



Driving innovation in sustainable urban retrofit

The case of the Malmö innovation platform

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Sammanfattning

I den här uppsatsen undersöks dynamiken i och utvecklingen av innovationsplattformen Malmö Sydost och hur plattformen kan driva fram innovation inom renovering av miljonprogrammen i Malmö. Resultatet från intervjuer med involverade aktörer från myndigheter, näringsliv och universitet visar att deras motiv för att delta i innovationsplattformen är både individuella såväl som samhällliga. Aktörerna vill med sitt medverkande förbättra sin miljöprestanda, men ser också en chans för nya affärsmöjligheter och att knyta kontakt med andra aktörer för samarbete och kunskapsutbyte. Respondenterna anser att samarbete är en av nyckelfaktorerna för att innovation ska uppstå och för att nå de uppsatta målen. Att hitta tillvägagångssätt som möjliggör samarbete mellan ett stort antal aktörer från vitt skilda sektorer kan i sig självt ses som innovation. Vissa aktörer är dessutom konkurrenter på samma marknad. För att möjliggöra bra samarbete krävs liknande motiv eller åtminstone motiv som inte är konflikt med varandra, samt att det finns tillit mellan aktörerna. En av åtgärderna för att säkra förtroende mellan aktörerna är att ett konsortieavtal har upprättats. Det finns dessutom ambitioner bland aktörerna att verka för ett mer hållbart samhälle och skapa en långsiktighet i arbetet med en hållbar stadsutveckling. Stort fokus har lagts på social hållbarhet och de boende i det aktuella området. En viktig aspekt är att lämna den gamla industriella modellen för innovation och övergå till mer av en användarkultur där de boende engageras i innovationsprocesserna. Detta, då de boende är en stor potentiell innovationskraft. Att förändra de boendes livsstil är en annan aspekt som kan generera stora miljövinster. Energieffektivisering är inte bara tekniska åtgärder utan innebär även att upplysa de boende och på så sätt kunna förändra energiförbrukningen i fastigheter. Fokus ligger även på att säkerställa fortlevnaden för innovationsplattformen och ett fortsatt arbete med hållbar stadsutveckling. Två år är en kort tid för innovationer att uppstå och det finns en risk att projektet blir just ett tvåårigt projekt istället för en långtgående kontinuerlig insats. Genom att se till att innovationsplattformen lever vidare utan statliga bidrag och genom att hitta nya sätt att finansiera renovering och energieffektivisering av befintliga byggnader kan innovationsplattformen verka som en stark positiv kraft i arbetet för ett mer miljömässigt, ekonomiskt och socialt hållbart samhälle.

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1. Introduction

In 1965, the Swedish government decided to invest heavily in building multiple dwelling houses to meet the increased demand for housing (Renovera Energismart). The aim was to build a million new homes between 1965 and 1974. Approximately 850000 apartments of Sweden's total of 2,5 millions today are from that period of time when house building peaked. Today, the houses from 'the million homes program' are between 40 and 50 years old and a large part of them are in need of renovation. The dwelling and service sector accounted for 40 % of Sweden's total energy usage in 2011 (Byman and Jernelius, 2013). The multiple dwelling houses built in 1961-1975 have an estimated higher energy usage of 25 % compared to houses built after 2000 (Industrifakta, 2008). By including energy efficiency actions in conjunction with other renovation actions, there is great potential to contribute to reaching the political goal of lowering the energy consumption in Sweden by 20 % by 2020 compared to 1990, which is a key European and Swedish goal (Industrifakta, 2008; Byman and Jernelius, 2013).

1.1. Aspects of renovation and energy efficiency

In addition to the environmental benefits and depending on the type of renovation measures performed, energy efficiency measures can also be profitable to a varying extent for the property owner. Some measures are not profitable at all and some are profitable in conjunction with other renovation actions. Different measures have different payback time, which can vary from one year to up to 30 years (Blomsterberg and Edström, 2008). The profitability is determined partly by how much energy is consumed in the building. The greater the energy consumption is the greater is also the potential energy savings. The profitability is also determined by if the most suitable efficiency action has been carried out, eg if the highest quantity of energy efficiency is obtained per invested Swedish crown. A third factor determining the size of the profitability are energy prices; with low energy prices the incentives to lower energy consumption will obviously be weaker (Högberg, 2012).

Despite the potential profit from energy efficiency measures and that the highest quantity of energy efficiency is obtained by combining measures, looking at refurbishment carried out over the last ten year period, they are mostly ad hoc. Difficulty in obtaining a satisfying payback time is stated as one of the main obstacles for carrying out energy efficiency

measures, by both public and private property owners. Another challenge is property owners' lack of adequate finance (Industrifakta, 2008). Financing renovation and energy efficiency refurbishment by increasing rental prices can have negative social effects in society, such as forcing tenants to move out because they cannot afford to stay there, which can lead to increased socio-economic issues and segregation. It is crucial to find a business model where enough finance is made available without increasing the rent too much so that it becomes a win-win situation for both property owners, residents and construction companies (Innovationsplattformen Malmö Sydost).

1.2. Potential solutions to the renovation challenges

Traditionally, innovation has been viewed from the perspective of industrial economy where innovation is driven by a challenge that needs to be solved, formulated by industry or by demand from consumers or others and the competition of market shares between companies. With societal change and a global economy comes the need for a new innovation approach, where it does not only appear in researchers' closed laboratories or test sites. Through business networks where communication and interactions occur between companies, innovation can arise (Arvidsson and Mannervik, 2009). In an *innovation platform* diverse and specially focused actors involved in research and innovation can collaborate through exchange of knowledge, experiences and technology (Engström, 2013). The Swedish Governmental Agency for Innovation Systems, VINNOVA, has identified "Sustainable Attractive Cities" as one of four key challenges in the future, as a consequence of growing populations in big cities. It is not only a matter of making sure resources are sufficient, but also that the social aspects, such as people and user involvement becomes more important (Vinnova Cutting Edge, 2012). In 2013 VINNOVA decided to finance four projects in the cities of Malmö, Lund, Göteborg and Borås with the purpose of supporting the development of innovation platforms that drive innovation in the renovation of existing buildings and/or building of new areas (Vinnova, 2012).

1.3. The Malmö innovation platform

Malmö, in the south of Sweden and with a population of approximately 310 000 inhabitants, is a former industrial city that has strongly emphasized sustainable urban development and it is today considered to be one of the "greenest" cities in the world (Malmö stad, 2014). During

the last 15 years the city of Malmö has been working actively to address great societal challenges and to create a sustainable city (Innovationsplattformen Malmö Sydost).



Figure 1. The city of Malmö is situated in the south of Sweden.

A few examples of their efforts in different parts of the city are Augustenborg, Västra Hamnen and Hyllie.

- The eco-neighborhood Augustenborg project was started in 1998. This part of the city was physically, economically and socially derelict which resulted in many residents moving out. The project adopted a holistic approach to ensure the transformation to an environmental, economically and socially sustainable area not only through collaboration between both private and public actors, but also by actively engaging the residents in work shops, information sessions and informal conversations. A wide-ranging renovation of houses was conducted to increase energy efficiency and improve waste management and recycling (World Habitat Awards, 2010).
- Västra hamnen is situated in a former seafront industrial area. Expansion of the area began when Malmö held the European housing exhibition Bo01 and it became Sweden's first urban area with a climate-neutral energy system from locally produced wind, water and solar power. Since then the area has expanded and consists of numerous energy-efficient buildings and an extensive collection of organic waste for biogas production (Delegationen för hållbara städer, 2012).
- Hyllie is to become the most climate-smart city district in the Öresund region with 100 % renewable energy consumption. The ambition is to create a vibrant area with a functional mix of apartments, office buildings, commerce and recreation. This will be obtained by the collaboration of many different relevant actors that share an interest in the areas' development (Malmö stad).

More than 30 000 multiple dwelling houses in the city of Malmö were built during 'the million homes program'. About 25 000 of them are located in the area that is included in the Malmö Innovation Platform, in the southeast part of Malmö, which has approximately 80 000 inhabitants. There are major socio-economic challenges in a large part of this area and a low employment rate is one of them (Innovationsplattformen Malmö Sydost).

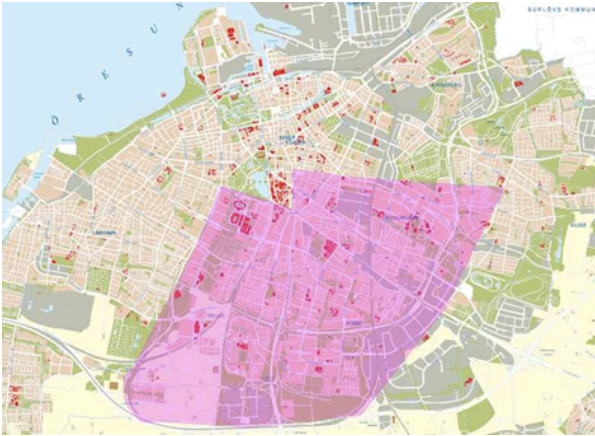


Figure 2. The Southeast part of Malmö that is the area included in the innovation platform Malmö Sydost.

The main purpose of the Malmö Innovation Platform is to use physical renovation as a driver towards greater changes not only in the short-term where the focus lies in the development of new technology and new employment opportunities but also in the long-term where environmental goals are met and the economy develops (Malmö.se). The Malmö Innovation Platform was initiated and is led by the City of Malmö in cooperation with Region Skåne, three universities and 16 companies (Innovationsplattformen Malmö Sydost).

1.4. Environmental scientific relevancy

As mentioned in the section above there are great potential energy savings in renovation of existing buildings which would have positive environmental effects and could contribute to the fulfillment of Sweden's national environmental goals. Innovations on both technical, social and financial areas are needed to enable renovation of existing buildings and making it profitable and a successful way of mitigating environmental impact. VINNOVA has not set ex-ante goals for the innovation platforms, but has left it for the participants what they make out of them. My thesis will contribute to clarify the perceptions of different actors on the actions, goals and visions of the innovation platform. This will also contribute to making it possible to multiply the concept to other cities and countries.

1.5. Purpose and Research Questions

The purpose of this thesis is to investigate and analyse the design and development of the Malmö Innovation Platform as a collaborative initiative to drive innovation in the renovation of existing apartment buildings. This thesis involves four key research questions derived from the framework developed by Eames et al. (2013), which is presented in the theory and methodology sections. In brief, this framework can be used for understanding different aspects of urban retrofitting. By answering the four key questions presented below a comprehensive picture of the transition to sustainable urban areas can be obtained.

- *What* is to be done to the city?
- *Who* is involved in this process?
- *Why* is it important?
- *How* will it be implemented?

The “*what*” question will answer what actions will be taken in the innovation platform and the purpose of them. The “*who*” question concerns identifying the key actors and networks and what role they have in the project. The “*why*” question is about identifying the actors’ individual, organizational and cultural drivers as well as expectations for the project. Institutions and governance are aspects of “*how*” the measures will be implemented.

2. Theory

This section is a description of the conceptual framework that will be used in the analysis of this thesis and theory that concerns innovation and collaboration that the framework originates from. These theories are Systems of innovation and The Triple Helix approach.

2.1. Theoretical framework

2.1.1. Systems of Innovation

Innovation is defined in different ways. Especially in early stages of the theory, innovation literature focused on technological change rather than innovation in general. Edquist (2001) writes,

“Innovations are new creations of economic significance normally carried out by firms (or sometimes individuals). They may be brand new, but are more often new combinations of existing elements. It is a matter of what is produced by firms and how”.

Innovation can be divided into categories depending on the type; product or process innovation. Product innovation can relate to goods or services and centers on what is produced; it is a materially focused type of innovation. Process innovation, on the other hand, can be technologically or organizationally driven and focused on how something is produced, also known as “intangibles”. By identifying what kind of innovation is in focus, analysis on a small and medium-scale is possible (Edquist, 2001).

Since innovation arises through multiple processes and is complex; individual companies almost never innovate in isolation. By collaborating with other organizations, such as other companies, authorities, universities and investment banks, innovation can occur through exchange of knowledge and experiences. Another factor, which strongly influences innovation, is institutional support that can work by both limiting and providing incentives for innovation. *The systems of innovation* model is designed to describe, understand and explain the factors that create and influence innovation (Edquist, 1997). Initially, the primary focus was mostly on national systems of innovation, but with development on sectoral (focusing on different fields of technology) and regional (regions within countries) levels, the concept of systems of innovation has emerged (Edquist, 2001). However, this does not mean

that only one approach needs to be selected when limiting a system. Whether the system should be sectorally or regionally limited depends on the subject of study. One approach does not exclude the other, often they can complement each other (Edquist, 1997). Edquist (2001) means that it is important to establish what innovation actually is to be able to determine the boundaries of the system and its determinants. Of course, what also becomes important is the ability to define the system, establish what a system is as well as its components (Edquist, 1997). Edquist (1997) writes that,

“one way of specifying system is to include in it all important economic, social, political, organizational, institutional, and other factors that influence the development, diffusion, and use of innovations”.

To put it more simply, a system's components and the relationship between each component can define a system. Boundaries are also required so that it is possible to distinguish the system from its surrounding environment and so that there is a clear reason for why the components form a system together (Ingelstam, 2001).

Edquist (2001) identifies organizations and institutions as main components. Throughout the literature concerning systems of innovation the definitions of institution and organization varies (Edquist, 2001). In this paper I will utilise the definitions used by Edquist (2001). Institutions can be described as “rules of the game”; they are cultural norms, common habits, rules that regulate interaction between individuals, groups and organizations. Institutions have, according to Edquist and Johnson (1997) three main functions; to reduce uncertainty by providing information on how other people act, regulate conflicts and collaboration between individuals and groups and provide incentives. Income tax, salary and wage schemes as well as patent rules and copyrights are said to be examples of how institutions provide incentives for innovation activities (Edquist and Johnson, 1997). Organizations can be described as the actors or players in the system and some important organizations are companies, universities and venture capital organizations (Edquist, 2001). Both private and public organizations are important for driving innovation. For private organizations innovation is essential for making a profit. Public organizations that are important for innovation processes can be research institutes, regulatory agencies and patent offices (Edquist and Johnson, 1997).

What does the relationship between the main components look like then? On the one hand, organizations are strongly influenced by institutions through laws and regulations, standards and norms. On the other hand, institutions can be embedded in organizations, for example, the relations between workers and their managers – this sort of established practice is only relevant in companies. Another type of relationship between organizations and institutions is that some organizations directly create institutions when, for example, public organizations create and implement rules that becomes an innovation policy. Institutions can also create organizations through, for example, a new law that leads to the forming of an organization (Edquist and Johnson, 1997).

Defining the different components of the system and the relationship between them is not enough to understand how the system works. It is also important to identify and examine the functions or the activities of the system of innovation, so that we can understand what actually happens in the system. Of course, the most important function is the production, diffusion and use of innovations and on a more specific level; the factors that influence the introduction, diffusion and use of innovation. These functions or factors can also be called the *determinants* of the system (Edquist, 2001). According to Edquist (2001) there is no established knowledge about which functions are the most important in systems of innovation and that this is something that remains absent in existing literature. Hekkert et al (2007) suggest seven functions when studying technological change, based on existing literature concerning functions and empirical studies at Utrecht University. By mapping out these functions, insight will be given to the dynamics of a system of innovation. The functions presented are: *entrepreneurial activities* (entrepreneurs are essential and can turn potential knowledge into something viable that might lead to new business opportunities), *knowledge development*, *knowledge diffusion through networks*, *guidance of the search* (identifying what consumers want and finding it by guiding activities in the innovation system), *market formation* (since it is challenging for new technology to compete with existing technologies, it is important to create “protected space”. This can be done by, for example, creating temporary markets), *resources mobilization* (to enable knowledge production right resources needs to be utilised) and *creation of legitimacy/counteract resistance to change* (new technology needs to become a part of the current system/market or even in some cases, overthrow it).

2.1.2. Triple Helix Approach

The Triple Helix model can be described as a spiral model of innovation driven by collaboration between the government, industry and universities (Viale and Giglione, 1998). Relationships formed between these actors can:

“generate new institutional and social formats for the production, transfer and application of knowledge”

(Ranga and Etzkowitz, 2013). The core of the triple helix model consists of interactions between the parties and learning from one another. By building relationships where the parties develop trust in each other and feel comfortable sharing their knowledge; innovation can arise (Bressers, 2012; Etzkowitz, 2003).

From a great quantity of literature two main perspectives of Triple Helix has arised, describing the interaction between the elements. *The (neo)institutional perspective* (Etzkowitz, 2003, 2008; Etzkowitz and Leydesdorff, 1999, 2000), is based on case studies and historical comparative analysis and describes the shape of the interactions between government, universities and industry. In a so called “statist regime”, the government has a leading role that act as both a driving and limiting force on university and industry. Another regime, called “laissez-faire regime” means that the government has little impact on the economy, as in Europe and the U.S. for an example, industry is the greatest driving force for innovation and the other two elements have less impact and work more as support in the shape of a regulating force (government) and by contributing with “skilled human capital” (university) (Ranga and Etzkowitz, 2013). In a society that is increasingly knowledge based, a “balanced regime” emerges, where the universities are given a more prominent role in partnerships with industry and government (Etzkowitz 2008). This regime is perhaps the most relevante since the overlap of the spheres provides the best environment for innovation (Etzkowitz and Leydesdorff 2000; Etzkowitz, 2003). *The (neo)evolutionary perspective* is based on different communication theories that describes government, industry and university as subcategories of social systems that co-evolve (Leydesdorff, 2000). These models of interaction are a vital part of two processes of communication and differentiation: *functional*, what occurs between science and markets, and *institutional*, between private and public control at the level of universities, industries and government, which allows for various degrees of selective mutual adjustment (Leydesdorff and Etzkowitz, 1996, 1998).

2.2. Analytical framework

Systems of innovation theory describes a system with components, where organizations and institutions are recognized as the main components, and the relations between them. The Triple Helix approach describes how collaboration works in a constellation of authorities, companies and universities as a driver of innovation. I will base the analysis of my collected data mostly on a framework by Eames et al (2013), which is specifically developed for understanding urban retrofits and sustainable transitions. The four questions in the conceptual framework laid out by Eames et al (2013) also focus on identifying components (*who* and *how*, since institutions are a component), why they form a system (*why* and *what*) and how collaboration works (*how*). Both The Triple Helix approach and Systems of innovation emphasize that collaboration between different actors is a very important factor in driving innovation.

One of the main purposes is to construct a conceptual framework that will be able to connect these questions, that often has been handled in a disconnected way.

- *What* is to be done to the city?
- *Who* is involved in this process?
- *Why* is it important?
- *How* will it be implemented?

The “*what*” question is about technical knowledge, targets, technological options and costs. Examples are given, such as cavity wall and loft insulation, double-glazing and central heating. The “*who*” question is simply about identifying the key actors and networks, such as landlords and tenants, local authority building control officers, plumbers, electricians and builders. The “*why*” question is about identifying individual, organizational and cultural drivers as well as expectations for the project. This can involve conditions relating to population growth and social status, peer pressure and growing environmental concern. Institutions and governance are aspects of “*how*” the measures will be implemented. Some examples of implementation are grants and subsidy schemes as well as building regulations.

3. Methodology

This section concerns how information and data was collected and analysed. A literature review was conducted as well as attending different workshops. Data was collected through interviews and the analysis was loosely based on "Discourse analysis".

3.1. Research Approach

The main characteristics of a case study are, according to Johannessen and Tufte (2003) that there is a clear delimitation between what is included in the case and not, and that a thorough description of the case in question is presented. Case studies are an adequate research strategy when the aim of the study is, for example, to explore the structure within a given industry or the economy of a certain municipality. What these types of cases have in common is a great need to understand complex social phenomena (Yin, 2006). In my case, I wanted to examine how the dynamics of the Malmö Innovation Platform can drive innovation in the renovation of existing buildings. Yin (2006) writes that the case study method is suitable when questions of "how" and "why" something works are to be answered and that case studies are preferred when studying a case that is ongoing.

A distinction should be made between single case studies and multiple case studies. A single case study can be the appropriate choice for several reasons; when studying a unique case or a common case or when the same phenomenon is studied over time (Yin, 2006). As mentioned in the introduction, Vinnova has financed four innovation platforms in Sweden during this period of time. Therefore, a multiple case study using four similar cases/relevant would have been possible. Yin (2006) writes that a multiple case study is often preferred, when possible, because the conclusions drawn from two independent cases are always stronger than from a single case. However, I decided to focus on a single case study in order to analyse one of the platforms more deeply as well as being able to meet the actors involved in person and attend workshops and meetings for this particular platform.

3.1.1. Literature Review

The starting point of my thesis consisted of researching literature on renovation of existing buildings and what has been carried out so far. One of the perhaps most obvious reasons for conducting a literature study is to avoid "inventing the wheel once more" (Bryman, 2011). Bryman (2011) writes that doing research on literature concerning the subject, is done in order to answer questions like "what has been done in this field?", "which theories and

concepts are relevant?" and "are there any questions on the subject that need further investigation?". When searching for relevant literature, both Google and databases at Lund University were utilised. Using Google, both have their "pros and cons". The supply is seemingly endless, but without any valuation of sources to information made (Bryman, 2011). Therefore, it is important to assess the articles and papers critically before using them and to only use reliable sources, which is why I mainly tried to use published scientific articles and reports from authorities, universities and research institutes.

During the same time that I was assessing the initial literature studies, I attended two events, which concerned sustainable cities and the renovation of existing buildings. There, I had the opportunity to hear presentations from actors involved in the Malmö Innovation Platform as well as furthering my understanding of what is currently going on in and around Malmö in terms of sustainability and refurbishment.

3.1.2. Stakeholder Interviews

When choosing interviewees, I focused on the steering group, where all the different types of actors in the platform, and the triple helix, are represented (Appendix 1). This may be seen as a type of "stratified sampling" where the purpose of the selection method is to obtain a sample of interviewees that represent the whole composition of the innovation platform (Bryman, 2011).

After my initial information gathering I started conducting interviews with the selected interviewees. By contacting them on email, dates were set up for when the interviews were to be conducted. Interviews can be executed in a more or less structured manner. I chose to carry out structured interviews with fixed questions (see Appendix 2). This is positive in the sense that comparing and interpreting data is easier. Furthermore, interviews with fixed questions are more focused and time efficient. On the other hand, a negative factor is the limited flexibility (Johannessen and Tufte, 2003). The questions were deliberately wide in scope with follow-up questions, to give the interviewee an opportunity to elaborate on their answers instead of just answering yes/no. The questions were slightly adjusted during the interviews depending on what kind of organization the interviewee represented (authority, company or university), but were kept as similar as possible to make the analysis easier.

Both physical interviews and telephone interviews were conducted. The interviews were recorded with a Dictaphone and notes were also taken. All of the interviews were then transcribed and saved in separate documents. Data was also collected from a partner meeting in February 2014, where most of the partners presented what is going on in the project and discussion groups were formed to analyse different problems and aspects concerning some of the projects connected to the platform. Data collected by other students on Lund's University, that had performed intensive telephone interviews during one week in December 2013 with all of the involved companies, was also utilised to some extent for the analysis.

3.2. Data Analysis

The analysis of the collected data was based on "Discourse analysis". Johannessen and Tufte (2003) write that in this type of analysis, the content of data material, such as an interview, is the main focus. To be able to sort out the context of the collected data, it is common to sort the material in categories with different codes. These codes can be derived from theory, in my case from the analytical framework presented in the Theory chapter. This is called a deductive coding. By sorting the results in categories, it is possible to determine connections, patterns, similarities and differences (Johannessen and Tufte, 2003).

The starting point of the analysis was reading all the transcriptions of the interviews and notes from the partner meeting without making any notes or sorting out specific information. After that I started re-reading all of the notes, but instead of writing key words on what the texts were about, I sorted them in four categories after what question they might answer, "what is to be done?", "who are the actors?", "why is it important?" or "how will it be implemented?". This gave me an initial rough division of the data collected. When all the relevant data was divided in the four categories, additional sorting of the material was done under each category and divided after further questions. This way, I was able to identify different themes, and see if the interviewees had answered similarly or very different on the questions that were asked during the interviews. After that, additional categories were created within the four main categories and the identified patterns were valued in the light of the theories chosen for this thesis.

3.3. Reliability and Validity

In quantitative research, reliability and validity are two important criteria when considering the quality of a specific study. Many researchers in the qualitative field have questioned how

relevant these aspects are on their field. However, other authors assert that these criteria can be considered in qualitative studies, but with less emphasis on more quantitative aspects such as measuring/statistics. Reliability is about how replicable a study is. This is usually hard to achieve in a qualitative study, but I have tried to give an elaborate description of how I have conducted my interviews and how and what theories I have derived from when analysing my data (Bryman, 2011).

Validity is about making sure that I have studied what I intended (Bryman, 2011). My thesis is about investigating the dynamics of the innovation platform Malmö Sydost. The interviewees were chosen so that authorities, universities and companies were represented. This way, the spectrum of different actors in the platform was covered. By getting access to interviews of all the companies in the platform, performed by other students, the whole “business spectrum” was also included. I also considered the validity of the responses. By providing my results to the interviewees and giving them a chance to confirm that the written texts were what they had actually said. All the interviews were recorded with a Dictaphone and thoroughly transcribed. I used the same language and phrases as the interviewees to make sure I did not anticipate what they were saying at an early stage. A certain amount of interpretation is necessary, but I reasoned that if this is not done in several stages, it would be easier to confirm the accuracy of what the interviewees had actually said.

4. Results and Analysis

In this section the results from the interviews are presented by using the conceptual framework introduced in the theory chapter. The data is sorted to answer four questions: "what is to be done?", "who is involved?", "why is it important?" and "how will it be implemented?".

4.1. What is to be done?

This sub-section describes what renovation of existing buildings in general can result in and the actions that are to be taken within the Malmö Innovation platform, including both physical/technical and social/behavioural measures. Furthermore, visions for the project are presented.

4.1.1. Renovation measures

There are several different measures that are performed in order to lower the energy consumption in multiple-dwelling houses. Broadly speaking, they can be divided into categories based on which part of the building it concerns and its technical function (Industrifakta, 2008).

- The building envelope, which includes the façade, roof, windows and doors etc, actions such as additional insulation and exchange of doors and windows, will lower the thermal leakage (Energi- & klimatrådgivningen, Industrifakta, 2008).
- Efficiency improvements in residential heating and indoor climate include exchange or upgrading of components in heating systems or whole systems.
- Electricity consumption, which includes measures such as improving indoor and outdoor lighting as well as upgrading equipment in laundry facilities and replacing old electrical wiring.
- Operation and property management including education for the staff and follow-up routines, which are essential to achieve the impact of energy efficiency measures.
- To change user behavior among the residents is an important aspect in lowering energy consumption in buildings. Not only will the residents need information on the implemented measures, but changing their behavior might lead to further efficiency. This can be done by, for example, providing information and installing equipment that reveal the actual cost of their energy consumption (Industrifakta, 2008).

4.1.2. Actions in the project

It is important not to rely too much on the innovation platform's survival after the project time has run out, but to actually make sure that actions are taken within the project time

period (Anna Heide, pers. com.). One way of going about is simulating certain scenarios, but this is not very interesting and engaging people in them is difficult. Carrying out real projects is much more relevant, but depends on how many real life cases that fit into the project (Tim Delshammar, pers. com.). The project has clear boundaries both in terms of time, sector (housing) and geograpy (Malmö Sydost).

The project is divided into seven different work packages, where work packages two to four represent final goals and packages five to seven represent ways to reach the goals. The first work package (AP 1), project management, is led by the city of Malmö. (Innovationsplattformen Malmö Sydost).

- AP 2 – Technical development of buildings

One project within work package 2 is about optimizing central heating in Lindängen. This project emerged from earlier collaboration between E.ON and Schneider Electric as they decided to collaborate also within the innovation platform. They are investigating what a full assessment program could contain and what actions that need to be taken in distribution, in the buildings and in the residents' impact on the system (Thomas Johnsson, pers. com.). They want to focus on engaging the residents in actions taken in this work package (Partner meeting, 2014).

- AP 3 – Physical development of the outdoor environment

The main focus of this work package is the regeneration of the outdoor environment. One project within the work package is about renewing a courtyard in Lindängen. What is most interesting in this case is not simply the physical changes that will occur, but the process of engaging the residents in the planning. The first steps of the project will be executed by conducting a preliminary study where representatives of the residents take small walking tours in the courtyard to identify how the courtyard is used and by whom and for what purpose. This is a way of mapping the present usage of the courtyard. After that, a description of the actions that will be taken is documented and presented to the residents and a consultant will use the mapping and the residents' ideas and thoughts to make a blue print. The plan is to start renovating the courtyard this summer (2014) (Tim Delshammar, pers. com.).

- AP 4 – Social and economic development

This work package is about social and economic development for residents and will be achieved by engaging the residents and making them co-creators in urban development. Local pride and a feeling of security are created through resident participation. The goals are to produce at least one social innovation that will hopefully lead to creating local employment, a service innovation that concerns energy- or consumption issues and an innovative IT product or service that enables local resident participation (Innovationsplattform Malmö Sydost)

- AP 5 – Collaboration between actors

One of the goals of this work package is to create an organizational innovation model for collaboration between different actors that are included in a mutual project. When a quarter of the project had passed they were still in an initial phase (Partner meeting, 2014).

- AP 6 – Finance- and business models

How does one put a price on graffiti and vandalism, employment and health, lack of housing and segregation? There is a need of finding ways to link together different types of investments and allocate responsibility (Partner meeting, 2014). For example, can local employment lead to savings in the public sector and can this money be redistributed to finance climate-control investments? This work package seeks to develop and assess financial models that enable long-term investment programs in the 'million homes program' (Innovationplattformen Malmö Sydost).

- AP 7 – Urban global innovation arena

The final work package is about connecting the innovation platform to the outside both on a regional, national and international scale, in other words, how to make the innovation platform interact with a surrounding system. The work package also seeks to figure out how to organize and finance the platform after the project has ended (Mikael Edelstam, pers. com.).

4.1.3. Visions in the project

One vision is to create a vibrant Malmö and to transform this area, Malmö Sydost, from a disreputable place to being as prosperous as other areas in Malmö. This could generate positive effects on the entire city. The residents in this area have great potential to be a part of the positive changes. Earlier experiences in the area of Rosengård in Malmö have shown that a great deal can happen in three years and that residents can be a strong creative force. This sort of urban transformation takes time and is affected by what kind of environmental and

dwelling/housing politics that are pursued both locally and at a national level (Moa Björnson, pers. com.). The innovation platform might also contribute to reaching goals of making Scania a world leading region for research, development and testing of solutions for creating sustainable cities (Mikael Edelstam, pers. com.). Another vision is that the innovation platform will continue on and that it will be replicable in other cities both in Sweden and other countries (Moa Björnson, pers. com.; Thomas Johnson, pers. com.; Christer Månsson, pers. com.). If the innovation platform can create a participation culture where technology and citizens meet in a successful way, this method should be able to work in other places as well (Christer Månsson, pers. com.).

4.2. Who is involved?

This sub-section presents the actors involved in the Malmö Innovation platform and what role they have in the project. They consist of three groups; authorities, industry and universities.

4.2.1. Steering group

In the steering group, the three different spheres in a triple helix are represented. Malmö stad and Region Skåne are the authorities. Three universities are involved: Lund University, Malmö Högskola and SLU Alnarp. Also three companies are in the steering group; MKB, a real estate company, E.ON an energy producer and Media Evolution, a media company cluster consisting of 380 companies. The steering group has several tasks; making joint decisions about project budget, driving the work of the work packages and making sure that goals and a high "innovation level" are reached to enable the project's viability (Moa Björnson, pers. com.). The steering group members are also there to represent the different actors involved in the project (Moa Björnson, pers. com.).

The interviewees have other roles in the project besides being members of the steering group. Below (table 1), short descriptions of their roles in the innovation platform are presented. A balanced triple helix regime where universities are given a more prominent role in collaboration with industry and government is ideal since the best environment for innovations are created when the spheres intersect (Etzkowitz and Leydesdorff 2000; Etzkowitz, 2003). All three universities involved are members of the steering group and are also work package leaders. Although the city of Malmö, an authority, is project leader, the constellation of the steering group is balanced rather than statist (where the government has the most prominent role).

Table 1. Description of what role the different interviewees have in the project.

City of Malmö	The project leader, Malmö stad provided the initiative for the project. The role of project leader has a lot to do with coordinating the work of the actors involved and making sure that they are working towards the same goals
MKB	They can contribute with formulating problems. They have a good insight in where the challenges are and can describe them to other actors and clarify where there is a need for innovation. MKB can also provide testing sites where innovations within the project can be tested
Region Skåne	Work package leader of AP7 that connects the innovation platform to an international arena. Their role is more about structure than engaging in specific renovation issues
E.ON	They do not own any work package; they are an actor in the project. E.ON feels that they have a clear role in understanding and creating a positive effect on the energy consumption in buildings
Media Evolution	They will become involved in the work packages concerning them as soon as concrete projects emerge. Until then, they are more of a spectator. What is important for Media Evolution is what is important to the 380 companies included in the organization
SLU	Work package leader of AP3 that manages outdoor environment

4.2.2. Working group

A basic division of the companies involved in the innovation platform can be seen in table 2 below. This is done to visualize different industry sectors that are involved and that are relevant to a project like the Malmö innovation platform. All the real estate companies involved in the project have properties within the area Malmö Sydost. MKB and Trianon are locally established companies, while HSB and Willhem are nationally established in different cities in Sweden. All of the real estate companies put great emphasis on increasing the quality and value of their properties and to engage the residents in increasing wellness and social capital (Axelsson et al., 2013).

Table 2. Presenting a division of the different companies involved in the innovation platform Malmö Sydost.

Real estate companies	Consultancy and innovation companies	Construction and design companies	Energy services and IT companies
MKB HSB Trianon Willhem	WSP ICIM Media Evolution Saab Group	Skanska PEAB NCC White Arkitekter	E.ON Schneider Electric IBM Siemens

For the consultancy and innovation companies, the focus of the project is not the renovation of buildings but information and communication services. Saab Group and ICIM are focused on citizen dialogue and changing resident behavior; while WSP at this stage of the project mostly is working on financing innovation projects within the platform (Weckman et al., 2013). None of the construction companies own any properties or renovation projects included in the innovation platform, but are involved in the platform as spectators. They see it as a way of keeping up with what is happening in construction and in society (Eliasson et al., 2013). The energy and IT companies involved have great competencies in fields such as mobility management and energy efficiency measures and want to contribute with their knowledge (Håkansson et al., 2013).

4.3. Why is it important?

This section concerns the drivers for actors to become involved in the Malmö Innovation platform and why this project is important in the context of renovation of existing buildings. Most actors express both individual and organizational/societal motives for getting involved.

4.3.1. Individual drivers and motivations

4.3.1.1. Contribute to a sustainable society

Many of the actors involved in the innovation platform expressed a desire to contribute to a more sustainable society. Most often, cities are a driving force in urban development (Moa Björnson, pers. com.). However, urban development issues can also be of great significance to a company's business, as is the case for MKB. For them, it is natural to participate in projects on these matters (Anna Heide, pers. com.). Media Evolution and E.ON want to be a positive force and participate in building and creating a sustainable society (Thomas Johnsson, pers. com.; Christer Månsson, pers. com.). The region of Scania has adopted an innovation strategy where smart sustainable cities are one of the "pilot areas" (Mikael Edelstam, pers. com.). SLU are involved because the research conducted in their institutions is focused on the public environment and landscape. A sustainable development of the public landscape is therefore central for their business and research (Tim Delshammar, pers. com.).

4.3.1.2. Improve environmental efforts and create new business

For some of the participants, involvement in the innovation platform is a way of improving their environmental efforts. The reason why Malmö initiated this project was because they traditionally worked with area-based development in areas such as Rosengård and Augustenborg. They have since realised that a more holistic and long-term approach is

needed in Malmö to really make a change instead of having independent and time-lined projects (Moa Björnson, pers. com.). In certain environmental areas, MKB has noticed that a limit has been reached in what is possible to achieve with existing technology and economy. There is a need for innovation in certain areas to improve the environmental efforts in their business (Jenny Holmquist, pers. com.). MKB are open to finding new and innovative ways of renovating their buildings. They believe that, by finding smart ways of collaborating, environmental efforts can go further and become more efficient (Anna Heide, pers. com.). One of the main purposes for Region Skåne getting involved in the project is to strengthen Scania's position both nationally and internationally in innovation concerning sustainable urban areas. They considered the Malmö innovation platform relevant to their efforts in driving urban areas in Scania to become more sustainable (Mikael Edelstam, pers. com.). Another motive for joining the innovation platform is to create new business (Christer Månsson, pers. com.). E.ON would like to, within the scope of their activities, see which products, services and concepts related to energy efficiency measures in buildings they might be able to offer. Producing and selling energy has been their core business, but since they realize that energy consumption needs to decrease in a sustainable society, they are exploring what other business opportunities there are for them besides producing and distributing energy. By finding new business opportunities, this could offset the loss in energy sales and contribute to a more energy efficient society (Thomas Johnsson, pers. com.). Today many universities are working increasingly with applied research and, in fact, many research councils require it. It has become more and more important to apply research to real life and SLU see an opportunity to do so in this project (Tim Delshammar, pers. com.).

4.3.1.3. Exchange knowledge and create new business relationships

The greatest opportunities that come from the platform are the possibilities to create new collaborations and exchange knowledge and experiences across business borders (Anna Heide, pers. com.; Tim Delshammar, pers. com.). MKB has already collaborated with some of the actors in the platform, but there are other actors that they might not have been in contact with outside of the platform (Anna Heide, pers. com.). The innovation platform is an important arena for knowledge gathering (Eliasson et al., 2013). The project is partly about the technical development of energy efficient solutions and partly about the outdoor environment and "social participation" of the residents. It is precisely these matters that are a perfect fit for Media Evolution where several companies in their organization can contribute with their expertise (Christer Månsson, pers. com.). SLU is hoping to develop new knowledge

and compile a best practice that can be used in other projects in the future (Tim Delshammar, pers. com.).

4.3.2. Organizational and societal drivers

4.3.2.1. Finding a holistic approach and multiplying it to other places

The project is a possibility to create something bigger. It is unlikely that a large number of innovations will arise in two years, but the collaboration and relationships between the actors can be established providing a good foundation for the emergence of innovation. The idea is not that the platform is up and running from day one, it will take some time to build the platform that hopefully continues and contributes to new innovations in a couple of years (Jenny Holmquist, pers. com.). Malmö stad, in particular, hopes that this project will lead to insight into a long-term way of working with changing 'the million homes program'. The ambition is to create activities in these areas that last longer, instead of a series of small projects. This is a great investment, as seen in new developments such as Västra Hamnen and Hyllie (Moa Björnson, pers. com.). Region Skåne believes that this innovation platform enables a stronger link between efforts driven by cities and innovation and research from universities. Testing new products and services can become more efficient and how and where collaboration can arise between different actors becomes clearer (Mikael Edelstam, pers. com.). A more complete view of all the aspects concerning renovation of 'the million homes programmes' can be obtained (Thomas Johnsson, pers. com.). The ambition is to be able to replicate this project and introduce the method in other parts of Sweden and the world, as well as for companies to multiply the actions performed during the project for other customers. The same challenges that can be seen in Malmö exist in other Westeurope, China and other fast developing countries. There is great potential for selling their products, services and systemic solutions in a global market (Mikael Edelstam, pers. com.; Thomas Johnsson, pers. com.).

4.3.2.2. Creating a good circle for the city

There is a hope that this project will be able to provide solutions and be a driving force so that renovation and energy efficiency measures are carried out in these challenged areas. This will show that social responsibility is taken to create positive changes for the people living in deprived areas (Thomas Johnsson, pers. com.). This will be carried out by, for example, creating local jobs and renovating buildings without having to increase rent (Moa Björnson, pers. com.). Creating local jobs in this sense means that by employing locally can lead to more

engagement from the residents, making them proud of their neighbourhood and increasing the sense of safety in the community. The employees can become ambassadors of change and spread positivity to their friends and family (Mikael Edelstam, pers. com.). Malmö Sydost can become a model of how to improve an area and make it sustainable in all aspects (environmental, economic and social) (Moa Björnson, pers. com.). This would have a positive effect on the city as a whole (Mikael Edelstam, pers. com.).

4.4. How will it be implemented?

This section is about identifying aspects such as financial, institutional and policy framework. These aspects are vital to be successful in implementing the measures described in section 4.1. and also what challenges that need to be overcome in the project..

4.4.1. Measures and actions

4.4.1.1. Establishing a consortium agreement

Institutions, as was described before, represent “the rules of the game” i.e cultural norms, common habits and rules that influence interaction between different actors (Edquist and Johnson, 1997). There is a tradition of collaboration between the city of Malmö and companies and between Malmö and universities, however there is not much experience on collaboration on this scale between several types of actors. In industry, companies often have trade secrets and some companies involved in the innovation platform are in direct competition with one another. On the research side, universities and research institutes can have unpublished research that can be relevant to a researcher’s career. This sort of information is usually not shared. Therefore, it is essential to create an environment where all actors feel comfortable in sharing knowledge and experiences (Mikael Edelstam, pers. com.). These are the best prerequisites for as much innovation to occur as possible (Thomas Johnsson, pers. com.). One of the actions taken to enable good relations between the actors is to set up a consortium agreement where all the actors bind themselves to be a part of the project. The agreement is there to create an open innovation arena. The idea is that all actors involved will get to be a part of information about and results from projects within the platform even when the results are from individual collaboration between two actors. Profit is intended to be shared among all the actors involved as opposed to singly benefiting individual actors (Moa Björnson, pers. com.).

4.4.1.2. Stimulating collaboration between actors

Collaboration itself can be a form of innovation. At this point in the project however, it is not exactly clear how collaboration will work. How it is expected to work is not often how it ends up, that is how entrepreneurship works (Christer Månsson, pers. com.). This whole project is about finding ways to collaborate with so many different actors involved. Not all actors are interested in all the different aspects of the project and the work packages provide a way for the actors to engage and collaborate around aspects that are most relevant to them (Anna Heide, pers. com.). The project needs to be divided into more narrow issues, even within work packages, and around those, different actors can collaborate to solve the problem. This way, a model for collaboration between many different actors can be obtained, which makes approaching the next issue easier (Mikael Edelstam, pers. com.). As it is now, collaboration between the different work packages is not relevant yet until more concrete action is taken within the packages (Tim Delshammar, pers. com.). However, discussions are conducted, across work package borders, for example, between E.ON (in AP2) and AP4 to see if there are mutual agendas. This is innovation in itself, as these discussions might never have happened without the platform (Thomas Johnsson, pers. com.).

Different types of collaboration occur in the platform. For example, those between different companies producing a mutual product or service and between companies producing a product or service and real estate companies providing a test site (Partner meeting, 2014). In the latter case, collaboration can arise either from a company presenting a product or service that they want to test in a building owned by a real estate company, or by a real estate company presenting a problem related to the project to a company that can then try to create a solution to the problem (Anna Heide, pers. com.). A way of making sure collaboration is successful is to be clear about what they suggest doing and what the predicted outcome will be. For example, for companies wanting to test a new product on property owned by a real estate company, it is advisable to have a concrete suggestion and be able to present expected results before approaching the real estate company. Otherwise, there is a risk of confusing the other party and delaying possible collaboration (Thomas Johnsson, pers. com.).

4.4.1.3. Engaging residents and changing behaviour

Residents in the area and citizens need to be integrated in the project as well. The innovation platform could be a way of creating new collaboration models (Mikael Edelstam, pers. com.). Several of the work packages include creating a culture of participation and changing

behavior of the residents as a measure for reaching the goals of the project (Partner meeting, 2014). The power of committed residents and citizens must not be underestimated (Thomas Johnsson, pers. com.). The technology needs to “learn” how to work with individuals. Some industry sectors have applied this, for example the music industry that has a main product that was easily digitalized. All industries that produce consumer-oriented products will in the future need to change and interact more with their customers. In the innovation platform, there is a great opportunity to engage residents and to make them feel that they are a part of the changes happening and that their opinions matter. The social aspects of people and their commitment based on their will, thoughts and beliefs is perhaps the greatest innovative force we will see in the future (Christer Månsson, pers. com.).

4.4.2. Barriers and Challenges

4.4.2.1. The structure of the project

The project has a complex structure with many different actors from various sectors involved. All the actors have different competencies, experiences, needs and goals. It is a challenge to find mutual projects and to create a structure in the innovation platform that meet the needs of all the actors involved in a way that is meaningful to them (Tim Delshammar, pers. com.). The project is also structured in a traditional industrial way. It is based on work packages and that the relevant industry will find solutions to the problems presented in the project. The universities are included for fresh perspectives and a new mindset and there is a work package that concerns internationalizing the results of the project. However, there is no resident participation incorporated in the processes of finding solutions to the problems, instead the solutions are created in a “top-down” approach. The main challenge of this project is to create a platform where there is a participatory culture and that resident engagement permeates through all the work packages. This is something that has been discussed lately in the steering group; how to involve the residents more (Christer Månsson, pers. com.).

4.4.2.2. The time aspect for the project

The time period of the project is short considering the goals that have been set up (Anna Heide, pers. com.; Mikael Edelstam, pers. com.; Thomas Johnsson, pers. com.; Moa Björnson, pers. com.). To create collaboration that works in as complex structure as this project and to see concrete results can be difficult to achieve in two years (Mikael Edelstam, pers. com.). The project is driven by the individual actors’ aspirations and ambitions. No one is coercing them to come up with new innovations (Thomas Johnsson, pers. com.). There must be enough

incentives for the actors to drive innovation in the project. It is possible for innovation to arise in two years, but then the ideas must come quickly and have time to go through an innovation process that leads to products or services that are easily repeated and distributed. Depending on the type of innovation, it is possible to achieve some in this narrow time period. For a small technical solution, for example, a prototype that can easily be created, tested and later sold in an existing or new market, but for more complex innovations such as systems solutions, the start-up period can be much longer (Moa Björnson, pers. com.).

4.4.2.3. The viability of the project

Another challenge is to secure the viability of the project. The project as it is now has clear limitations both in time and in budget, but the idea is to create a more permanent innovation platform (Tim Delshammar, pers. com.). How will the project survive without funding from Vinnova? The innovation platform needs outstanding results so that future finance can be secured (Mikael Edelstam, pers. com.). Creating successful financial models for local investments and systems to create local jobs could be one of the key solutions in securing the viability of the platform and enabling continued renovation of 'the million homes program' (Moa Björnson, pers. com.). Work package AP6 in the platform concerns financial models (Partner meeting, 2014). Looking at other examples in Sweden where retrofitting of existing buildings have been executed, the financial aspects has not been very highlighted (Thomas Johnsson, pers. com.). Today, there is a lot of technology and the problem is to combine technology and finance. Putting all the available technical solutions in place would mean a significant increase in rent, if the rent alone is to finance renovation. The goal is to find a way of financing renovation of these buildings without having to increase rent so much that the current residents are driven away (Mikael Edelstam, pers. com.).

5. Discussion

The purpose of this thesis was to study the dynamics of the innovation platform Malmö Sydost and how the platform through collaboration can drive innovation in renovation of existing buildings. A framework consisting of four questions was utilised to simplify the presentation of- and connect different aspects of the innovation platform. A few key aspects were identified concerning the dynamics of the innovation platform (table 3).

Table 3. Short summary of the key results from the executed interviews with actors in the Malmö Innovation platform.

Questions	Results	Comments
What	Technical/physical measures Social/behavioural measures Finding new collaboration- and financial models Spreading the platform globally	The measures that are to be carried out are in alignment with the aim of the project being taking a holistic approach to renovation of existing buildings.
Who	Authorities Universities Companies	The triple Helix is represented among the partners of the project. The actors have different roles in the project; drivers, spectators, problem formulators to mention some.
Why	Contribute to sustainable society Create new business Knowledge exchange Finding new holistic method for working with renovation of existing buildings	The actors have both individual and organizational/societal drivers for participating in the project. Emphasis is put on improving environmental performance both within the actors business and in Malmö and the rest of the world.
How	Consortium agreement Collaboration Changing resident behavior	Building trust is crucial for good collaboration. Collaboration is not only important between the partners in the project, engaging residents in the whole process of the project is very important as they also are key actors.

5.1. Innovation through collaboration

Innovation platforms can be a way of departing from the old industrial model of innovation. According to the old industrial view, innovation is created by competition between different actors on the same market. This view of innovation will not work in “the new knowledge society” (Arvidsson and Mannervik, 2009). Innovation, as mentioned before, does not often

arise in isolation. Collaboration seems to be the crucial factor for driving innovation. The innovation platform is built on collaboration between different actors, some of which are in competition with one another. What motivates them to collaborate and share knowledge? Firstly, there are mutual or similar drivers, both individual and more societal; secondly, a consortium agreement has been set up to control how the collaboration will proceed. According to Buerkler (2013), the actors must share common interests to engage in collaboration or they must be at least non-conflicting (Buerkler, 2013). The results show no obvious conflicts of interests, though not all motives for joining the innovation platform are shared among the actors. It is crucial that both individual and mutual/organizational drivers are present. The individual drivers will attract interesting actors to the project and the organizational drivers will help drive the project towards the mutual goals that has been set up and that have positive environmental effects both within and outside the system.

The actors will of course have different interests in the project and therefore different roles. Some have taken the role of spectators and are involved to obtain an update of what is going on in the sector, while some see the involvement as a way of finding new business opportunities and act more as drivers in the project. Dividing the innovation platform into work packages is a way of gathering actors that share common interests. This way, the actors are able to decide themselves with the incentives and businesses they have, which issue/issues are most interesting to them. Buerkler (2013) writes that partners' objectives should be similar, but their capabilities should be different. The members of the innovation platform consist of a wide range of actors, authorities, companies and universities and differ within these groups as well. The companies can be divided into four different sectors and the universities' scientific fields differ. These conditions are very promising for the outcome of the project.

Another aspect of creating successful collaboration is trust. The composition of the innovation platform can be a potential risk for the actors involved. If, for example, a technological solution is produced for decreasing the heat consumption in a building, for the company/companies that have produced it it is important to establish good relationships with property owners so that they are willing to test the new developed product. For the property owners, of course, there is a risk in trying new solutions and services as it is their capital that might be damaged if the product or service is insufficient. Buerkler (2013) describes trust as one of four critical factors for successful collaboration driving innovation (together with

interests, resources and behaviour) and writes that “trust helps participants to openly define and communicate interests, fosters more sharing of resources, and encourages behavior in the best interests of all parties involved” (Buerkler, 2013). This is also an important factor when companies in competition are to collaborate. How the consortium agreement is drawn up sets the standard for how safe the actors will feel in sharing knowledge with each other. Trust also strengthens in time and the more the actors interact with each other, the more successful the relationships will be.

5.2. Engagement of residents

Another type of collaboration that is important to establish, is the one between the actors of the innovation platform and the residents of the project area. One of the interviewees considered the structure of the innovation platform to be too industrial and that the engagement of the residents are a source of innovation and should permeate through the entire project. Discussions on how this could be further incorporated have occurred within the steering group. Residents are already involved in several of the work packages. There is an entire work package that concerns engaging residents and making them co-creators of sustainable urban development. It has not been established just how much the residents are to be engaged in each project in the different work packages. This is something that will show in time as the projects proceed.

To really ensure that the residents are involved in the project, one solution could be to include the residents in the project as a partner, equal to the companies, universities and authorities. It would contribute to erasing the line between “them” (the residents) and “us” (the innovators/actors). However, it is questionable if this is possible at all. There are several aspects to consider. Who would represent them, how would they be included in the consortium agreement and would they be entitled to a share of the possible profit from the project as well? Resident commitment is sought after and the importance of it has been highlighted in this project, is there a way of simply involving them more into the platform and making their presence permanent and natural? How can a continuous dialogue be conducted with the residents?

Another aspect that is highly emphasised in this project concerning the residents is changing their behaviour and lifestyles. If the obvious answer to increase residential engagement and changing their behaviour is not through including them as a partner into the project, then

what measures can be successful in changing their behaviour? This is an institutional matter. Changing their way of using energy and water is changing their everyday lifestyles. The actors in the innovation platform are definitely aware of the fact that technology can only take you so far and also that technology needs to "learn" how to work with people and not the other way around. How to affect the residents' behaviour was debated among some of the actors involved in the innovation platform during a partner meeting. The possibilities of producing an app to overcome this challenge were discussed. MKB has during a long time put in efforts to change the behavior of their residents, but it has not had a full effect. By, for example, producing an app that could contribute to more awareness and change the residents' behavior in every day life could make a difference. This together with technology could result in great energy savings (Anna Heide, pers. com.). An app could be used for enabling the residents to view their warm water consumption and how much waste they recycle. The motivation for improving their environmental efforts could be driven by individual measuring of the residents' water consumption, for example, and some sort of individual competition or competition between different neighborhoods (Partner meeting, 2014).

An app could also be the suitable equipment for the residents' to get involved in changes in the neighborhood in a simple way. The app could make it easier for the residents to, for example, report a fault and have the problem quickly solved. This could lead to an increased feeling of participation and greater power to influence the development and changes of the area the residents live in which could have positive effects in, for example, reduced vandalism.

It is important that the app is user-friendly to all of the residents. These areas are usually multi-cultural, but an app that is available in several languages would be easy to develop (Mikael Edelstam, pers. com.; Partner meeting, 2014). When creating an app for changing behaviour, there are several aspects to consider. The user must feel in control and want to use the app rather than feeling that they have to. The app will probably be more successful if the app is making an existing behaviour easier to do, rather than demanding a completely new behaviour (Eyal, 2013). Residents already throw away waste. If people do not know how to recycle or what material should go in which recycling bin they probably tend to just throw everything in the same bin. An app with easy accessible information on where to recycle what material, could improve something they already do, but increase the amount of recycling. Additional motivation for change could be residents taking part of the savings made from decreased energy consumption and be allowed to partly decide what that surplus money

should be used for (Partner meeting, 2014). In conclusion, this could be a way of combining technology and resident engagement to improve environmental performance of existing buildings.

5.3. Viability and finance

Two years is a short time for innovation to arise, as several of the interviewees urged. Even though collaboration can be seen as innovation in itself, it was pointed out that it is important to take real actions in the project and not only focus on establishing relationships between the actors. Depending on what type of innovation it is, two years might or might not be sufficient time to produce a proto type and test it. Even though no radical innovations might occur, there is still some pressure on the level of the outcome of the project. The actors want to get as much as possible out of being involved and for the innovation platform to be able to live on and also to be attractive to the outside world, both in concept and the innovations that has arised from it. The results from the interviews show that a success factor could be that there are existing projects that fit into the innovation platform. That would lessen the risk of not enough action being taken within the project time.

The Delegation for sustainable cities (Delegationen för hållbara städer) has, at the request of the Swedish government, identified key actions that will contribute to the development of sustainable cities. In a report carried out by the delegation 15 obstacles that complicates the transition to sustainable cities were presented. Several of the problems that the Malmö innovation platform seeks to solve are described in the report, among them "unsufficient citizen dialogue", "short-term project focus that hinder long-term development" and "lack of succesful business models" (SOU 2011:01/2012/66). Clearly, the problems that the Malmö innovation platform seeks to solve are established problems that are highly relevant. If there is a global demand for solutions to these problems it increases the possibilities to connect the innovation platform to the outside world. It is important to invest in pilot projects to drive the development, but it is also important that the pilot projects do not dominate over long-term planning and goal fullfillment (SOU 2011:01/2012/66). A good balance between investing in different pilot projects and long-term projects and goals needs to be established. The Malmö innovation platform consists of different pilot projects and there is a good balance between technical/physical and social/behavioural projects. But the collaborations between the different partners are also an important aspect and several of the interviewees have expressed that good collaboration will be one of the key aspects in the innovation platform's viability.

Interesting pilot projects will attract interesting partners, both in the sense that they can contribute to innovation and that many of them exist on a global market which can contribute to the spreading of the innovations, and the collaboration that arises will keep them interested and involved in the platform in the future as well.

Another important aspect in making the Malmö innovation platform successful and enable to survival of the platform after the project time has come to an end is the financial aspect. There are two aspects of finance: financing renovation and financing the viability of the innovation platform without government fundings. It seems not much emphasis has been put on the financial aspects in earlier similar renovation projects, there appears to be a great demand for finding financial models that work and that would enable renovation without financing it by a substantial increase in rent. By finding new financial models, this could contribute to the viability and future financial security for the Malmö innovation platform as it would make the concept highly attractive to other cities and organizations. The actors of work package AP6 want to develop financial models where social factors, such as local employment and security, are given a monetary value as this would help enable and finance restoration of socially and economically run-down areas.

Social Return on Investment (SROI) is an example of a method used to analyse the social, economical and environmental effects of different measures taken and give them a monetary value, for an example an educational initiative with the goal to increase employment of an area. The method is effect based which means that it is the effects of the action performed rather than the results of it that is given a value (Widheimer and Salner, 2011). As with other methods to estimate the socio-economic value of different actions, the SROI has some issues that need to be considered. This type of analysis often requires subjective value judgement on the measured outcomes. This can be problematic when, for example, weighing the value of a life-saving medication that is used in both a developed and a developing country. The people from the different countries will be given different values as the value reflects possible lifetime earnings. Another aspect to consider is the importance of consistency in the methods used when, for example, comparing two businesses. Different weighing of measures can affect the calculations, which results in an unreliable outcome of the comparison (Lingane and Olsen, 2004). The actors of the Malmö innovation platform need to take issues, such as these, in consideration as well, as they may lead to a greater penetrative power for the financial models they will develop. This would not only increase the appeal of the Malmö innovation

platform as a concept, but also be a great positive effect on and enable in a larger scale renovation of existing buildings.

5.4. Environmental Scientific Relevancy

I have, by using a framework, presented key issues concerning innovation in renovation of existing buildings through collaboration. The project was, during the time I investigated it, still in its initial face of establishing contact between the partners and finding suitable projects. Exactly how collaboration will work and what it will result in is not known at the present time. I have investigated the prospects of creating good collaboration rather than mapping out how the relationships worked. Arvidsson and Mannervik (2009) write that "there is a need for models of innovation systems that acknowledge a socio-technical approach, are dynamic, do not view people as only being driven by maximizing their economic gains and that are built on a view of firms that reflect the economic and business realities of the 21st century". The Malmö innovation platform has great potential to contribute to successful models of how innovation platforms work. By monitoring the work and progress of the actors in the platform it will become easier for others to follow. My contribution has been to identify key components and the initial work of an innovation platform. I highly recommend that the opportunity to follow and document the further progress and map out collaboration on the Malmö innovation platform is taken. This could contribute to understanding how collaboration works between many different actors and how collaboration can contribute to driving development into a sustainable urban future.

6. Conclusions

The conceptual framework utilised in this thesis sought to answer the questions "what", "who", "why" and "how" to help identify and understand the dynamics and key aspects of the Malmö innovation platform. The framework successfully identified the actions, of both physical/technological and social/behavioural character, that are to be carried out in the project. The actors involved and their roles in the innovation platform and motives for participating were presented as well as the success factors and challenges the project is facing.

Collaboration is key to driving innovation since innovation almost never arises in isolation. This contradicts the old industrial view that innovation arises through competition between actors on the same market. In the Malmö innovation platform the actors involved represent authorities, different business sectors and universities. Some are in complete different businesses and others are competitors on the same market. In this innovation platform, the success factors are considered to be sharing knowledge, collaborating and combining expertise from a broad spectrum of actors. The actors must not share the exact motives for participating in the innovation platform, but the motives must not be in conflict with each other. A combination of individual and organizational/societal drivers seem to be a good motivation for the actors involved and drive the project towards the defined goals. A critical factor for creating successful collaboration is trust. The drawn up consortium agreement will set the standards for how safe the actors will feel in collaborating and sharing knowledge. This trust will strengthen in time and through continuous interactions.

Another highly relevant aspect, which also means breaking free from old perceptions of innovation, is the increased engagement of residents in the innovation processes and the renovation actions. Engaging the residents in the actions that are carried out has several advantages. It can be a way of making sure that the products developed actually will be used and that the changes made are perceived as positive. Engaging the residents could lead to local employment and to an increased feeling of pride for the neighborhood, which could then lead to increased safety and less vandalism. Information on how the residents can make positive changes in their lifestyles should be easy accessible and by making them co-creators and participants they will most likely want to make changes as the changes are not forced upon them.

Innovation is not only the products and concepts that are produced to change and improve the environmental performance of existing buildings and increase the social standards of an area. Innovation also means creating a new environment for innovation to arise from and businesses to thrive in. Innovation is the development of new concepts to enable renovation and upgrade derelict areas and find new innovative ways to interact with the residents and engage them in every process of the transition to a sustainable urban society.

As has been pointed out, my thesis investigates the initial stages of the Malmö innovation platform wherefore I recommend that research on the further development of the innovation platform is carried out. I also recommend investigating the socio-economic effects of the actions carried out in southeast Malmö to be able to establish a correlation between the actions performed and potential positive effects in the lives of the residents in the area.

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Appendix 1.

The actors in the innovation platform that were interviewed.

Name	Organization
Mikael Edelstam	Region Skåne
Thomas Johnsson	E.ON
Anna Heide	MKB
Jenny Holmquist	MKB
Christer Månsson	Media Evolution
Moa Björnson	Miljöförvaltningen Malmö stad
Tim Delshammar	SLU

Appendix 2.

The interview template with questions asked during the interviews conducted in this thesis (in Swedish).

- Varför är ni involverade i Malmös innovationsplattform?
- Vilken roll har ni i projektet?
- Vilka intressen har ni i renovering av befintliga byggnader (här miljonprogrammen)?
- Vad hoppas ni att uppnå genom att vara involverade i projektet?

- Vilka är de främsta/nyckelutmaningarna för innovationsplattformen och vilka är de främsta utmaningarna med själva renoveringen av byggnaderna?
- Vilka är möjligheterna? (utmaningar och möjligheter både ur ert och ett generellt perspektiv)

- Vilka aktiviteter och projekt kan utföras inom 2 år?
- Vilka är de förväntade resultaten av innovationsplattformen för denna tidsperiod?
- Vilka är de främsta målen för de närmsta 5-10 åren? (VISIONER) Även här, vilka är de förväntade resultaten?

- Hur kan, rent praktiskt en rad olika företag, Malmö stad och universitet samarbeta och driva fram innovation i byggsektorn?
- Hur fungerar samarbete i detta projekt? Skapar ni egna nätverk, egna samarbeten inom projektet med de aktörer som arbetar med samma/liknande frågor som ni?
- Vilka samarbetar ni med inom projektet?