactions and is divided into five sections. One section allows the residents of Hammarby Sjöstad to request or offer services to each other in exchange of money, another section is only dedicated to selling and buying different kinds of second hand goods, a third is dedicated to donation of goods, a fourth is dedicated to swapping goods and spaces against other goods or spaces, the fifth is dedicated to renting goods and space to others.

There is also a Time bank app for Hammarby Sjöstad's residents. The app is used by the residents to request or offer services to one another without any money exchange. Instead the time someone spends helping someone else is added to their personal Time bank account as credit, which can later on be used when receiving help from someone else.

Reviewing system

For this specific section the personal accounts are key as they are used to create a peer-to-peer reviewing system. Therefore every account can rate other accounts and leave a comment on the person's profile about the transaction they made with the persons. These ratings and comments are part of everyone's profile for others with accounts to access. This creates online profiles that are validated, which takes out the unknown from the equation. For example when someone request a service and is hesitant to invite a stranger to their home they can go into the stranger's profile and see the person's network of other accounts and if the person has had feedback from other persons they previously performed a service for.

By 2020, the development of "The market in the mobile phone" as an online marketplace for the residents and collaborative businesses in Hammarby Sjöstad contributed to less consumption of new products, which resulted in reduced environmental impact. It also had a positive social impact due to increased peer-to-peer transactions between the residents resulting in more interactions among the residents. This resulted in an increased social capital in Hammarby Sjöstad.

Besides the Smart City SRS platform "The environment in the mobile phone" section is also developed by incorporating encouragement and guides that focuses on Collaborative Consumption and a discussion forum that focus on sustainability. There are guides on how to create cooperatives and new organizations such as solar-cooperatives, co-working groups, community gardens or other types of communities and cooperatives. Other guides explain how to start sharing, lending/borrowing and swapping schemes within a condominium or a tenancy associations, for example how to start a tool pool, or a toy and

clothing swap. There are also guides directed towards local business on how to change their business model to focus on redistribution markets or to offer product service systems, as an alternative or a supplement to their existing business model. The discussion forum is an online meeting place, where people can specifically discuss sustainable urban development and sustainable lifestyles with other residents. Part of this forum is also a section for people who want to create new organizations, cooperatives, other types of groups/clubs or pursue a new collaborative business idea in Hammarby Sjöstad together with other residents.

By 2020, the development of "The environment in the mobile phone" led to creating more awareness of sustainability and how to live more sustainably in general. It also contributed to different types of collaborative cooperatives, communities and different types of sharing schemes within the buildings were established. This resulted in less consumption of new products, and a more efficient use of existing products and spaces, which in turn resulted in lower environmental impact. It also had an impact on the local businesses, since they changed their business models to also focus on redistribution market and product services systems models. This led to a reduced environmental impact.

In 2020, the concept of a local communication platform is also being implemented in other city districts around Stockholm. Every district has its own communication platform and these platforms are connected to each other. This makes it possible for persons to choose whether they want to reach out to everyone connected through the network or only within their own district, for example when they try to sell unwanted goods. This is the beginning of creating an online forum and a meeting place that can be accessed by everyone living in Stockholm with the same basic structure as the communication platforms connected to the specific districts.

5.2.4. Återvinning

HS2020 also expanded their collaboration with the City of Stockholm to further develop the waste recycling concept to include reuse, repair, remake and redistribute. This was done through creating a new collaborative business idea, which function as a physical redistribution marketplace for all types of goods that are not collected by the existing second hand businesses in Hammarby Sjöstad. Goods collected for this new business were for example jewelry, books, kitchen-ware, tools and fabrics such as sheets, curtains and clothes. This business concept also includes a repair and remake section for the collected goods. The clothes are put together in a so called "rental wardrobe" as a section of the second hand store. The other goods are either sold in the store or rented out.

When this business was realized, HS2020 initiated a collaboration with the existing second hand businesses in Hammarby Sjöstad, which were Kompanjonen, JOJO Second hand, BBstyle and ReFurn to create a cluster of collaborative businesses. The purpose of this collaboration was to implement a new concept to collect all different types of unused, unwanted or broken goods from the residents of Hammarby Sjöstad with a mobile container. The collected goods are distributed to the different

businesses that are a part of this cluster. The container function both as a mobile recycling station and a room for bulky waste. Through a "mobile container" app everyone can find out the exact location of the container. The app can also be used by the residents of Hammarby Sjöstad to request a specific location of the container the following week. It can also be used to give feedback if the container is filthy or full. The container is locked, but can be accessed by using the app and therefore residents can both leave and take things from the container.

By 2020, the new marketplace and mobile container led to a decreased demand of new products as unwanted, unused or broken products are redistributed to others that are in need of those products, both through peer-to-peer and business-to-consumer transactions. Products such as clothes are used more efficiently through the lending wardrobe. This resulted in a decreased environmental impact, by reducing the resident's consumption of new products.

FIGURE 7: ILLUSTRATION OF THE MOBILE CONTAINER AND THE INTERLINKED APP, BY JÖHNEMARK 2015

5.2.5. ELBIL2020

Elbil2020 started a collaboration with Fryshuset MekaCykel to also repair electrical bikes and cars. It has an educational purpose, where youth can take a course at Fryshuset learning first how to repair normal bikes, then moving on to electrical bikes and lastly to electrical cars. MekaCykel also expanded their services to a public workshop for private bike and car owners to get their vehicles repaired. The students who finished the course were offered to work in the public workshop. Other bike and car owners were also welcome to the workshop if they want to learn how to fix their own vehicles. This way the students became the teachers and their skills were shared with others. This collaboration expanded to also include the local bike store Fix My Bike, where the employers offered to become teachers for the course.

By 2020, this collaboration led to a larger number of people starting to use bike or electric car as their main means of transportation. This resulted in lower climate impact, due to a reduction of air pollution and decreased demand of natural resources. It also had a positive social impact, since it has an educational purpose. It also created local jobs that do not focus on consumerism, but rather on keeping the existing resource useful for a longer period of time.

Elbil2020 also expanded their collaboration with Sunfleet to also include smaller vehicle pools in their car-sharing system. These pools include an electric car or/and carrier bike that is shared among three or more households. The vehicle that is shared among these households is also backed-up in three lines by Sunfleet. This means that if one household is using the vehicle and one or both of the other two households also need the vehicle Sunfleet can provide available vehicles for them in the nearby area.

By 2020, the vehicle pools led to a larger number of people using bikes and fewer cars were needed to support an accessible and convenient way of transportation. This resulted in lower environmental impact. It also had a positive social impact since the participating households started to communicate with each other, sometimes adjusting when to use the vehicle and sometimes they would ride with each other. The increased communication resulted in stronger bonds amongst the users. It also resulted in the households started to share other things, with other households.

Elbil2020 also started collaborating with Car2go and further developed the collaboration with Sunfleet by helping them incorporate a new service for their systems – ride sharing. This means that through the Sunfleet membership and the app for Car2go the people who use their cars can offer others to co-ride with them. This service is limited to the members in the case of Sunfleet, and for anyone who use the app for car2go. This increased the convenience and accessibility for Sunfleet members and for Car2go users who Co-ride split the cost, reducing the individual cost.

By 2020, the new ride sharing service led to similarly results as for the vehicle pools, which means that fewer cars were used to support an accessible and convenient way for transportation. This, in turn, resulted in a reduced environmental impact.

Elbil2020 also expanded their collaboration with KTH by developing a car parking app that can be used by all car owners in Hammarby Sjöstad. This app has three different services. The first service connects people who are willing to rent out their own private parking spot for a specific period of time to others in exchange of money. This service is for everyone who is willing or can afford to pay for the parking spot. The other service is an exchange service where private parking owners are connected with other private car owners in a network. This service is not geographically limited to Hammarby Sjöstad. It is available everywhere in Stockholm, where there are people who want to lend out their parking spot for a period of time to someone else. The last service enables people to put up the location of the public parking spot they left in an interactive map, to let everyone else know where there is an empty parking spot. This way the idling capacity of both private and public parking spots can be dramatically reduced.

By 2020, this led to a decreased demand for more parking spots in the existing urban area, reduced the idling for cars, and more trips were shared with others, which in turn resulted in a lower environmental impact.

Elbil2020 also further developed their collaboration and created an agreement with the Ica supermarket in Hammarby Sjöstad to include a new service, where the electric car that was used for home delivery of food to resident, was also available for other local businesses to rent when Ica did not use it. When more businesses started to rent the car they further developed the idea to an electric car pool for a cluster of local businesses to use.

By 2020, this led to an increased number of electric cars and decreased total number of cars in Hammarby Sjöstad, which in turn resulted in a reduced environmental impact.

5.2.6. Nya Hammarbybacken

HS2020 also initiated a collaboration with the outdoor clothing company Houdini to offer ski clothing rentals for the visitors to supplement the current rental business of ski gear. Since the rental business was only season based, they arranged a special contract for the company to rent the space for the store during the winter season. At the same time, HS2020 also initiated a collaboration with Fix My bike to offer mountain bike rentals during the summer season for anyone who wanted to try Downhill Mountain biking at Hammarbybacken. Therefore, the space used as a rental store for Houdini during the winter was used by Fix My Bike to offer mountain bike rentals during the summer.

By 2020, this new store led to a decreased demand for owning ski clothes and therefore reducing the production of ski clothes, which resulted in a reduced environmental impact. It also led to an increased activity in Hammarby Sjöstad and Hammarbybacken during the summer season, where both residents, people from around Stockholm, and tourist from elsewhere, came to Hammarby Sjöstad to try downhill mountain biking offering a form of ecotourism activity.

6. EVALUATION AND DISCUSSION

This chapter first presents an evaluation of the future images of Hammarby Sjöstad based on three of the Swedish environmental quality goals and four of Hammarby Sjöstad's main environmental goal. After that is a discussion carried out that focuses on the challenges within HS2020, the social benefits of sharing and the challenges with implementing Collaborative Consumption. The discussion is based on the material from the workshops and the literature on sustainable development and Collaborative Consumption presented in the report.

6.1. EVALUATION OF THE FUTURE IMAGES OF HAMMARBY SJÖSTAD IN 2020

Here are the future images of Hammarby Sjöstad, which incorporates new ideas based on Collaborative Consumption within six sub-projects of HS2020 used to evaluate their potential to contribute to sustainable urban development. The evaluation is based on the Swedish environmental quality objectives and Hammarby Sjöstad's main environmental goals.

For this study three of the Swedish environmental quality objectives; reduced climate impact, a good built environment and clean air are used to evaluate the sharing solutions presented in the future images. The other 13 goals were assessed to not be able, or too hard, to be addressed by the solutions presented in the results. These three selected objectives have specifications and indicators to help evaluate them. The specifications and indicators for the objectives partially overlap with each other and with Hammarby Sjöstad's main environmental goals; land usage, transportation, waste and energy. These overlaps leads to some repetition in the evaluation of the future images. The other two goals in the Hammarby Sjöstad's main environmental goals that deals with water/sewage and building materials were assessed to not be able to be addressed by the solutions presented in the results.

It should also be pointed out that the Swedish environmental quality objectives have a much longer time span than HS2020's projects, and they also describe a "desired ideal state" one or more generations ahead. Here we assess what can be achieved by 2020, i.e. in five years from now. As for Hammarby Sjöstad's environmental goals, which were formulated in the 1990's, have been said to be a "good start", but not enough to actually achieve sustainability in the long term (Hult, 2014; Wangel, 2013).

None of the environmental quality objectives nor Hammarby Sjöstad's environmental goals deals directly with a reduction of consumption of goods, which is a central part of the sharing solutions potential to contribute to sustainable urban development. Neither do they address the social aspect of the sustainability concept in terms of social capital, which is also a central part of the sharing solutions potential to contribute to sustainable urban development.

6.1.1. REDUCED CLIMATE IMPACT

The first environmental quality objective, reduced climate impact, is defined as concentrations of greenhouse gases in the atmosphere must be stabilized at a level that will prevent dangerous anthropogenic interference with the climate system. This objective must be achieved in both such a way and at such a pace that biological diversity is preserved, food production is assured and that other goals of sustainable development are not jeopardized. Sweden, together with other countries, must take responsibility for achieving this global objective (Naturvårdsverket, 2013). This objective have four relevant indicators for this study, which are energy use, waste, driving distance by car and greenhouse emissions (Miljömål, 2015). These indicators overlap with three of Hammarby Sjöstad's environmental goals, which are energy use, waste and transportation (Stockholm stad, 2007).

The energy use indicator focuses on reducing the energy use per person and building, and increase use of renewable energy sources (Miljömål, 2014a). This is also addressed in Hammarby Sjöstad's energy use goal (Stockholm stad, 2007). The ElectriCITY project could through sharing of space reduce energy usage per person and buildings, since the space and buildings could be utilized by more people and during other periods of time during the day. The HS2020Energi could contribute to increase use of renewable energy sources.

The Elbil2020 project could lead to a reduction of greenhouse emissions and distance driven per person and car, due to the car-sharing and co-riding solutions. A part of Hammarby Sjöstad transportation goal included to offer carpools in the area (Stockholm stad, 2007). The Nya Hammarbybacken project could also lead to a reduction of international travel from Sweden as they offer a sport activity in the form of downhill biking within the district. Thereby lead to a reduction of greenhouse emissions. On the contrary it could also lead to increase international travel from elsewhere to Hammarby Sjöstad as a tourism attraction at the same time as it could be considered as ecotourism locally.

The Nya Hammarbybacken project could also lead to a reduction of waste since clothes are rented out, and thereby are they owned and maintained by a company that can profit from increasing the lifespan of the products. The Interaktivt IKT project could lead to a reduction of waste since broken or unwanted goods can be redistributed to others and thereby become useful again. The waste indicator focus on household waste and only the amount of recycling material is measured (Miljömål, 2014b). Hammarby Sjöstad's waste goal include that material and energy should be recycled wherever possible (Stockholm stad, 2007). The sharing solutions presented in this study takes a step further focusing mainly on reusing instead of recycling.

6.1.2. A GOOD BUILT ENVIRONMENT

The second environmental quality objective, a good built environment, is defined as cities, towns and other built-up areas must provide a good, healthy living environment and also contribute to a good regional and global environment. Natural and cultural assets must be protected and developed. Buildings and other facilities must be located and designed in accordance with environmental principles in such way that it promotes sustainable management of land, water and other resources (Naturvårdsverket, 2013). The relevant specifications for this environmental quality objective include natural areas and green spaces, sustainable use of energy and natural resources and sustainable waste management. These specifications overlap with three of Hammarby Sjöstad's environmental goals, which are land usage, energy and waste (Stockholm stad, 2007).

The first specification, natural areas and green spaces, is defined as there are good-quality and accessible natural areas and green spaces and corridors close to the built environments (Miljömål, 2012). Parks and green public space is also a part of the Hammarby Sjöstad's land usage goal (Stockholm stad, 2007). The ElectriCITY project could contribute to an increase of green areas and parks in Hammarby Sjöstad by redeveloping the rooftops. Green space should not be limited to only horizontal surfaces as it could also contribute to healthier living environment on vertical surface, which is also incorporated in the ElectriCITY project.

The ElectriCITY project could also contribute to the second specification, sustainable use of energy and natural resources, which is defined as energy, land, water and other natural resources should be used in an efficient, resource-saving and environment-friendly manner so that, in the long term, the usage is reduced, and are primarily made of renewable energy sources (Miljömål, 2012). Renewable energy source are also highlighted in Hammarby Sjöstad's energy goal (Stockholm stad, 2007).

The ElectriCITY project could contribute specifically to energy, land and natural resource are used more efficient by sharing of space and products, and also incorporating a variety of functions to underutilized space such as rooftops, common rooms within apartment buildings and office space. The HS2020Energi project could lead to increase use of renewable energy sources and that transportation for food is reduced since more food is produced locally in the district. Thereby utilizing the space within the district more efficiently by incorporating more function. The Elbil2020 project could contribute to reducing car ownership and thereby lead to reduction of total number of cars needed to support convenient and accessible transportation. The project could also contribute to parking space is utilized more efficiently since more cars are in motion and thus one car can be utilized by several persons and the time cars are parked is reduced.

The third specification, sustainable waste management, is defined as waste management should be efficient for society and easy for consumers to use, and waste is prevented, while the resources in waste produced are as much as possible made use of, and the impact of waste and the risks it presents to health and the environment are minimized (Miljömål, 2012). Recycling is included in Hammarby Sjöstad's waste goal (Stockholm stad, 2007). The sharing solutions presented in Återvinning, Interaktivt IKT and Nya Hammarbybacken could all contribute to increase reuse of products enabling rental, trading and remake schemes for used, broken or unwanted products.

6.1.3. CLEAN AIR

The third environmental quality objective clean air is defined as the air must be clean enough that human health, animals, plants and cultural values are not at risk (Naturvårdsverket, 2013). The use of fossil fuels leads to climate change and polluted air that are be hazardous for humans, animals and plants. This objective can be addressed with Elbil2020's sharing solutions that could contribute to a reduction of fossil fuel usage, which improves people's health and protects the natural and cultural values. Since ElectriCITY incorporates new green areas and urban farming on the rooftops they could contribute to a reduction of transportation since more food can be produced locally and the new vegetation could contribute to a reduction of air pollutants.

6.2. SOCIAL BENEFITS OF SHARING

One of the aspects to the sustainability spectrum is the social benefits that sharing could have, which is not directly addressed in the Swedish environmental objectives nor Hammarby Sjöstad's main environmental goals. During two of the workshop discussions on community building and the social part of sharing were highlighted. Some of the participants spoke out of experience from their own living situation in Hammarby Sjöstad stating that socializing or even just greeting your neighbor is not that common, even if they live in the same building, share the same entrances and therefore also meet on a regular basis.

Depending on how Collaborative Consumption is organized, it can lead to increased social sustainability. One example of an initiative based on Collaborative Consumption is the community garden in Hammarby Sjöstad. Since the residents grow food and plants together, interaction and socializing are central parts of the activity. On the other hand sharing solutions based on services or products that are provided by companies, usually do not contribute to social sustainability and are sometimes more time efficient. In the case of Hammarby Sjöstad these kind of sharing solutions might be more appropriate, since the majority of the residents in the area are high income households they might have less time to spend. However, the success of the existing community garden that has over 120 members, and where there are people queuing to become members, implies that there is a demand for social activities in the area. The social capital in the district could increase if more sharing initiatives similar to the community garden were initiated.

As stated before in the background chapter, the majority of the residents in Hammarby Sjöstad are high-incomers, but there are also students and elderly living in the area. It was brought up during the workshop that the connection between different age groups play a big part in strengthening a community, which could be applicable to Hammarby Sjöstad. In Hammarby Sjöstad, there are for examples families that do not have enough time and elderly that have plenty of free time, but no one to spend it with. There are also students that are flexible and that often need an extra side income, who could help their neighbors. Connecting residents who want to help with others that want help can contribute to an increased quality of life and also that stronger bonds are created among the residents. Thereby leading to increased social capital in the area.

However, there are several aspects to the concept of social sustainability and were presented in the theory. A social sustainable society is a society where people have equal opportunities to get a "good" life regardless of employment, income, education, housing etc. (Olsson, 2012). In that sense Hammarby Sjöstad could be seen as a somewhat socially sustainable urban area. However, social sustainability is also about equality. On an urban level one social aspect of equality is segregation (Fainstein, 2010). Zooming out of Hammarby Sjöstad and in a Stockholm context, the majority of apartments in Hammarby Sjöstad are newly produced condominiums. This has led to Hammarby Sjöstad becoming a segregated urban district, where almost only high income households can afford to live. There is also another aspect of equality, which deals with social injustice, patriarchy and the oppression of women etc. (Sanne, 2012). On a local scale this leads us to the questions; who takes out the most parental leave or who does the most household chores in Hammarby Sjöstad? On a global scale this leads us to the question; where and under what conditions are the products consumed by residents of Hammarby Sjöstad produced, both in terms of social and environmental aspect, such as pollution regulation, chemical waste or labor laws and wages etc.

Addressing this issue in context of Collaborative Consumption calls for a discussion of our consumption habits and lifestyles. Customers who rent or borrow products are usually the kind of customers who need that specific product for just a short while or during a few occasions. It can be assumed that they would, if they could not rent or borrow that specific product, buy the cheapest product possible (Sykes, 2013). The cheapest products produced today have most likely been produced in poorer countries that do not have strict, if any, environmental or labor laws (Green, 2013). Thereby, our consumption is indirectly causing more greenhouse emissions and sometimes even child labor, which is having a negative impact both on the environment and society. If more people would adopt the Collaborative Consumption model it could contribute to less production of goods and thereby reduce the negative impact we have on the environment and society.

6.3. CHALLENGES WITHIN HS2020 AND FOR COLLABORATIVE CONSUMPTION

Considering there are already, to some extent, collaborative businesses and initiatives that share both products, services and spaces within Hammarby Sjöstad these futures images are not far from reality. However, that is not to say that there are no challenges to make them real. During the workshop several challenges were brought up, one being communication. This is something that HS2020 has been struggling with – to reach out to large groups of people within Hammarby Sjöstad. Today the network reaches out to a couple of hundred people, including residents, representatives from businesses and academia, but only a handful are working with the project on a daily basis. The HS2020 network needs to expand within the district and among the residents. For the project to move forward more residents needs to become aware of what HS2020 is doing, and in their turn to get more involved and become informed members of the network.

Another challenge brought up during the workshop was money and economic incentives. HS2020 is mainly a voluntarily and only an organization, a structure, it is not a company and has no capital. They do have collaboration partners with capital and those partners believe that being a part of the project is beneficial to them. However, when trying to reach out to other companies their first question is often what will it cost? Then when HS2020 cannot fund it they lose interest in whatever idea they are suggesting. Almost everything is driven by economic factors. While a lot of the sustainability efforts are profitable there is a greater need to invest in sustainability efforts that are profitable in the long term, and where the gain sometimes is for examples improved health or resilience to a changing climate. These are efforts that are impossible to put a monetary value on, in terms of profit, but are nonetheless needed (Fleming, 2011).

During the first workshop, parts of the discussion centered on the challenges of Collaborative Consumption. These were challenges such as limits and implications that can be encountered when trying to implement sharing solutions and that the concept also needs to be critically assessed. For an example, not every product, service or space is applicable to schemes of Collaborative Consumption. However, that do not exclude the fact that there is a huge idling capacity in our cities in terms of goods, services and spaces that could and for sustainability reasons should be used more efficiently (Rinne, 2014).

Another aspect to be considered is how the current legal frameworks and policies can act as restrictions to engage in schemes of Collaborative Consumption. In the states of California, Oregon and Washington laws have been passed relating to car-sharing. In this case placing liability directly on the shoulders of the car sharing service and its own insurance. These laws can have a negative impact on the willingness for people to share their cars with someone else (The Economist, 2013). There are also issues concerning

taxes, for example some collaborative businesses cannot survive if the current tax schemes are applicable to them as well. Last year, the Swedish tax agency concluded that second hand stores are competing with commercial trade, and therefore should be subjected to value-added tax. This could be the end for a lot of second hand stores, since they would not be able to survive the same tax system as a conventional store (Mannheimer, 2014). Another example is the increased concerns that the tax basis is lost when peer-to-peer transactions are becoming more common (The Economist, 2013). On the other hand that is one of the cores of Collaborative Consumption, peer-to-peer transactions, which enable and promote empowerment of individuals. It promote individuals to tap into skills and talent that they have, but have not previously found opportunities to use. It enable people to be in control of their jobs and lives. Participating in Collaborative Consumption empower people to get involved, to be creative and change their living environment for the better. Collaborative Consumption has democratized, economized and facilitated the ways in which increasing numbers of people can transact with one another and create new value (Rinne, 2013). What is needed is another tax system, which focus on energy use and consumption of natural resources rather than labor (Wijkman & Rockström, 2012).

However, Collaborative Consumption also implies that we need to reassess our view of private property and private ownership, both in terms of legal frameworks but also in terms of social status and the idea that individualism is always better than collaboration. Today's society fosters us into the belief that private ownership is a sign of success, that we should own everything we use in our daily life, that you should be able to do as much as possible by yourself or seek services from a company, and that your space cannot or should not be someone else's space too.

When people with good intentions want to share their space, goods or services with others there is sometimes a mistrust against that person, that there is a hidden agenda. In Hammarby Sjöstad, there have been issues regarding a proposed car parking app for people to rent out their own parking spots. There is an unwillingness among some residents to let others into their private property, because of fear of safety and misuse of the space. Although there are a lot of people that are open to try new sharing ideas and solutions, there are also usually a few people in power positions and that do not take part in these kind of exchanges that are the ones that will not allow these sharing solutions. However, as stated before, not everyone are nay-sayers and a way to start could be to begin in small scale, and where all the users are known either person to person, through each other's network or online profiles. Then people can oversee who is in their property and when. If it is successful it will most likely spread and the nay-sayers could eventually become open to the idea of sharing. It is also important to point out that when the sharing solutions are not owned or maintained by an organization or company there still needs to be a structure or a framework around the solution for it to work and that is managed by one or a few users.

However, as long as some cultures perceive high accumulation and ownership of material goods and individualism as desirable in terms of social status, Collaborative Consumption will not be the mainstream way of conducting economic activities. Collaborative Consumption is not mainstream yet, however, the sharing economy has been growing rapidly during the past years. There are no indications of the trend slowing down within the next years (Ufford, 2015).

In the literature study it was mentioned how technology improvements actually may increase total resource use, also known as the rebound effect (Sanne, 2012). The rebound effect can also be applicable in the case of Collaborative Consumption. WWF attributed the growing ecological footprint in Sweden to its increasing consumption rate. It is important here to not only look at the consumption rate, but also what kind of goods and services that are consumed. According to the Swedish Environmental Protection Agency, the Swedish consumptions categories with the highest impacts on the climate are; food, travelling and accommodation (Naturvårdsverket, 2014). The rebound effect in this case could be that even if collaboration consumption leads to less accumulation of materials goods, the money saved is instead used for food or travelling. This could lead to the overall ecological footprint might not decrease despite a reduction of purchased material goods.

In relation to this, it is also important to note that Collaborative Consumption might not fully capture the previously mentioned consumption categories, perhaps in particular food consumption. Food, unlike the majority of material goods, is something essential to life and the key issue is not to reduce the total amount of food we eat, but rather what we eat, e.g. red meat (WWF, 2014). That our food habits needs to change is not only a matter of reducing the environmental impact, it is also a health issue. In a Swedish context the per capita consumption levels of red meat are twice as high as public health recommendations (Hallström et al, 2014).

7. CONCLUSION

This final chapter returns to the research questions, summarizes the results and presents the conclusions drawn from the study.

- *What if HS2020 also focused on Collaborative Consumption as a means for contributing to sustainable urban development, what could be done as extensions to their existing projects?*

There are already, to some extent, collaborative businesses and initiatives that share both products, services and spaces in Hammarby Sjöstad today. In HS2020's projects there are also elements of Collaborative Consumption. However, the future images of Hammarby Sjöstad mediate how HS2020 could further develop the existing sub-projects, by focusing more on Collaborative Consumption as a means for contributing to sustainable urban development and to promote a more sustainable way of living in Hammarby Sjöstad.

- *What services, goods and spaces could be shared in the district?*

The future images illustrates that there are many opportunities to implement elements of Collaborative Consumption, such as the sharing of products, service and space, in all the selected sub-projects. The ideas and solutions presented in the theory could be implemented in Hammarby Sjöstad. Goods such as books, toys, clothes etc. could be shared through redistributions markets, services such as babysitting, dog walking, homework help etc. could be shared through an online forum, or spaces within the buildings could be used more efficiently by incorporating more function into the space. For examples, common rooms or local businesses could let others use their space during specific hours of the day. There are also opportunities for HS2020 to initiate collaborations with the existing businesses and initiatives that focuses on sharing different kinds of products, services and space in Hammarby Sjöstad.

- *For whom are they implemented?*

The sharing ideas and solutions could be implemented for anyone, such as public stores or online marketplaces. There are also examples where they are implemented specifically for paying members, within an apartment building for residents to share with each other, or a small group of people that could also own and maintain the sharing solution such as different types of cooperatives. Since the critical mass must be reached for the solutions to become self-sustained it might seem as all sharing solutions should be implemented for anyone. However, there are other factors that play a part in the success of a sharing solutions such as accessibility, reliability and safety. Therefore sharing solutions can also be successful with a restriction in number of participants.

- *Who could provide, own and maintain these sharing solutions, what actors in the existing networks could contribute and could new actors be involved?*

This study identifies four actors that could provide, own and maintain sharing solutions. These actors are private companies that owns and maintain real estates or retail businesses, residents that owns products and apartments, municipalities and non-profit organizations. There are several real estate companies, car sharing companies, non-profit organizations identified in this study that could contribute to realizing different kinds of sharing solutions. Both actors in the existing networks and new actors could and should contribute to finding new ways to share products, services and space in Hammarby Sjöstad.

The findings in the study show that there are existing collaborative businesses and initiatives in the area. They are mainly founded and maintained by residents and private actors. This, in turn, implies that private actors as well as residents need to and can play a big part in influencing the development of Hammarby Sjöstad to become more sustainable. Therefore the study show a great development potential of Hammarby Sjöstad and the work of HS2020 to continue further develop the area to become more sustainable.

- *How could these sharing solutions contribute to increase the sustainability in Hammarby Sjöstad?*

The sharing solutions presented in this study could contribute to increased sustainability in different ways. The evaluation implies that they could contribute to reaching three of the Swedish environmental objectives, which are reduced climate impact, a good built environment and clean air. Four of Hammarby Sjöstad's environmental goals, which are land usage, transportation, energy and waste could be addressed by the sharing solutions presented in the future images. However, a lot of the solutions could mainly contribute to a decrease in consumption of new products, which is not directly addressed in the objectives nor goals. Neither is the social aspect in terms of social capital addressed in the objectives nor goals, which could also lead to increased sustainability in the district.

The future images presented in the results illustrates how changes in behavior and technology solutions are needed and could together contribute to reduce the negative environmental impact that today's western lifestyles have on the planet. However, that these kind of sharing solutions contributes to reduced environmental impact may be limited by the rebound effect. There are also a lot of solutions that could contribute to increased social capital, since most solutions are dependent on interactions among the participants. The images show that the solutions can contribute to creating stronger communities and bonds between the residents and thereby lead to increased social sustainability in the district.

This study also point out what is needed to be done in terms of developing existing urban areas to become more sustainable. The study show that today, a relatively new urban area that is fully completed and has no need to be further developed when it is been built, is not true. Therefore it is vital for existing urban areas to be further developed, to make a conversion to meet the challenges that the climate change imposes on our society. It also highlight the need to not only focus on technology improvements to contribute to sustainable development, but also on how we can share our resources more efficiently by Collaborative Consumption.

That is not to say that by adopting the Collaborative Consumption model, in my view, will lead to a sustainable world. Collaborative Consumption has potential to contribute to sustainable urban development, but it also needs to go hand in hand with a greater transition, not only in how we consume, but also what we consume, and with technology improvements. However, it is through a learning process and exchange of knowledge with others we become more aware of the surrounding world. Participating in Collaborative Consumption can have other effects such as people becoming more aware by creating mutual respect for one another and the environment. This could, in turn, lead to more people coming to the conclusion that after a certain level of wealth, money and ownership of material goods might not be as important to quality of life.

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