Circular economy –
the way to a more
sustainable urban
environment?

A study of how conversion and a circular
economic business model can benefit
the aspects of sustainability.

Emelie Warodell and Victor Lindholm
Abstract

Today there is a global growing discourse regarding sustainability and the need for ecological responsibility. This in combination with the high level of shortage of accommodation on the market in Sweden and Stockholm, which is the geographically limitation of this study. One strategy to handle the shortage of accommodation and the high vacancy levels is property development through conversion where the change of use is in focus. This study is an exploratory study were the aim is to investigate how the existing property portfolio can be used to benefit the aspects of sustainability by conversion and a circular economic business model. There is also a goal to deepen the understanding of the incentives and market strategies in relation to conversion.

The chosen method for this research is to use an abductive research method to ascertain the possibility for changes along projects’ life-time. Qualitative data have been collected with semi-structured interviews as the main source where the respondents have been projects managers, and other essential actors, on a few selected companies as well as influential actors within the real estate sector.
The three dimensions of sustainability, ecological, social and economic, have different influential roles depending on which explaining model that are studied. Also, there could be a ‘fourth dimension’ of sustainability, the cultural dimension, which widens the perspective. Further, the need for an environmental change have led to the birth of another economic model; circular economy. Here the traditional linear economic model is challenged with a model where recycling together with re-usage are in focus.

Conversion is a strategy that is more frequently used now then for example 20 years ago, but the concept could have a larger role in today’s society. This could be seen as a circular economic approach for the construction, and/or real estate, industry, in which there have been investigations whether this new economic business model could have a bright future. Although, the actors on today’s market do believe that the traditional linear economic model is a better fit since it provides them with a larger profit in a shorter amount of time. Furthermore, the actors do believe that a circular economic business model is a good approach, but it is unfortunately not economically defendable in a large scale today. Since the market is full of uncertainties there are few actors that are willing to step into the world of conversion.
Acknowledgement

It is with great joy and pride that we can present our master thesis within construction management. It has been extremely developing to work with this study, to create the research question and to engage ourselves in a topic and stick with it. The journey that we have taken, while writing this thesis, have learnt us a lot.

We would like to thank Tina Karrbom Gustavsson and Väino Tarandi for sharing their expertise within the area of research. The seminars with you have helped us to concretize goals in advance, to have sub targets and to increase our knowledge about research in general.

A special thanks to our supervisor, Tina Karrbom Gustavsson, who have been our rock and supportive companion during the work and creation of this thesis. Without your guidance we would not have come this far. Thank you for helping us concretize our ideas from time to time and to steer us in the right direction.

We would also like to thank Professor Hans Lind for sharing his expertise with us and for helping us to gain knowledge that the construction industry could not. Thank you for the interview and for reserving time for us even though you have retired.

Finally, we would like to thank all of you who have helped us in our work in any way possible. Particularly thanks to all the respondents who have helped us to gain knowledge of the practices of conversion, circular economy and sustainability. Without all of you this thesis would not have been possible.

Thank you!

Emelie Warodell and Victor Lindholm
Stockholm, May 2016
Sammanfattning


Vi har valt att använda en abduktiv undersökningsmetod. Kvalitativ data har samlats genom semistrukturerade intervjuer som huvudkälla där respondenterna har varit projektledare, och andra viktiga aktörer, på diverse utvalda företag såväl som inflytelserika aktörer inom fastighetsbranschen.

De tre hållbarhetsdimensionerna, ekologiska, sociala och ekonomiska, har olika inflytelserika roller beroende på vilken förklarande modell som studeras. Det skulle också kunna finnas en fjärde
hållbarhetsdimension, den kulturella dimensionen, som breddar perspektivet. Vidare så har behovet för en miljömässig förändring lett till skapandet av en annan ekonomisk modell; cirkulärekonomi. Här utmanas den traditionella linjärekonomiska modellen av en modell där återvinning och återanvändning står i fokus.

Förord

Det är med stor glädje och stolthet som vi kan presentera vår masteruppsats inom byggprojektledning. Det har varit otroligt utvecklande att arbeta med den här studien, att skapa frågeställningen till studien och att engagera oss själva i ett ämne och att hålla fast vid det. Under den här resan som vi har tagit, under tiden som vi har skrivit den här studien, har vi lärt oss otroligt mycket.

Vi skulle vilja tacka Tina Karrbom Gustavsson och Väino Tarandi för att de delat med sig av sin expertis inom forskningsområdet. Seminarierna med er har hjälpt oss att konkretisera mål i för tid, att ha delmål och att öka vår kunskap om forskning i allmänhet.


Slutligen skulle vi vilja tacka alla er som har hjälppt oss med vårt arbete på ett eller annat sätt. Särskilt tack till alla respondenten som har hjälppt oss öka vår kunskap om hur det rent praktiskt går till gällande konvertering, cirkulär ekonomi och hållbarhet. Utan er hade det här arbetet och den här masteruppsatsen inte varit möjlig.

Tack!

Emelie Warodell och Victor Lindholm

Stockholm, Maj 2016
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Introduction

In the introduction chapter the background of the research is given and the concepts are briefly explained. Also, the research gap is highlighted and the research question is presented.

Sustainability

Today there is a global growing discourse regarding sustainability and the need for ecological responsibility. According to Rockström (2010) humanity is pushing the Earth’s processes in terms of climate change, biological diversity loss and freshwater use to its limits and therefore threatening the self-regulating capacity of our planet. Furthermore, Rockström highlights the importance of how humanity needs to manage these Earth system processes to avoid catastrophic and disastrous changes in the future. To prevent these negative effects, the concepts of sustainability could be implemented through conversion as an example. The concept of sustainability can be said as consisting of three key components, which are the ecological, social and economic dimensions (Schoenherr 2012). The ecological aspect includes all environmental commodities, assets and services, which humanity is dependent on and that are jeopardized by pollution, emissions, resource use and demolition of habitats (Rydin 2010).

Rydin (2010) refers to the report ‘Our Common Future’, of the Brundtland Commission, and describes how the economic, social and ecological aspects are interconnected. Rydin also explains the economic dimension as using market-based dynamics to meet people’s needs and provide fundamental material for the quality of life. The different dimensions of sustainability can be explained through two different models. In the first one the three dimensions of sustainability are presented as equally important to fulfil sustainable development (Elkington 1997). The second one on the other hand is presented in a hierarchical order where the different dimensions have different value (McKenzie 2004). Both of these models are illustrated in the theoretical framework chapter. Further, the relationship between the ecological and economic aspects can further be described as the economy being reliable on the improvement of environmental quality, which is significant for sustainability (Linan et. al. 2004).

The concept of sustainable development can be connected to the ecological and economic dimensions of sustainability. The idea of sustainable development is the foundation of another concept; cultural development. Cultural sustainability is a concept created from the point of view where the long-term needs of future generations are in focus and that they have the possibility to
access cultural resources (Throsby 2003). It has been argued that the concept of sustainability is in need of four dimensions; ecological, economic, social and cultural.

**Shortage of accommodation**

Another problematic situation today is the shortage of accommodation on the market in Sweden. Primarily in the larger cities such as Stockholm, Malmö and Gothenburg. The resources of dwellings in these cities are decreasing since the population is increasing. In other words, the demand of dwellings is higher than the supply which partly could be explained by the urbanisation and the immigration (Stockholms stad 2009). Therefore, there is a need for developing more dwellings.

In the Stockholm area the building density is constantly increasing and this will probably result in a lack of built-ready land in the future. Due to the lack of built-ready land and the shortage of accommodation the need for alternative means when creating dwellings is more up-to-date than ever (Boverket 2012).

**Conversion**

Property development is one strategy when trying to decrease the shortage of accommodation in combination with handling the lack of built-ready land (Stockholms stad 2009). One strategy within the concept of property development is through conversion, which means that a new use for the already existing building is created (Remøy and van der Voordt 2014). The change in use can for example be from commercial buildings to residential or from industrial to residential. When managing the shortage of accommodations and land property development have become a more frequent used strategy. Since 2009 an average of 700 apartments has been added per year through property development by conversion in Stockholm (Stockholms stad and Sweco 2015).

**Circular economy**

In 1976, Walter Stahel and Genevieve Reday came up with a vision for an economy in circulation, the circular economy, and the impact it has on e.g. resource conservation and waste prevention (The Product Life Institute 2013). Stahel showed, in partnership with Max Börlin, in a report from 1987 that if using the circular economic way of thinking a higher profitability can be achieved in the long run than the opponents who uses other economic models. One of these other economic models is for example the classical linear economic model which can be described as a “cradle-to-grave”-model. Stahel felt, since this way of thinking and this model has an open end, that the only and best sustainable model in economy is one with a “cradle-to-cradle”-model where products that are
recyclable are used (The Product Life Institute 2013).

The concept circular economy was first used by the two British economists David Pearce and R. Kelly Turner in 1990. They believed that the classical linear model did not have a natural built-in recycling system. Therefore a circular, closed flow of material in the economy was suggested that later was given the name circular economy (The Product Life Institute 2013). An example of circular economy is designing the products produced of renewable materials in a way that enables redesigning based on the need and a long lifetime.

Since the traditional linear economical model will result in having a negative impact on the environment in the long run, there is a need of using new alternative models. Such as the circular economic model (Su et. al. 2013). A circular economical perspective is as mentioned a closed flow system where materials are re-used instead of being wastage, if not necessary (Feng 2004). The construction industry is an industry which have a high level of wastage and which have a large impact on the environment. Therefore, a more resource efficient approach might be more suitable such as circular economy.

The interest of implementing circular economy in the construction industry in a more extensive manner has grown. Recently there have been several articles in the Swedish trade magazine ‘Byggindustrin’ where actors from the industry have highlighted the importance of circular economy in the construction industry as well as the present positivity towards the implementation. The problematics with implementing circular economy in the construction industry are still unclear, although the willingness towards it are present (Åfreds 2016a). Further, a new way of thinking needs to be established in the industry and there are some companies and organizations within the built environment sector who have formed a network which aims to work towards a circular economy (Åfreds 2016b). There are actors within the construction industry who states that the new circular flow slowly replaces the traditional sustainability working method (Åfreds 2016c). According to Charlotta Szczepanowski, head of sustainability at Riksbyggen, interviewed in Byggindustrin by Åfreds (2016c), circular economy is a more frequently used concept. She highlights the importance of stepping away from the product consuming approach and instead have the function of the product in focus. Further, Hayar Gohary executive business manager at Akademiska Hus, interviewed in Byggindustrin by Åfreds (2016c), points out the collaboration between different actors and that a co-operation can benefit the circular economy and its basic principles. He also highlights that the design process and the selected materials should be sustainable in long-term with actions that benefits the flexibility of division of rooms.
In a previous study, ‘Konvertering av kommersiella lokaler till bostäder’ (Conversion of commercial facilities to residential) by Ullsten and Svensson (2010), the concept of circular economy in the construction industry have been touched upon. Although circular economy in combination with property development through conversion have not yet been studied. Since there is a need for a more sustainable way of thinking when handling resources and especially in the construction industry this thesis will cover how it is possible to manage and use the existing property portfolio to benefit the sustainability aspects. In this study the aspects of sustainability are in focus combined with the ‘fourth dimension’, cultural sustainability. This also in combination with the circular economic model. Finally, the research questions are:

*How can the use of existing property portfolio benefit aspects of sustainability through conversion?*

*And can the circular economy business model be of use? Also, how can market strategy and incentives highlight the actions of the actors in the industry in relation to conversion?*
Limitations

In this chapter the limitations in and of this study is presented. This to set the frame of the research and to highlight what aspects that will not be covered in this research.

This study is geographically constrained to Stockholm, Sweden and will not cover the different dimensions of sustainability thoroughly. The study will also only cover property development through conversion to residential from another use such as industrial, commercial or other. A circular economic perspective will be used all-trough the study and therefore other important aspects may not be covered.

Throughout the study both the construction industry as well as the real estate industry are mentioned. Although, these are to be seen as synonyms in this research since the researchers believe that both industries would benefit from this study. The real estate industry since there is a long-term perceptive that could benefit owners and the construction industry since the implementation of circular economy in the construction industry needs to be in mind from the beginning when constructing.

The study will also be limited since conversion is not established on the market and the actors with knowledge of the area are hard to find. Also, that the theoretical framework may not be as extensive as hoped since the concept of conversion in general is not a frequently studied subject. In addition, there have only been nine interviews executed which can limit this thesis. Another limiting aspect is that the actors who have been interviewed might not have enough knowledge of the area even though it has been assumed that they have. It would have been desirable to have executed an interview with different so called early adopters on the conversion market in a larger extent.

Since there have not been interviews with all kinds of actors in this area, for example early adopters, all point of views may not have been highlighted. The interviews have also been made in different times of the day and different days of the week which may have affected the responses from the respondents. During these interviews the respondents may also have given other answers to the questions than they would have and instead answer in the way the management wants them to answer. The answer could have then also been interpreted incorrectly which may have affected the result. It is also important to consider if the right respondents have been chosen for this thesis to get to the best result possible.
The validity of the thesis can be discussed since the researchers, as mentioned above, have not interviewed an early adopter. Although there have been extensive attempts to interview an early adopter, but the attempts have unfortunately been unsuccessful. The outcome of the research might have been different if one or several early adopters would have been a part of the empirical chapter. This since the responses from them might have changed the answer to the question why conversions are not that common today, for example.

Further limitations within this study is that all of the actors that would have been good to interview was not because of lack of response. To get to a better conclusion interviews with at least one early adopter would have been preferable. An interview with an early adopter could as well have led the study to a new track and new information within the area. It could also have given a deeper understanding of how the market works. To push more and become a little annoying when it comes to getting the interviews an interview with one of these early adopters could have been possible.

Further it is difficult to generalize how conversion and circular economy are looked at outside of Stockholm by the results in this thesis since it is limited to the Stockholm region. If the demarcation of the work instead would have been looking at the whole country the answers and conclusions might have looked differently.
Methodology

In the method chapter the chosen method strategy is presented. Also, the working process and the reasons why the working process have taken this specific direction.

Research purpose

This study is an exploratory study since the aim is to gain insight in the construction industry, conversion projects and in combination with circular economy and the sustainability concepts (Robson 2002). There are three strategies when conducting an exploratory study, which are literature research, interviews with ‘experts’ and conducting focus group interviews. The advantage with this type of research purpose is that it is flexible and adaptable to changes, which can be preferable in an abductive research which this research is (Saunders et. al. 2015).

In the beginning of the master thesis, when deciding the topic and the purpose, there was an interest of the subject of conversion. This since conversion is an enthralling alternative to new construction. Due to this, in collaboration with the supervisor there were speculations on how to make the topic of conversion interesting and with depth. As a result of that and after reading former master theses the topic of the master thesis took form. Initially, the subject of the degree project was to explore how property development through conversion can generate added value for companies within the real estate sector. This by challenging the traditional linear economical model and instead adapting a circular economical model with the main focus, of the conversions, on sustainability. Since property development projects are not always economically profitable the degree project would explore how value can be created where there now is zero or negative value. Also, how participants in the real estate sector could be benefitted by adapting the sustainability aspect to property development in a more extensive manner and by adapting circular economy when pursuing projects for property development. Further, it was decided that the topic and the purpose of the thesis would be explorative and it would explore how the existing property portfolio could benefit the social and cultural sustainability through conversion, by using a circular economical perspective.

Research method

The chosen research method in this study is the abductive research method. The abductive research method allows the researcher to both develop a set of data based on already developed theories and vice versa (Dubois and Gadde 2002). The abductive research method is chosen for this thesis since it is possible to jump back and forth between theories and data to find the explanation to the
questions asked. This is why it is the most suitable research method for this thesis, since there was not a complete knowledge of the subject and it was not clear how to exactly approach the subject. When performing interviews there have been more important to find a fitting theory after the interview have been executed (Saunders et. al. 2015). In the first interviews the questions were based on information that had been read while the later interviews were more based on the findings from the first ones. The questions developed as more knowledge was gained and patterns were shown. Meanwhile, the aim is to explain the relationship between variables, e.g. explaining the relationship between conversions and social sustainability. Here it is more fitting to be able to find theories first and develop a set of data later. Since there has been a need to mix these methods, the abductive research method were chosen.

Theory

In a thesis the matter of theory is highly relevant. The role of theory is to assistance when deciding the approach and designing the research (Saunders et. al. 2015). This research is a substantive theory since these type of theories is restricted to a particular time, research setting, group or population or problem, which this research is (Creswell 2002). This since there is a specified problem and question which are restricted to a particular time since this is a state of curiosity now and perhaps not later.

According to Saunders et. al. (2015) the significance of contributed research and findings will unavoidably be judged in relation to previous, and future, research and their findings. Therefore, the existing published research have to be established within the same research area. But if possible there is also good to identify other research that might be in progress. Although, this can be hard to accomplish. All the previous research read will therefore help when gaining knowledge of the research area and will also help when clarifying the research question.

In most research the search for literature is an initial pursuit, although it is usually necessary to continue searching for previous research during the thesis as well to further increase the knowledge (Saunders et. al. 2015). This has been done in this research as well as complementing with additional literature and articles along the research’s development. This is a process that goes over and over until the thesis is done (Saunders et. al. 2015). Although, along the way the research questions and objectives have been redefined in light of the reading and collected knowledge.

In this thesis the literature together with the empirics will be the foundation of the research. Former master theses have been read, but mainly articles on topics such as circular economy and conversion
in general. This to gain knowledge of the topics and to be able to further develop the research question. Also, knowledge was gained on previous research when combining circular economy and the construction industry. Here it was discovered that circular economy in the construction industry had been touched upon, meanwhile circular economy when discussing conversion was not a topic which had been covered yet. Although conversions from commercial buildings into housings had been touched upon which was a good reference project to look at.

Later on, when having conducted a couple of interviews, the chosen strategy and chosen topic resulted in the curiosity of exploring why this type of method was not as frequently used. To be able to gain an understanding of how different actors behave and how companies think knowledge of market strategies and incentives have to be added. Therefore, articles with the main focus of market strategies and incentives were read. When gaining that knowledge articles and concepts were studied on topics of market strategy and the Boston Consulting Group Matrix to gain understanding of why conversions is not as frequently used as a strategy as it could be.

Keywords that have been used are for example; conversion, circular economy, sustainability, property development, housing, commercial, industrial, market, early adopters, Boston Consulting Group matrix and Corporate Social Responsibility.

**Qualitative and quantitative data**

In this thesis qualities rather than quantity are interpreted. Qualitative data are for example the data collected when doing interviews (Saunders et. al. 2015). Therefore, this is a qualitative study. The data collected are from both reports within the subjects touched upon and interviews that are later transcribed and analysed. The method chosen for this degree project is, as mentioned, an exploratory study and therefore the research approach is non-standardised with qualitative interviews as the method (Cooper and Schindler 2008). Qualitative interviews are a fit method for research that have the purpose to gain understanding, which this thesis have (Saunders et. al. 2015). The conducted interviews will be semi-structured which are conducted to gain understanding of the area. Interviews in general also provide significance and depth to the obtained data, which will be necessary to highlight incentives and values in relation to conversions (Saunders et. al. 2015).

The interviews were conducted with actors on a few selected companies; projects managers, a project manager for the planning phase, a CEO, an administrative manager. Also, two professors and a representative from Stockholm municipality were interviewed. All of the actors are or were active
within the real estate sector, this to gather qualitative data. In other words, these actors are to be seen as ‘experts’ within the research area since they have insight in the practical part of the process and knowledge of it. The majority of the respondents are presented anonymously in the empirics. Although the expert Hans Lind, professor in real estate economy, have been kept known. Each interview was recorded and then transcribed to fully be able to highlight relevant aspects from each interview in a correct manner. When writing the empirics, the different interviews were studied and examples of different concepts were identified. This is what the empirical chapter is built upon.

As a complement to the interviews knowledge was raised after visiting the seminar ‘Cirkulär ekonomi – möjligheter och utmaningar’ (Circular economy – possibilities and challenges) with focus the on circular economy in companies. The seminar, which occurred 2016-04-12, was initiated by the research group ‘Bortom BNP’ KTH where one part of their research is about circular economy. On this seminar, there were four persons participating in a panel discussion and two of them also held an introductory lecture each on the subject. This knowledge resulted in a deeper understanding of the subject and the complication of it which could be a guideline whether more and deeper theory should be collected and it could also be implemented when analysing and discussing. Here one of the members of the panel discussion was also an influence later when the part on how the future research and further discussion was to be formulated.

**Presentation of the respondents**

The empirical findings are based on eight interviews with different actors in the construction industry with insight in conversion projects. Below in table 1 there is a short summary of the respondents.

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<th>Project Manager</th>
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<td>Interview 6</td>
<td>Professor Hans Lind</td>
<td>Hans Lind</td>
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<td>Interview 7</td>
<td>Professor</td>
<td>’Responder 8’</td>
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<tr>
<td>Interview 8</td>
<td>Municipality Official</td>
<td>’Representative from Stockholms stad’</td>
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The first interview was with an experienced project manager at a municipal housing corporation wholly owned by a municipality in the Stockholm region. This municipal housing corporation is one of the largest housing corporations in Sweden. The project manager of this company will further be referred to as ‘Respondent 1’. ‘Respondent 1’ is a project manager of a conversion project which changed purpose from a centre of learning to student apartments. This project was the main focus in the interview along with the general challenges of conversion.

The second interview was with two respondents who both are project managers at a small development company, which is mainly active in the Stockholm region with the main focus on residential development. One of the respondents, ‘Respondent 2’, is the project manager of a large conversion and development project in the Stockholm region. The project has been the headquarter of a large Swedish telecommunication company with both production and commercial uses. This project was one of the focuses in the interview, but also the challenges of conversion as well as the possibilities to ease the process of conversion in the future. Further, the other respondent, ‘Respondent 3’, is a project manager at this company as well but not for that specific project.

The third interview on the other hand was with an administrative manager at one of the largest private housing corporations in Sweden. The administrative manager, ‘Respondent 4’, have great knowledge of the construction industry and have insight in several conversion projects in the Stockholm region which the company is involved in.

Furthermore, the fourth interview was with two respondents involved in a large conversion and development project in the Stockholm region, which was the main focus of the interview. The first respondent, ‘Respondent 5’, is an executive project manager and the second, ‘Respondent 6’, is a project manager for the planning phase. They are both working at a small development company active in the Stockholm region with the main focus on residential development.

The fifth interview was with an experienced actor in the construction sector who is the CEO for a small development company active in Stockholm with the main focus on residential development. This person will further be referred to as ‘Respondent 7’. The main focus on the interview was on conversion in general. This since he previously has been converting in a great extent at another company, although his current company do not convert at the moment and have no conversion projects planned or in production.

To give depth to the study a sixth interview with professor Hans Lind have been executed as well.
During his interview the focus was on conversion in general and he provided the study with his expertise and opinions. Also, a complementary interview was executed with another professor, ‘Respondent 8’, to gain his perspective of the flexibility in detailed development plans.

The last performed interview was with a representative of Stockholm municipality, Stockholms stad, to gain another perspective on the subject and to gain knowledge of how a municipality reason.
Theoretical Framework

To enable an analysis of the executed interviews, the following theoretical framework was based on four themes; ‘economic profit versus ecological and cultural sustainability’, ‘conversion’, ‘circular economy in the construction industry’ and ‘market strategies and incentives’. These themes are related to the purpose of this research and will be used to develop a theoretical explanation of the generated results.

Economic Profit versus Ecological and Cultural Sustainability

According to the Brundtland Commission there are three aspects of sustainability, although there could also be a ‘fourth dimension’. The sustainability dimensions relate to each other based on two different models deepening on which role they play in relation to each other.

The three dimensions of sustainability

According to the Brundtland Commission the aspects of sustainability are economic, social and ecological which are interconnected (Rydin 2010). Further, sustainable development is a concept that is used when discussing the development of society. The original explanation of the relation between the three dimensions of sustainability is often based on a Venn diagram were three circles overlap each other. The criteria for sustainable development is then fulfilled where all three dimensions are overlapped. According to this diagram the three aspects of sustainability are illustrated as equals with the same weight and value no matter what aspect it is (Elkington 1997).

![Venn diagram over the three dimensions of sustainability (Elkington 1997).](image)

**Figure 1** Venn diagram over the three dimensions of sustainability (Elkington 1997).
Another explanation to sustainability and how the dimensions are connected is through hierarchy. In this model the foundation of the hierarchical order is the ecological dimension. This means that the ecological dimension of sustainability is of fundamental weight and a condition for achieving social and economic sustainability. The dimension which is dependent on both ecological and social sustainability according to this model is the economic dimension. This means that if the ecological and social dimensions of sustainability are fulfilled the economic dimension can also be achieved. Sustainability in whole can then be fulfilled if all of these aspects are achieved by this hierarchical order (McKenzie 2004).

![Hierarchical model over the three dimensions of sustainability](McKenzie 2004)

**The ‘fourth dimension’ of sustainability**

The relationship between the ecological and economic aspects can further be described as the economy being reliable on the improvement of environmental quality, which is significant for sustainability (Linan et. al. 2004). The concept of sustainable development can also be connected to the ecological and economic dimensions of sustainability. When interpreting the quality of life as an aspect a wider perspective is taken into mind and the idea of ‘human development’ is interpreted. The material progress is not the focus here, but as mentioned, the quality of life and the standards of living is the main focus. In the Brundtland Commission sustainable development is defined as “development that meets the needs of the present without compromising the ability of future generations to meet their own needs”. The idea of sustainable development is the foundation of another concept; cultural development. The focus here is the long-term needs for future generations to access cultural resources which can be seen as essential. Cultural sustainability is a concept
created from this viewpoint. The ‘fourth dimension’ of sustainability, cultural sustainability, takes the aspects of different generations over time into mind in a more extensive manner (Throsby 2003). Therefore, it can be argued that the concept of sustainability is in need of this ‘fourth dimension’ and that sustainability is best explained by ecological, economic, social and cultural aspects.

Economy and ecological sustainability

In the construction industry there is often a traditional linear economic point of view which demands the projects within the companies to be economically profitable. Although there is also an urgent demand today which requires the four sustainability aspects to be considered. Economic profit and ecological sustainability are two aspects that are related to and dependent on each other. But the question is in what ways the two aspects are linked; does it really have to be a battle between these or could they instead support and complement each other? In a previous research made by Schoenherr (2012) it was concluded that environmental management, e.g. initiatives as pollution prevention and waste reduction, had an overall positive influence on different plant’s performance, in terms of quality, delivery, flexibility and cost performance. In other words, this indicates that the ecological aspect supports and contributes to economic profit. It is important to highlight that ecological sustainability does not only have to be a negative load on businesses or companies, but it could rather be used as a tool for achieving successful economic results. According to Haanes et al. (2013) the sustainability aspect can be seen as a device to accomplish and contribute to new innovation for all. Since economic profit and ecological management are related to each other, they might not be viewed as self-standing and independent aspects. In the study of companies in developing countries made by Haanes et al. (2013) this interdependent relationship is highlighted by describing that there do not have to be a trade-off between the ecological and economic aspects.

Economy and cultural sustainability

The cultural sustainability aspect on the other hand can also be linked to economics. This since sustainable development, which is the foundation of the concept of cultural sustainability, marries the idea of sustainable economic development according to Throsby (2003). He means that this particular link is the concept ‘cultural sustainable development’ (Throsby 1995). Cultural sustainability changes with people and the environment and the purpose is to strengthen the identity of culture while the knowledge and appreciation for different cultures will be raised. The definition of culture is wide since it includes both material and non-material aspects. By cherishing valuable buildings and habitats cultural sustainability can benefit (Finlands FN-förbund 2016).
Another aspect that is important when discussing sustainability is the improvement of current knowledge of the attitudes, the cultural differences and how behaviours of developers influences the sustainability aspects of a project and a development business. Although, there is a limited understanding of what motivates individual developers since there is a lack of understanding the factors behind their incentives and attitudes (Seeglier and Turok 2015).

Conversion

In Stockholm there are currently, as mentioned, a shortage of accommodation on the market due to urbanisation and the high increase in level of the population meanwhile the resources of dwellings decrease in relation to the population. (Stockholms stad 2009). Furthermore, due to the lack of built-ready land and the shortage of accommodation the need for alternative means when creating dwellings is more up-to-date than ever (Boverket 2012). In addition, there are high vacancy levels on the market which could be eased by different strategies of property development (Remøy and van der Voordt 2014).

Conversion as a strategy

Property development is one strategy when trying to decrease the shortage of accommodation in combination with handling the lack of built-ready land. One strategy within the concept of property development is conversion. This by converting the use of buildings. For example, from industrial to residential. When managing the shortage of accommodations and land property development have become a more frequent used strategy. Conversion can also be a strategy when having high vacancy levels in the office market (Remøy and van der Voordt 2014). There is a high potential for conversion of commercial facilities in housing areas or inner-city locations. If the facilities which are located in segregated locations are converted the location itself needs to be transformed.

Statistics

In 1995 approximately 400 apartments were added by conversion (Finansborgarrådet, Gatu- och fastighetsborgarrådet och Stadsbyggnadsborgarrådet 2005). Meanwhile, since 2009 an average of 700 apartments have been added per year through property development by conversion in Stockholm (Stockholms stad and Sweco 2015). During the time period 2009 to 2014, an average of 16 percent of the total amount of added apartments have been added through conversion which indicates that conversion is a more frequently used method. This can also be stated since the increase from 1995 to the time period 2009 to 2014 is 43 percent.
Definition

Conversion in general is a transformation or change of something (Nationalencyklopedin 2016c). The concept ‘change of a building’ contains all that is not newly built or maintenance such as addition, to a building, or other changes (Ullsten and Svensson 2009). In the Planning and Building Act (1:4§) the change of a building is one or several measures which changes a buildings construction, function, way of use, appearance or cultural-historical value. Addition, to a building, on the other hand is a change of a building which means an increase in the volume of the building. Addition is therefore also an excavation for a basement since addition is regardless of direction (Boverket 2015). When discussing conversion, it is the change of the way of use that is mainly relevant.

Advantages and disadvantages

In previous research by Ullsten and Svensson (2009) they performed an interview with the Area Manager in the Department of Housing and Urban Development and the Director of City Planning. According to that interview the Department of Housing and Urban Development claimed that there are some advantages and disadvantages of conversion. The advantages of conversions are that more unconventional housing solutions is made and that it will result in a more mixed city with a large possibility of integration of residential and business. The possibility of getting more housing in the city will also increase. The disadvantages, or more of a problem, on the other hand with conversions are that the buildings that will be converted often are deeper than what usual residential buildings are. This will create areas in the future dwellings that will lack of direct daylight. Another problem is also, since many buildings that might be converted are located nearby heavily trafficked roads, that the residents will be disturbed by noises in the surroundings (Ullsten and Svensson 2009).

According to Remøy and van der Voordt (2014) there are some success and failure factors connected to conversion projects. The identified risks of conversion are related to legal or technical aspects, which eventually turn into financial aspects. Further, there are also success factors connected to conversion, which are low purchase price, an adaptable floor plan, government subsidy, or clients with long-term investment perspective. Remøy and van der Voordt (2014) mean that these critical factors of success and failure are generalized and should cover the range of possible opportunities and risks with conversion projects. Also, that the sooner these factors are assessed the better and if so they can contribute to increased feasibility. According to Jansz (2012) conversion is more sustainable in certain market situations if the lifespan of new construction is expected to be shorter. To enable conversion change-of-use adaptability should be incorporated as an important issue when designing commercial buildings (Remøy, De Jong and Schenk 2011). In addition, Remøy, De Jong and
Schenk (2011) mean that there also is a potential role for planners and the legal framework to allow for flexibility in the design of new buildings for their future adaption. Barlow and Gann (1993) on the other hand means that there are five major triggers and obstacles of conversion. These were found to be physical and design aspects, location, financial and economic and legal aspects. Also, the changing real estate market with a growing gap between demand and supply. Further, Wilkinson and Remøy (2011) established that a main driving force for conversion and building adaption is the aspect of sustainability. This since parts of Australia have as a goal to reduce the CO₂ emissions before year 2020. Another aspect is to upgrade the existing building stock to improve sustainability. Further, the interest for conversion increase when having a high office vacancy and high residential construction activity (Wilkinson and Remøy 2011; Bullen 2007). According to Barlow and Gann (1995) it is necessary to have a more flexible approach to building design and construction to ensure that buildings can be converted when the demand for new uses of the market increases.

**Circular Economy in the Construction Industry**

Circular economy can best be described by comparing it to the traditional linear model of economy. The linear model means that raw materials are used to produce products that after usage later, by most of the time, will be scrapped and thrown away. From an economical way of seeing it this will be a great profit for both the individual and the company, since the linear economical model generates greater profit in the short run. But looking at it from a larger perspective this model will have a negative impact on the environment (Circle Economy 2016; Boulding 1966).

**The traditional linear economic model**

According to the Ellen MacArthur Foundation (2016) the traditional linear economic model is illustrated as below. According to that model the virgin feedstock is the provider of materials and are produced to products. Later, after usage and during usage the products and the materials become leakage and landfill. Also, some of the energy that is created can be used and most of the energy is spilled. Furthermore, a small amount of the used products or materials is collected for recycling where some is lost. The amount that then is recycled of the total incoming virgin feedstock is 2 percent.
*Figure 3* Illustration of the traditional economical model according to the Ellen MacArthur Foundation (2016).

**The circular economic model**

The circular economic model on the other hand means re-usage of materials that earlier have been used. This way bringing in new materials and by that strain the environment is no longer that necessary (Circle Economy 2016; Stahel 2010). In accordance with the Ellen MacArthur Foundation (2016) a smaller amount of virgin feedstock than in the linear model is provided in the system, which should be renewable. The materials are then designed optimally for recycling and produced in accordance as well. The usage phase is here extent with a re-usage phase where the main idea is that products should have a longer life cycle than in the linear model. Here it is illustrated that a small amount of materials and products are leaked from the system, by composting, energy recovery and leakage, and that the majority of the products and materials are recycled.
**Figure 4** Illustration of the circular economic flow according to the Ellen MacArthur Foundation (2016).

**Definition**

According to Yuan, Bi and Moriguchi (2006) there is no accepted definition of circular economy. Although, the core of circular economy is according to them the circular flow of materials, which is closed, and the use of raw materials and energy through multiple phases. Circular economy is described by reduction, reuse and recycling of materials and energy according to Feng (2004). The system of circular economy means that there need to be a change in production processes and consumption activities, which means that human activity need to be changed and the efficiency of the economy depend on discharging fewer pollutants (Yuan, Bi and Moriguchi 2006).

Even though there is no generally accepted definition, as according to Yuan, Bi and Moriguchi (2006), the idea of circular economy in whole is although pretty much the same. Circular economy can for example be explained as being “**driven by the desire to use the value in products we already have that might previously have been thought of as waste**” (Coara 2015). Further, circular economy is, according to the Ellen MacArthur Foundation (2012) defined as:

“A **circular economy is an industrial system that is restorative or regenerative by intention and design. It replaces the ‘end-of-life’ concept with restoration, shifts towards the use of renewable energy, eliminates the use of toxic chemicals, which impair reuse, and aims the elimination of waste through**
the superior design of materials, products, systems, and, within this, business models.”

Another description of circular economy that can be found on the website of the Ellen MacArthur Foundation (2015a) is:

“A circular economy is one that is restorative and regenerative by design, and which aim to keep products, components and materials at their highest utility and value at all times, distinguishing between technical and biological cycles.”

The four building blocks of circular economy

According to the Ellen MacArthur Foundation there are four building blocks of circular economy. In these are ‘circular economy design’, ‘new business models’, ‘reverse cycles’ and ‘enablers and favourable system conditions’. The first essential building block is ‘circular economy design’. According to the Ellen MacArthur Foundation (2015b) it is essential that companies build core competence in circular design to facilitate product reuse, recycling and cascading. This building block demands advanced skills, information sets and working methods to enable circular products and processes. For example, it is important when choosing materials, standardizing components and designing for long-life products and for an easy end-of-life sorting. Another building block that is essential is ‘new business models’. New business models are needed since circular economy requires innovative business models that either replace existing ones or capture new opportunities. The Ellen MacArthur Foundation means that profitable circular economy business models and initiatives will inspire other actors and then will be copied which will expand the circular way of thinking geographically. The third building block is ‘reverse cycles’ which means that new and additional skills are needed for cascades and the final return of materials. Here it is materials to the soil or back into the industrial production system. This block includes aspects such as risk management, chain logistics and sorting. This phase supports the phase of ‘circular economy design’ since leakage of materials for example decreases. The last and final essential building block is ‘enablers and favourable system conditions’. The meaning of this block is to make the concepts of reuse of materials and higher resource productivity more frequently used so that these concepts become commonplace. It is enablers such as collaborations, rethinking incentives and providing a suitable set of international environmental rules.
The limitations of recycling

Andersen (2007) implies that circular economy will be beneficial to the society and the economy as a whole. According to him the beneficial aspects are not only when minimizing use of the environment as a sink for residuals but also when minimizing the use of virgin materials. Andersen means that circular economy is based on physical observations instead of economic. Currently, the environmental approach is mainly executed by recycling but Andersen means that there will come a breaking point where recycling will become too difficult and burdensome to provide a net benefit. Therefore, circular economy cannot promote recycling in perpetuity. According to Andersen (2007) only a limited range of circular options will make sense from the perspective of company managers. He means that recycling will be accepted only if it is desirable from a private economic viewpoint. Furthermore, if companies are rational and profit seeking the recycling and reuse options should then have been realised. If taxes would be set on key pollutants, activities that diminish the environmental burden will then become profitable.

Economy and the construction industry

In general, the traditional linear economical model is used in construction projects. This means that the projects, each for them or together within a specific area, have to be economically profitable. When using this type of economic model, the foundation of it means that a product is produced and
is sold to the user who eventually throws it away on the waste ground. This approach will eventually not be resource efficient. Therefore, another economical model, circular economy, might be more suitable to use. Circular economy is a vision of a system which is built on rebuilding and reuse of resources in a circular orbit. A criterion to accomplish circular economy is to eliminate wastage in the end phase. The use of environmental initiatives is significant in the building industry, since developers have a major influence on the built environment (Seeglier and Turok 2015).

**Market strategies and incentives**

A market perspective is needed for putting conversion in context of the market. There are some explaining terms that can explain the behaviour and attitude of different actors in the construction industry when it comes to conversion.

*Early adopters*

Early adopters are the first out of five established adopter categories, where the others are Innovators, Early Majority, Late Majority and Laggards. Early adopters are people who enjoy leadership roles and represent opinion leaders, and are seen as localities. They adopt early ideas with comfort, and search actively for new inventions, since they are already aware of the change that is needed to be done. They are the first to try new ideas and, for example, technology before others does. The definition, based on one of the oldest theories in social science, comes from the theory ‘Diffusion of Innovation’ which was developed by the sociologist Everett Mitchell Rogers in 1962 (Rogers 1962).

The early adopters can be seen as respectable trendsetters that potential adopters later will follow in their choice for something since they are an integrated part of the local social system (Rogers 1962). The potential adopters follow the early adopters’ choice of innovation and also for their advice since they are looked at as ‘the individual to check with’ when it comes to adopting new ideas. They are often respected for their peers and are seen as role models for the other parts of the social system. The role is basically to adopt new ideas and control them so that others can use them later on. It is important that the early adopters make careful decisions about the innovation so that their reputation will be intact (Rogers 1962).

*The Boston Consulting Group matrix*

The Boston Consulting Group matrix, or the growth share matrix, is developed by the founder of the Boston Consulting Group, Bruce Henderson (Reeves, Moose and Venema 2014). There are four
different groups in the matrix called; the stars, the cows, the pets and the question marks. Each of these four groups has their own specific, strategic imperative. The stars are high rated, have a high growth with a high future potential and are invested through the cash that are milked out of the cows. If the stars remain in their high position they will eventually become the cash cow in the portfolio. (The Product Portfolio 2016). The cows have both a low growth and a low development costs but high share and are the ones generating a large amount of cash to the company. The cows also supply the funds for the future growth of the stars. (The Product Portfolio 2016). The question marks are very uncertain and it is hard to really know whether or not they are becoming stars in the future. Because of this there is a decision to either invest in them or discard them. The expectation is that the question marks in the future will become stars. The fourth group, the pets, is more or less worthless since they are unlikely to generate any cash whatsoever.

![Relative market share](image)

**Figure 6** Illustration over the Boston Consulting Group matrix (Henderson 1970, 1973).

One of the main areas were the matrix is used is when companies need help to decide which markets and business units to invest in. The balanced portfolio includes stars, cash cows and question marks but do not necessarily need to contain pets since these are seen as evidence of failure. (The Product Portfolio 2016).
Focusing on four practical imperatives the companies can then get the most of the matrix as possible. These four practical imperatives are according to Reeves, Moose and Venema (2014):

**Accelerate**, which basically means that the businesses should keep up with the speed of the environment by frequently evaluate their portfolio. Since it is important to be up to date the planning cycle must be shortened and the decision-making requires more simplicity. **Balance exploration and exploitation**, which means that the companies should be more risk taking and be more tolerant to failure. The amount of question marks should be increased and they are tested more quickly which leads to the cost of failure to be limited. It is also recommended to have your pets on a short leach since they are great indicators for future failures and capture failure signals. **Select rigorously**, which basically means that the companies should be careful with the decisions of where to invest. **Measure and manage portfolio economics of experimentation**, which means that to understand how the portfolio grows with a long-term sustainability it is required to also have control over the level of experiment required. This can be divided into three sub-categories; Manage the rate of experimentation, drive new product and business success and Maintain a portfolio balance. **Manage the rate of experimentation** means that successful companies study the question marks continually by their costs and numbers to ensure that the company’s pipe-line stays filled. This is made with continuously measurement and management. **Drive new product and business success** means that the companies need to be sure that the question marks in the portfolio have a high probability of becoming stars while the cost of question marks that becomes pets are acceptable. This to keep up growth from new products. To **maintain a portfolio balance** successful companies need to look for today’s stars. This to generate a profit that is great enough to weigh up for the cows and pets that will occur later in the life-cycle of the business and so that the company still is profitable.

**Limbo**

When going from one stage in a process to another limbo is the state in between these two stages. At this stage you are separated from whatever was before and what will come afterwards, and often you stay in limbo since the stage that is about to come is not yet created or does not exist yet (Czarniawska and Mazza 2003).

The concept of limbo is defined as (Nationalencyklopedin 2016d):

“**Limbo, according to roman-catholic theology an intermediate state between heaven and hell, not identical to purgatory. It distinguishes between the limbus partum (‘limbo of the fathers’) for the**
pious who lived before Christ and limbus parvulorum (‘limbo of the babies’) for unbaptized children who doesn’t have access to heaven and doesn’t deserve hell. In contemporary roman-catholic theology limbo is usually regarded as an unsatisfied giving construction.”

Although, when adapting the biblical definition to the construction industry in today’s society the phrase ‘limbo’ means the state in between when you are going from a very safe ground to an unsecure ground. In this case the ‘limbo’ refers to the state where the construction companies who have not done conversions are taking the step into doing their first conversion.

**Corporate Social Responsibility**

Corporate Social Responsibility (CSR) is the relationship between corporations and individual citizens, or the corporations’ stakeholders. According to the European Commission (2016), CSR is “the responsibility of enterprises for their impact on society”. CSR should be company led while public authorities can play a supporting role. CSR is important as it makes companies economy more sustainable since they become more innovative and sustainable.

*Social Responsibilities of the Businessman*, a book written by the American economist Howard Bowen, is said to be the beginning of the subject of CSR in the modern period. According to Howard Bowen, corporate social responsibility is "the obligations of businessmen to pursue those policies, to make those decisions, or to follow those lines of action which are desirable in terms of the objectives and values of our society" (Bowen 1953).
Empirical Findings

To enable an analysis of the executed interviews in comparison with the literature review the structure of the empirical findings are based on the same four themes as above. These themes are as mentioned related to the purpose of this research and will be the frame of the empirical findings.

Economic Profit versus Ecological and Cultural Sustainability

In general, the view on the economic profit versus the ecological and cultural sustainability based on the interviews is that the economic aspects overweight’s the sustainability aspects.

“When you try to reuse the things that you don’t really have control over we cannot be circular because it becomes uneconomic and very tediously. So in that case we tear out even though we have a function. There is no one that can make it become a profit machine so to speak.” – Respondent 5.

Although, all of the respondents mentioned that sustainability is an important feature. Further, the use of circular economy would interconnect economy with sustainability. Though, none of the companies the respondents work at have implemented the circular economical way of operating.

Cultural aspects and the City Museum

‘Respondent 2’ points out which cultural aspects that are important in her project and in the area of that project. She means that different areas and different buildings have different values and different historical meaning. These form the frame of the preservation and gives the guidelines of the conversion. ‘Respondent 2’ says that these aspects in this case have resulted in that they have been allowed to demolish some parts meanwhile they have been acquired to preserve other parts. According to her the cultural history is a major inhibitory factor. Here it is the City Museum that decides which aspects that should be preserved and to what extent. Because of that they had to, in ‘Respondent 2’s’ project, change the façade plans even though they made it through the consultation phase of the process of the detailed development plan. The City Museum felt, according to ‘Respondent 2’, that they interfered with the original façades excessively. She says that the entire area is blue classified which where the reason why they had to change the façade plans. She means that this is one of the major consequences when converting, that the object of conversion has to be greatly respected and the meaning it has for the area. Furthermore, she points out that the preserving regulations have to be analysed, what the intention of future built environment is and what the future structure of the area will be. All of these results in a great deal of discussions with
the City Museum. Due to that they had to contact a consequence analyst specialized in cultural history who acted as an advisor and which further have been a part of the process of the detailed development plan. The representative at Stockholms stad says that there need to be a discussion with the City Museum about the preservation demands to ensure that the valuable cultural environments are kept.

Furthermore, ‘Respondent 6’ points out that they have had to contact several consequence analysts specialized in cultural history who clarified if they fulfilled all the regulations the legislation demands. Although, according to him it is unusual that there are several consequence analysts that are involved in a project. He means that, in most cases, the developer has one or two, meanwhile the municipality have one analyst themselves. ‘Respondent 4’ also brings up that every decade often has its own design and building technique. According to him it is important to preserve, but he highlights that our times design and buildings technique also should be represented in the built environment. He means that today’s time epoch not only should be represented by our high preservation demands, but also a legacy of design and technique from this time should be represented in the built environment. ‘Respondent 4’ means that the City Museum focuses on how it has looked like in too large extent and that the future not will know our times design and techniques.

‘Respondent 1’ highlights that the detailed development plan in these kind of projects have the tendency to be extremely detailed, since the City Museum want to control the outcome of the project and the preservation. He also points out that they needed to bring in an expert adviser within the cultural historical subject. Further, he mentions that the demands of preservation of buildings, materials and installations can generate a lot of extra costs since these aspects often have to be adapted to the original time of construction.

Dispensation – Quality of life

Further, when preserving cultural important buildings ‘Respondent 7’ highlights the question ‘for whom do we preserve?’. According to him, it is not always clear whether the preservation is in line with the original thought or if the municipalities complicates conversion projects. He says that there are some cases where developers have given up since the municipalities have complicated the process. He gives an example which is often occurring, where developers are denied to construct balconies. Residents today rate a balcony as a value adding component which for some people are a demand when purchasing an apartment. He adds that municipalities often deny this even though they are allowed to give dispensation. Here the preservation is at the expense of the residents. He believes that the municipalities might give dispensations in cases that can raise the quality of life for
the residents. A balcony can raise that quality and therefore the developer should, according to ‘Respondent 7’, be given a dispensation and therefore be allowed to construct a balcony even though it is in conflict with the preservation demands in the legislation. Although, he points out that this should not interfere with the aesthetics of the building and that additional constructions should be coeval and blend in in the surrounding environment.

Dispensation – Noise control

In other cases, where the legislation limits the level of conversions since the demands of noise and so on are too high, ‘Respondent 7’ feels that there should be cases when dispensation could be given.

“The officials, they follow the regulations, and this is how the regulations look. We must follow it, that’s the way it is. So maybe you have to ease the regulations, one may think.” – Respondent 7.

He brings up that some target groups, such as students, often have lower demand of standards. Students are most of the time pleased with only having somewhere to live, especially students who not have grown up in the Stockholm region.

Even though the municipalities have the legislation to relate to Stockholms stad are trying to ease the demands in some cases. Sometimes the consequences of the demands, such as noise demands, are too high. There have been some easements, although Stockholms stad would like to extent those easements further in some cases. She brings up that there are politicians that would like to ease the noise demands but there is also a department which is working with health issues and since noise is a health issue there need to be a consideration between these aspects. She does not believe in easements for certain categories of people and points out that these environments should be adapted for all. Although, in the Stockholm region there is an accepted model which is frequently used. According to this model an apartment need a silent side if another side do not fulfil the requirements of noise levels.

When it comes to noises and pollution, Hans Lind mentions an example where the municipality says no to building new accommodations in a noisy area in the central of Stockholm but there are around 50 000 residents that already are living there and are perfectly fine with it. He believes in giving the market more space for their opinions and let it have more power in the shaping of the town.
**Dispensation – Accessibility demands**

The legislation contains a demand of availability which ‘Respondent 7’ questions. He brings up the question ‘for whom?’ again. According to him it costs a lot to adapt a building for disability and it is a demand to do so in all conversions since it is the same regulations here as with new construction. He means that dispensation should be able to be given in some cases and that it perhaps would be more reasonable to donate money to De Handikappades Riksförbund (DHR), the Swedish disability association, which is a national association for disability. He believes that it is unclear if DHR would prefer all buildings which are constructed to be fully adapted for disability or if they would rather have money from donations to spend on research or whatever they feel necessary. ‘Respondent 7’ says that it is especially difficult to adapt for disability in conversion projects since there often are level differences in the floor and ‘half floors’. ‘Respondent 4’ also gives his opinion on availability and means that a lot of projects have gone down the drain so to say because of the availability demands. He means that because of the demand that there should be an elevator in every apartment building to increase the availability many projects, that for example could have been student apartments, simply will not happen. The suggestion that ‘Respondent 7’ brings up here is to make a common area in the bottom of the buildings so if there is a disabled person who cannot use the stairs he or she is still able to have a place to meet others. The ones that are not disabled can then rent the apartments on the upper floors and they do not have to feel excluded.

Another easement that Stockholms stad have been working with is the demands of accessibility. Though, the representative points out that this question is more complicated. The municipality have earlier initiated a discussion with the DHR to find an agreement on whether they would be open to ease the demands of accessibility. One aspect that complicates the matter is purely political, since no politician actively would say that their aim is to worsen the accessibility even though this probably would increase the share of yearly produced apartments. These efforts have been made from the municipalities side mainly focused on student apartments since this is a short term resident. All student apartments do not need fully accessible bathrooms and the representative from Stockholms stad points out that it might be enough if 10 percent of the total amount of student apartments were fully accessible. Further, she explains that these apartments would then be prioritized for people with a disability. She means that it would be enough to find an agreement and then initiate a suit to establish a common law out of it.

**Dispensation – In general**

Professor Hans Lind discuss the problem and the fact that conversions are not that common today
and what can be done is to push a little on the rules to make conversions more common. He also mentions that municipalities for example are discussing the fact of breaking the law so that creating refugee accommodations will be possible, maybe through conversion. Hans Lind says that because of all the restrictions that must be complied conversions today are really expensive to make into reality so the best solution is, as mentioned, to push a little on the rules. This since there is empty offices and a need for accommodations. He also stresses the fact of what might be the lowest tolerable level of housing standards that people can accept.

The high restrictions that exist today are based on how the market looked like in the 1990’s when there was an excess of housing and it was easy to set all kinds of requirements. It did not really matter if you were going to build just a little or a lot, it did not matter if the requirements were high. Hans Lind thinks that it is time to find compromises where it will be possible to push the rules a bit and says that when it comes to reconstruction there are some possibilities to give dispensations with certain requirements. He feels that the possibilities are high now since the housing shortage today is as great as it is.

All of the so far mentioned respondents feel that the municipalities often block conversion efforts. Although, according to Stockholms stad the municipalities often try to help and approve changes in detailed development plans if those changes are necessary. Further, the representative from Stockholms stad continues and explains that there although have been some discussions when a company have wanted to convert from an office for example to residential use since it is up to the municipalities to ascertain that the city has all aspects represented in some extent. She highlights that the municipalities are not against dispensations, but that they have the legislation to relate to which today do not allow all those dispensations that the developers wish for. This then can be seen as the municipality blocking their efforts. She points out that Stockholms stad often are very generous when interpreting the legislation when there is room for it.

**Economy and cultural values**

A cost consuming factor is the inefficiency of area and utilisation. ‘Respondent 1’ means that this factor often is the reason why a lot of companies chose to demolish instead of converting. When demolishing, the rate of utilisation can be raised and the total area of the property can further be maximized and optimized since the buildings can be fit to the property in a more efficient manner. ‘Respondent 7’ also points out the challenges with inefficiency of area and utilisation. According to him the market and potential future residents are blinded and often only focus on the living area. Even though the residential do have a larger total area, the auxiliary area is often neglected. Further
he points out the inefficiency in area and utilisation when looking at the height of the building. Often in conversion projects the ceiling height is higher than the average which could have allowed an additional story if it would have been a new construction project. This could therefore be seen as lost potential income. But he also means that there is a type of value in the ceiling height. If the original building has a low or normal ceiling height the level of the ceiling is then lowered after installing the needed installations. This result in a lower height then what is the standard. Although, the area and utilisation can be maximized and more efficient if the original building were demolished and then new optimized building or buildings could be constructed which maximizes the use according to the construction rights. He finishes with the conclusion that if there is an older building from the late 19th century or early 20th century there are values that overweight the economic challenges. Examples are ceiling heights and cultural aspects which are highly valued by potential future residents who are therefore willing to pay more even though the total area of the building, or of the apartment, is inefficient.

The reason why conversion is not as frequently used as it could be is mainly because the building volume can be maximized in new construction, according to the representative at Stockholms stad. She means that the economic aspects often overweight and also that there is a discussion with politicians. The politicians often have the aim to maximize the share of apartments and therefore new construction is then a more efficient solution.

‘Respondent 8’ means that it is said that the detailed development plan becomes too detailed many times and that there are too many regulations. He mentions the question ‘what is the detailed development plan for?’ and says that it is basically for the neighbours of the one that wants to do the conversion for example, and also for the public so that they know what will be. ‘Respondent 8’ says that the detailed development plan should focus on protecting against noise and particles in the air rather than on what colour you have on the façade. The protection should be against serious problems rather than something that just is annoying. He says that a lot of municipalities are aware of that they go too far in the plan.

_financially defendable_

‘Respondent 1’ points out that the project he is managing definitely is profitable financially. Often these kind of properties are bought at a lower price. Also, since the foundation of the building already is there this is an expense that they save from reusing the building. ‘Respondent 2’ also points out that a positive aspect of conversion is that the foundation of the building as well as the façade already are constructed which lowers the costs. Here ‘Respondent 4’ means though that since
the drawings may not be completely accurate you cannot trust the existing drawings of the foundation and the façade when using them in the conversion process.

The role of knowledge

According to ‘Respondent 7’ the conversion process is often glorified. He means that smaller developers and entrepreneurs, who have not been involved in conversion projects before, underestimate the costs. Their calculations are often optimistically performed and do not for example take a change in construction costs in to consideration. Often the economical calculations of conversion look good on paper and are profitable, meanwhile there is often a lot of extra costs which emerges throughout the project. This since the regulations in the legislation often have higher demands then anticipated which results in higher construction costs as well as unforeseen events. Therefore, the costs for conversion projects vary a lot from project to project depending on the extent of unforeseen events or other challenges. When constructing new construction, the calculations are more certain since the only floating costs often are the establishment costs. Due to that the risks are lower with new construction in this aspect. He means that conversion projects demand more precise calculations. This can for example be implemented through adding an experience aspect in the calculations which can be hard, but not impossible. It can either be added through in-house competence or through external competence. Developers who are experienced with conversion can easily calculate the costs since they have reference projects which they can study to estimate calculations of costs and time. As a result, they can with more certainty estimate calculations and therefore gain lower risks.

According to both ‘Respondent 3’ and ‘Respondent 7’ conversion is quite expensive and new construction do not cost that much more. ‘Respondent 3’ means that if the costs can be lowered the incentives for the developers could be raised.

“Conversion is rather expensive, it is in fact not that much cheaper than new construction. If you can do something to decrease the expenses as much as possible for the developer there is a greater incentive to actually try to use what is available and not tear down and build new.” – Respondent 3.

A high level of details obstructs

One aspect that the representative from Stockholms stad highlights is that she once was told that today’s building technique is to build customized and meticulous which hardens the process of conversion. If the area is not too tight in a building this increases the possibilities, which she thinks
often is the reason why older buildings more frequently are converted. She means that the buildings must be more flexible in this manner to enable conversion in the future. She believes that conversion demands larger areas which make industrial facilities ideal on that subject.

**Conversion**

There is a type of cultural value in the existing property portfolio which ‘Respondent 7’ highlights. He means that conversion projects often have a cultural value and a type of charm which is a strong incentive for performing conversions. Further, he points out that some buildings are more worth converting since they have this cultural value that attracts potential future residents. The cultural value lays in the charm of the building as well as the quality of the construction. Younger buildings, which according to him are buildings with less quality in the construction such as prefabricated load bearing construction, do not contain cultural values in the same extent as older buildings from the late 19th century and early 20th century. This since, according to ‘Respondent 7’, it is the quality in the construction that composes the value and this quality is not to be found in prefabricated parts which often is the case with younger buildings. Further, he means that this often reflects the reality. Most companies chose to convert facilities that are of cultural value because of the ‘attraction power’. Meanwhile, younger buildings are converted in some cases but then more frequently with the use as student apartments.

**Location**

According to ‘Respondent 1’ future conversion projects will most likely not occur in the inner city of Stockholm. He believes that the outer parts of Stockholm and close by areas have better conditions for conversions since the city grows and the need for dwellings will be demanded in a greater extent. Also since there more likely will be industrial facilities and commercial facilities that are vacant in the suburbs which could be an incentive to convert them to dwellings. Although, according to the representative from Stockholms stad the official numbers of the built amount of apartments in the municipality of Stockholm which are mentioned in political contexts is mentioned without the part added through conversion. Therefore, she means that the official perception of conversion is that it is not as frequently used, but that it is more common in the Stockholm region than perceived.

‘Respondent 3’ points out that the level of conversions and the profitability are controlled by the location. In the Central Banking District (CBD) area there is often more profitable with commercial facilities since the residential market have to compete with the commercial market. Since the commercial market have a larger purchasing power than the residential market, the share of the
residential market area which can compete with the commercial market that is quite small. Also, in the CBD area there is often a lot of commercial property owners which from an investment perspective often is a long-term conducting of properties. Due to that the residential market is less attractive to those property owners since it is a short-term solution because they then sell the facility. The long-term perspective can generate them income for perhaps the next 60 years. Even though conversion to residential use is profitable for the moment, most of these property owners value a long-term perspective and the security which that perspective often generates.

According to ‘Respondent 4’ conversion, or property development as they prefer calling it, is one way to handle vacancy levels in commercial areas. This since the area often is not attractive as office space for example, but could instead be converted in to residential use. Although, he means that conversion in these cases often is accompanied by new construction as well. This since, the developer often wants to build the maximum level allowed according to the detailed development plan. Further, he highlights that conversion from commercial facilities is more common on the south side of Stockholm. He explains this by highlighting that a lot of big companies used to have two main offices, one on the south side and one on the north side of Stockholm. He continues with mentioning that this is not the case anymore. Since the commercial core now is denser and centred on the north side the ones on the south side is not of use anymore, which allows the conversion there. Another positive aspect that these areas often have is that the infrastructure is good and often highly developed.

*Flexibility – The detailed development plan*

When discussing conversion, the fundamental conditions are brought up. All respondents agree upon that the legal framework makes it harder to convert. Also that the demands that residential buildings have by law are incompatible with the preservation demands. The demands in the legislation in ‘Boverkets byggregler’ (BBR) is as extensive as in new construction projects and collides therefore with the demands of preservation from the City Museum. Another fundamental condition that hardens the process is the extensive process of the detailed development plan. ‘Respondent 3’ suggests that a flexibility aspect could be implemented in the detailed development plan process. She means that, there could be some properties within the detailed development plan that have a flexible use. They could be marked as potential conversion properties which would simplify the process. In some extent and some cases, the need of changing the detailed development plan when converting would not be necessary. In the long run, this would ease the process and enhance the incentives of conversion. If this would be possible, the change of use would be done easier. Flexibility in the detailed development plan would mean that the time of the entire conversion process would
be shorter and therefore lower the expenses. Although, ‘Respondent 2’ understands that the Housing and Urban Development office would like to know and control the built environment. She also means that flexibility in the detailed development plan would allow them to create their own profitability. If the market of one specific use do not generate profitability the use can change from that use to another or partly to another. This would also generate increased security to the owner. According to ‘Respondent 2’ they have tried to take this into consideration. They have not raised the question of flexibility in the detailed development process explicit, but they have tried to increase the level of flexibility. This since they have two different uses for one facility in the project which allows the building to both serve as dwellings and as a hotel, which allows them to adapt the use depending on the current demand.

Regarding flexibility in the detailed development plan, ‘Respondent 3’ feels that the character of the area of the built environment still would be the same even though some properties could have a change in use. Although she does not know if the municipalities would see it that way, but hopes that they could take a step back and try to see the whole. These properties would probably have to be of no significance for the area. This means that if the property changes use the character of the area would not be affected. If it would be possible to have a sort of flexibility in the use of the property in the detailed development plan, ‘Respondent 3’ thinks that more possibilities with the property probably would increase the value of the property.

When it comes to flexibility, Hans Lind says that it might be a good idea to make the detailed development plan in a way that it is possible to both make the building into offices and/or apartments depending on how the market is. According to Stockholms stad there is already some cases where there is a flexible use in the detailed development plan. She also means that the aim often is to increase the possibilities with older and/or already existing buildings. Furthermore, she points out that Stockholms stad have a positive attitude to flexibility in the detailed development plan when discussing the use, but she also says that there is a need for a certain level of details in the detailed development plan to ascertain that developers do not over utilize.

In general, the representative from Stockholms stad point out that changes in the detailed development plan such as increased flexibility demands that the developers do not use the system and bend it till the breaking point. She suggests that the alternative uses would need a description so that developers do not over utilize and interpret in another way from what was the initial aim.
**Flexibility – In the construction**

Another flexibility aspect that could increase the number of conversion is if the facility would have better conditions. According to ‘Respondent 1’, the project he is managing have quite good conditions since the buildings foundation is built up by columns. Because of that the walls can easily be changed since these columns and the façade is the load-bearing construction. Although the walls cannot be placed freely since the windows often are limiting the position of the walls if the façade cannot be interference with. ‘Respondent 3’ and ‘Respondent 7’ also highlights that a construction with columns as load-bearing, and perhaps the façade as well, would ease the conversion process. ‘Respondent 7’ although questions the implementation of a column construction weather it would lower the charm and esthetical values of the building or if the flexibility would overweight that. According to ‘Respondent 3’ this type of construction would not lock the inside structure of the building. She also mentions that developers could take this one step further. Developers could in the projection and construction phase prepare for future potential conversions. This means that stairwell and shafts for example could be planned for in advance. If so, the conversion process would be easier and some problems could be solved years before the conversion actually takes place. Shaft, or future shafts, could for example be prepared for in advance so that they do not affect the load-bearing construction.

“I think that if you really want to work with the whole circular economy you should as a developer already now start thinking. Thus, the flexibility in the building. What do we want to do today and what do we think it can be in 20, 30, 40 years? And to build in that flexibility now already. The challenge is that it is often more expensive to have that flexibility and that is why you don’t think that way. You don’t think in long term.” – Respondent 3.

**Possibilities**

According to ‘Respondent 6’ the business often works with the flexibility aspect when constructing commercial facilities. In these cases, a shell is often constructed and due to that the wall within can easily be moved. ‘Respondent 4’ brings up two examples of conversion that he believes in. He believes that conversion of a part of a building can be efficient. At his company they convert and develop attics and storage spaces to connect to stairwells in to residential use. The storages will then be relocated to the basements or new storages will be built in the yard outside. Another example that he believes in is conversion from geriatric care to student apartments. Although, this is nothing that is performed today. He means that the facilities for geriatric care have higher demands today which means that they either have to be re-constructed, which is very expensive, or that they could
be converted into student apartments. This would allow the municipalities to build new facilities for geriatric care and would also allow student apartments to be built cheaper.

*Actors in the construction industry*

Furthermore, ‘Respondent 1’ explains that the company he works for will not be a future actor on the conversion market. This since they primarily focus on rental apartments. He believes that the main actors here would be companies that are accomplished on the commercial property market. He means that conversion could be a future speciality for companies that are skilful when it comes to owning, managing and renting commercial facilities. Though, the companies that are accomplished on the commercial property market are usually not involved in the residential market as well. Furthermore, ‘Respondent 1’ adds that it is not very common that companies are accomplished on both markets and sees the potential in converting their commercial facilities. He means that the focus instead should be on finding cooperation’s between companies with different specialities. In the project he is managing that was the case. He believes that this could further be investigated and that these kind of cooperation’s could be the future foundation for conversion. ‘Respondent 3’ also points out that commercial property owners can see conversion as profitable. Although, according to her the company she works for has received the indications that the municipalities often prioritize the detailed developments plans that contains some extent of residential facilities. This could be an incentive for conversion according to her even though an area mostly contains development of commercial properties. Conversion could then be a small or large part of the plan to decrease the time to develop a new detailed development plan. Although, she believes that this is a result of indications from the municipalities that residential areas are highly valued. Another municipal related factor is that the municipality often wants to increase the density of built environment with residential facilities in the central parts of Stockholm to increase the liveliness of the city all hour of the day. If there are too many commercial facilities in an area that area becomes “dead” after office hours. In other words, the city desolates. Therefore, if the commercial areas are implemented with residential facilities there will be a more even level of people all hours of the day. Because of this, the municipality might see this as an incentive for raising the level of conversion projects. On contrary to ‘Respondent 1’, ‘Respondent 2’ and ‘Respondent 3’ do work with conversions in an extensive manner, since the company they work for have this as a part of their business model. The project which was the main focus of the interview was only one of many, even though it was the largest one. ‘Respondent 2’ points out that they are a short-term company which will not conduct properties long-term and therefore it is more profitable for them to convert than to conduct. According to her the willingness to conversion lays in what investment perspective the company have.
Circular Economy in the Construction Industry

According to ‘Respondent 5’ they work with sustainability in some extent in their projects since they try to recycle the materials which can be salvaged, which he thinks can be an example of a circular economical way of thinking. The respondent also points out that the materials that they cannot reuse in some extent will be sold. Although, the respondent indicates that a circular perspective can only be adapted if it can generate money. If it is too complicated though, it takes more than it generates and the sustainability aspects then becomes inefficient and uneconomical. It needs to resemble a machine which is constantly generating profit. Further, he highlights that materials and installations should not be reused ‘just because’, if they are reused it should be because they generate a value for the residents. He does not believe in reusing already used, or second-hand, materials and installations. Further, ‘Respondent 6’ fills in that everything that will be reused in a project demands an investigation. He means that everything is not fit to reuse and even though it might be fully functional it might not fit the project. Due to that he explains that it in many cases is easier to reject the idea. The respondent highlights the importance of simplifying projects, especially conversion projects. During the interview with ‘Respondent 2’ and ‘Respondent 3’, ‘Respondent 3’ phrases that her perception of the concept of circular economy is the circular flow.

When it comes to circular economy, Hans Lind says that it is a good idea to use the existing materials because that leads to lower construction costs which will lead to lower housing prices. This will make the apartments more accessible to low-income households and the circular aspect will then be a social dimension.

Early adopters and market strategy

According to ‘Respondent 2’ and ‘Respondent 3’ the company they work for are successful within the market of conversion. Although, they are, in addition to conversion, also constructing new produced buildings. ‘Respondent 5’ and ‘Respondent 6’ says that the company they are working for are new on the conversion market. Though, they will definitely continue with conversion projects assumed this project will be successful.

Basically all respondents agree on one clear early adopter that stands out from the mass and that early adopter is one company that was, and still are, in the forefront when it comes to conversion of the existing housing portfolio to residents. This is a young company that develops apartments mainly through conversion. They buy, develop and sell real estates in the central parts of Stockholm. This company dares to take on such projects and also does it really successfully, looking at their profits,
and this is a reason why more actors start to look at conversions as a way to extent their business.
But, as mentioned above, the cost of conversion and the legal restrictions makes the process both difficult and non-profitable.
Analysis

When analysing, the theoretical framework and the empirical study is combined and compared. This according to four new themes appropriate to the findings.

Conversion

Conversion is, as mentioned in the theoretical framework, a strategy contained in property development. The concept of conversion is primarily the change of the way of use of a building, or the flexibility in use. The perception of the industry is not that conversion is a well-recognized concept that is frequently used. There is a difference among the companies in what terminology they use, although some companies do use the concept of conversion while other companies use the concept of property development. Though, it seems like they have the same perception of what the meaning of the concept is even though they use different terms for it.

Quality

One of the respondents mentioned that one incentive for conversion is the value conversion projects often possesses. For example, there are values such as economic values since the construction is already constructed and therefore money can be saved from that aspect. Further, there are also values such as cultural value since the preservation enables future generations to take part of past culture. These values are therefore partly in the already constructed load-bearing construction and the façade, but also partly in the charm and the legacy.

According to the respondents the need of conversion is large because of the current housing shortage, especially when it comes to student apartments. The need of conversion will basically be larger outside of the central parts of the city since the purchasing power of commercial buildings in the CBD are still greater than it is for residential buildings. A reason why it is more profitable to do conversions outside the CBD is also, according to the respondents, that the owners of the commercial buildings has a long-term perspective on profit and understands that converting into residential building will look good for the moment but in the long run it generates a larger profit if being kept as a commercial building.

Basically all respondents mean that conversion is a good thing but it is hard to actually do in reality because of the legal requirements regarding noises or daylight for example. If loosening these requirements up most of the respondents can agree on converting in a greater extent by doing that.
The requirements for accessibility suited for disabled makes a lot of potential conversion projects go down the drain. This should be looked at in the legal perspective. If it is not possible to convert these buildings this leads to demolition and construction of new buildings on the same ground as the old ones. The solution that the respondents have is to make exceptions in the detailed development plan that allows some buildings to be marked as future conversion projects to speed up the decision time for detailed development plans. This will both make conversion more attractive since it will not be as complicated as it is today and also much more profitable for the companies performing the conversion since the time will be shortened considerably.

Flexibility is also something that have been discussed during the interviews and not only when it comes to the detailed development process. As mentioned in the empiric’s one respondent, for example, pointed out that their current conversion project would be a mixed use building in the future where it is possible to change the use of the building depending on how the market looks. The change of use of the buildings is also something that is discussed and that this, the ability to change the use, would increase the value of the building and the surrounding area. The possibility to be able to have walls that can easily be moved is discussed so that the market with more ease can decide what use of the building is more suitable at the moment.

A large argument, that is discussed, for conversion into residential buildings is that having to many commercial buildings will make the area ‘dead’ after office hours. If conversion would be an easier and a more profitable process, the solution might instead be to have more residential buildings in these areas that will make them more ‘living’ all hours of the day.

**Sustainability**

As mentioned in the theoretical framework the relationship between the ecological and economic aspects can be described as the economy being reliable on the improvement of environmental quality, which is significant for sustainability. Although, in the empirical study the general view on the economic profit versus the ecological and cultural sustainability is that the economic aspects overweight’s the sustainability aspects.

*The three dimensions of sustainability*

According to the Brundtland Commission the definition of sustainable development is, as mentioned, the “development that meets the needs of the present without compromising the ability of future generations to meet their own needs”. This is the goal with the concept of sustainability, which
traditionally contains three dimensions; ecological, social and economic. The traditional illustration of the connection of these three dimensions and how they interact are illustrated by a Venn diagram and here the three dimensions have the same impact and weight the same. Meanwhile another illustration of the connection is as a hierarchical order where the economic aspect of sustainability is dependent on that the requirements of ecological and social dimensions are fulfilled. Basically, the main difference with the different models of the concept of sustainability and the interaction of the dimensions is that they are seen as different. In the first one mentioned, the dimensions have precisely the same impact and is equally important. In the second one, the environmental dimension is the most important, the social dimension second most important and the economical dimension the least important. The question here is if there is one dimension that is more or important than the others or if they should be seen as equally important?

Today’s society reflects that the environmental aspects should be seen as more important than the other two since there is occurring problems with pollution and so on. Also, that the social aspects have become more important as the time passes since today’s aim is to strive to a more equal and just system and society. This indicates that the hierarchical model better reflects the development of the society and how the concept of sustainability generally is looked at. Although, this is not reflected in the real estate business. None of the interviewed actors from the real estate sector did tell that their company value the environmental and social aspects higher than the economic profit. According to the respondents the economic aspects of a project is more important and the concept of sustainability is not worthwhile if it do not generate any profit or economic advantages. Meanwhile, they all expressed that sustainability is an important element. As it seems like this is the general perception of the business since all the respondents did point this out, it can be concluded that the model of sustainability that the business uses is the hierarchical model but flipped upside-down. This means that the economic dimension composes the foundation of the model, meanwhile the other two can only be fulfilled if economical sustainability already is accomplished. See the illustration below.

Figure 7 Illustration over the theoretical and the practical sustainability model.
Circular economy

Another approach in the spirit of sustainability is the concept of circular economy. Some researchers have stated that there is no commonly accepted definition of circular economy. The concept although have some parameters that are reoccurring. These mutual parameters are the circular flow of materials where the life-time of the materials and products are extended. The main idea is to reuse and recycle. Here the products that are already in use are valued high. The Ellen MacArthur Foundation have two definitions which basically brings up the same essentials, which are that the industrial system is restorative and regenerative by intention and design. The aim is to heighten the utility level and the value, which corresponds with the other researcher’s idea of the concept. The general perception of the business of the concept is quite poor. One of the respondents did point out the circular flow of thinking and another had a good idea of the concept since she was aware of the different dimensions of it. In general, there is none or poor perception of the concept of circular economy in the industry. The majority of the respondents did not know or understand the concept. One of the respondents did believe that they were very circular since they work with recycling some products when converting from one use to another. Meanwhile, he pointed out that the circular economic way of thinking only was adaptable if it generated money which the model partly can do but that is not the aim of the model. He also mentioned that they do sell some parts or products which they cannot reuse themselves which still are an example of re-usage and collaboration between different actors. The circular flow does not need to be a flow within one company, it can be a flow which several companies are a part of as well. The one with the best perception of it was Professor Hans Lind, which though is understandable. According to him, circular economy in combination with the construction industry is a good idea since the existing materials are reused which leads to lower construction costs and that in turn leads to lower housing prices. He believes that adapting circular economy into the construction industry will lead to more apartments which are accessible to low-income households. Further, the circular economic aspect will be a part of fulfilling the dimension of social sustainability.

Yuan, Ni and Moriuichi (2006) means that there have to be changes in the current production processes, consumption activities and human activity. This is a step that could be made towards a more sustainable way of producing and using materials and products. The Ellen MacArthur Foundation (2012; 2015b) points out the importance of designing. This for re-usage and to ease the phase of recycling. According to them designing for re-usage and recycling would increase the amount of circular flow and lower the leakage from the system. Recycling is not the answer to our environmental problem though, according to Andersen (2007). He means that there is a demand of additional actions that have to be made which can be the increasing level of re-usage. If the aim is to
reuse products in the greatest possible extent and to lengthen the life-time the level of recycling will automatically be lowered.

When looking at the models how the difference of the circular flow in the traditional linear economical model and the circular economic model differ from each other, there are some major differences. The largest ones are that the part which is recycled in the traditional linear model is little and that re-usage is not a part of the model at all. Further, the leakage is a much larger post. The traditional linear model is based on products and materials with short life time which is not sustainable at all. Although, there are some advantages with this model. These advantages, for the companies, are mainly that they can keep up with the business models that they already have. They do not have to change their behaviour at all, which is hard, and they can keep on gaining the high profits that they do for the moment. Though, this will not be sufficient in the long run since the behaviour of today’s society and humans today have resulted in the current environmental problems.

None of the companies the respondents work at do use a circular economic business model and all of them points out that it is important to have profit. Since it is not profitable to have this way of thinking they are looking more at what economic model generates the largest profit for the company in the end. It seems that the respondents think that circular economy is good, as long as it is profitable and will generate money. An important aspect here to ask is if it is financially defendable with a circular economical business model for the companies? All of the respondents mention that sustainability is an important feature, which are implemented in the concept of circular economy. The general perception in the business, according to the interviews, do not seem to be that the economic aspects can profit from taking sustainability aspects into consideration. Also, even though the economy can be described as being reliable on the environmental quality these parameters are not prioritized. If sustainable aspects generate a profit the business will prioritize it, but as soon as it is a liability the greater whole is not given priority to. The improvement of environmental quality reflects on the economical outcome, although the economy can also suffer from the sustainability way of thinking. When reusing materials and installations everything has to be investigated whether they are fully functional or not. If there is a great extent of materials and installation that will be reused extensive investigations will have to be executed, which is time consuming. As a result of this, the economy for the specific project can suffer from these sustainability aspects. But seen to the greater whole, the society and the environmental values can still overweight the slightly more negative aspects. There are incentives for the companies to implement circular economy in their businesses. One incentive is that they can adapt the concept of CSR in to their company. Since CSR is
the relation between corporations and individual citizens, and/or the corporation’s stakeholders, the view of the company can generate potential future customers or employees for example. If CSR is a part of a business it can raise the reputation of that company. In accordance with Howard Bowen, companies are obligated to follow the lines of action which are desirable and valued by the society. Since there is a large interest in sustainability and a need of sustainable approaches CSR and circular economy is something that can generate value for a company, which then can generate profit in the long run.

**The ‘fourth dimension’ of sustainability**

As mentioned in the theoretical framework sustainability could have a ‘fourth dimension’ containing the cultural aspect. Cultural sustainability takes the aspect of different generations over time into account in a more extensive manner. The focus here is that future generations have access to cultural resources in a long-term perspective. Other aspects that interpret when widening the perspective is adding the quality of life as an aspect as well as the idea of human development. When discussing cultural sustainability in combination with conversion the cultural dimension becomes more important. The question is then whether conversion is sustainable or not. Conclusively from the empirical study, all conversion projects there have been facilities of historical value and because of that it can be seen as sustainable to convert them to fit a current need and to be preserved in the process. A cultural aspect is that the building is preserved since it is of great meaning either to the area or to its epoch of time. Since cultural sustainability takes different generations over time into account in a more extensive manner conversion can benefit today’s need of residential facilities, meanwhile the cultural legacy of the building or area is preserved for future generations. In the Brundtland Commission it is stated that “development that meets the needs of the present without compromising the ability of future generations to meet their own needs” is sustainable.

This is something that the City Museum values a lot and is the main incentive for them since the cultural heritage from each time epoch should be represented in the built environment. The culture of the past should not be demolished, except it should be something that future generations also can take part of. In accordance with the interviews the City Museum are driven by the cultural history and that the object of conversion is greatly respected. Also, that the meaning and influence the building have on the area do not change. Because of this the cultural dimension should be added to the model of sustainability as well.
Although, the extent of the cultural legacy can be questioned here. As the definition of cultural sustainability indicates the cultural legacy is important so that future generations will be able to take part of the legacy. In the context of conversion, this means that all building design and techniques should be represented in the built environment. Although, the business expresses that this have become too extensive. As one respondent mentions, the City Museum might have taken the thought of preservations a bit too far. He believes that they preserve in a too large extent which seems to be the general perception of the business. From the interviews it was brought to the table that if the preservation demands keep on being this high there will be no room for the present times design and building techniques. This would then mean that the city will not have the entire spectra. Although, this will eventually be the problem anyways since there in time will be a vary of buildings from different times, which will have to be preserved, but no further land to build on. The cultural legacy is, as mentioned, important and with time the preservation will be even more important to share the cultural legacy on to future generations. This since the human development becomes very clear when studying the design and techniques of the past.

It is, as mentioned, the City Museum who decides what should be preserved and to what extent. Since this is a matter of perception in some extent this could be seen as a bit unconventional. Although, it is still important that there are preservation demands which all actors who have been interviewed have mentioned. It is important to keep in mind that these preservation demands do lead to increased costs for the developers, since preserving regulations have to be analysed and it have to be stated what the intention of future built environment is and also what the future structure of the area will be. All of this have to be discussed with the City Museum which increases the time the process takes, which in turn increases the costs.

When converting from one use to another, as mentioned, a consequence analyst specialized in cultural history is often contacted and work as an adviser in conversion projects. The analyst is brought in to make sure that the conversion is performed correctly according to what shall be preserved. Here the sustainability aspects become costly. Since this is a demand that have to be respected from the municipality the developer has to fulfil this no matter the cost.

**Market**

According to the respondents there are challenges when converting since there are a lot of risks in combination with uncertainties in the market. Although, there are some actors who overcome these challenges and are willing to convert in spite of the general perception.
Early adopters and the Boston Consulting Group matrix

When it comes to the market there is only one or maybe a few more that can be considered as early adopters. As mentioned in the theoretical framework early adopters are the first category out of five of established adopters. During the interviews the companies that were interviewed as well as the other respondents were, as mentioned in the empirics, clear that there were one company that was, and still are, in the forefront when it comes to conversion of the existing housing portfolio to residents. Many of the respondents agreed on that when this company started their niche the market was near to perfect for this kind of business. The market was in an upswing so to say which this company probably took advantage of.

Looking at the Boston Consulting Group matrix it consists, as mentioned, of four groups; the stars, the cows, the question marks and the pets. The risks with being an early adopter are of course that you jump into an unknown market that is filled with a lot of question marks, but what defines early adopters is that they adopt new ideas with comfort since they know that to develop the search for new ideas are needed. They know that the question marks in the end will, in most of their projects, become stars that will generate a great profit.

Of course there are still risks with stepping into these kinds of projects but with experience the companies know what projects to proceed with. More unexperienced companies can here be naïve by looking at successful companies and step into projects that are to unclear and think that these question marks automatically will become stars that generates a great profit. These more unsuccessful projects that will be the consequence might frighten other actors on the market. These other actors can be potential, successful early adopters but will not even come that far because of the fear of another failure. When the word is out that it is too risky to step into the conversion part of the market the result will be, in a worst case scenario, that no one will dare to do any conversions at all, at least not the more unestablished companies.

Limbo

As mentioned, there is a company which have been pointed out by the respondents that above is identified as an early adopter, who is the most successful company in the market focusing on conversions and which is something that the respondents also agree on. But, there are examples of companies that are taking deviation from this niche. Another actor in the property development industry have a history of conversions but takes more and more deviation from it, mostly because it is an unclear market that doesn’t generate an adequate financial gain. This state that can be the
reason why many actors avoid conversion is called ‘Limbo’. This is when an actor is stepping out from a stable platform to get to an unclear platform, or idea, that is not yet created.

**Legislation**

The foundation when it comes to the legislation is the detailed development plan. The detailed development plan exists to help protecting the neighbours of the ones building the house or doing a conversion. But, as all of the interviewed respondents agree on, the detailed development plan can be too detailed and the restriction in it too strict. Today there is the same restriction when it comes to conversion as it is when a company is doing a new construction. The respondents say that this puts a spanner in the works for the ones that want to start converting. The suggestion here is to start loosen up the restrictions a bit to make it possible to convert in a greater extent. A reason for this, that is mentioned, is that more conversions will lead to more low-income people to have the ability to get their own home which will gain the social sustainability.

**Dispensation**

Also when it comes to student apartments that today have restrictions when it comes to access, there must be a change in the restrictions to make it possible to provide students with a home. The solution that is suggested by the respondents is, in this case as well, to loosen up the restrictions. A lot of possible conversion projects that can generate student apartments are stopped because they cannot meet the accessibility requirements. Almost everyone can agree on that these restrictions have gone a bit too far but no one dares to bring up the subject to risk making themselves enemies with DHR.

There are five major triggers and obstacles of conversion and legal aspects are one of those. The detailed development plan is connected to the legal framework and to make conversions more frequent increasing the flexibility in the detailed development plan is one suggested solution. The respondents all agree that it would of course be easier to convert something from one use to another if the detailed development plan allows this from the beginning. The decision parts would be shortened and you know from the start what you can or cannot build and if it is stated in the detailed development plan that it is possible to convert to housing then a lot of time has been saved. A downside though is that companies can take advantage of the plan and build maximum capacity that is allowed in the plan which may not blend in well in the surroundings. One respondent mentioned a shocking example where a city has no detailed development plan which led to people building whatever they wanted. People could then use the plan to build or convert however they wanted as
long as it did not affect the neighbours in a negative way, otherwise a compensation had to be paid.

Noises and pollution is another constraint when it comes to converting a commercial building into apartments since the restrictions are tougher when it comes to housings. The commercial buildings are more often placed in a noisier area where a lot of other industries might be located which makes the air more pollute. In the empirics it is discussed if it is possible to loosen the restrictions here as well and let people decide for themselves if it is okay to live ‘worse’ if they agree to it before they move in. One respondent mention that there have been plans for housings in a specific area in the central of Stockholm, but that it is hard to implement because of the surrounding noises and the pollution. Even though there already are apartment buildings there now with around 50 000 people living there and they can live there perfectly fine, these plans are hard to implement.

Another aspect of the conversion process that costs a lot is the process of the detailed development plan. This since it is unknown in advance whether the plan will be approved or not. Also, whether the process will take the average time or if the process will be extended. A longer process generates more risks and increases the costs. In general, conversion projects are profitable although these types of projects demand a lot from the developer.
Discussion

In the discussion an interpretation of the analysis is presented. Also, other parameters are presented with the roots in the theoretical framework and the empirical findings chapters. Here the authors own conclusions are presented and the analysis is further discussed from that point of view. It is here the research questions are answered.

Conversion and sustainability

An important aspect to discuss is whether conversion is or can be seen as sustainable and if conversion could be an example of circular economy. Therefore, there have to be an investigation whether circular economy can be seen as sustainable. Circular economy is as mentioned a business model where the focus is on recycling in combination with re-usage. Since this model have as a goal to limit the amount of virgin feedstock used it is, and should be seen as, ecological sustainable. This because the environmental aspects are a large part of this economic model. Further, there is the matter of whether conversion is an example of circular economy and if the concept can be adapted on conversion. Since the aim of circular economy is to re-use and recycle conversion could be seen as an example of circular economy. This since the core of conversion is to preserve the valuable parts of the already existing building such as the façade and the load-bearing construction. Therefore, the core of conversion is to reuse a building and to adjust it to a new need. Another essential part of circular economy is to lengthen the life time of products which conversion does. When one use no longer is needed conversion allows the building, or the product, to ‘live longer’ by finding another use and adapting the building to that use. In accordance to these arguments conversion is an example of circular economy and therefore conversion would preferably be sustainable as well. At least ecologically sustainable. But as mentioned in the analysis conversion is also an example of cultural sustainability since it ascertains the preservation of cultural asses for future generations.

Other possible sustainable aspects of conversion are the increasing in ‘liveliness’ of an area where the larger amount of the build environment otherwise is of commercial use. This allows the area that otherwise are ‘dead’ to become ‘living’ all hours of the day. This partly increases the level of perceived safety in the area which contributes to social sustainability. Another aspect that contributes to fulfilling aspects of social sustainability is the already existing infrastructure that most of the conversion projects have. All of these aspects points out that conversion fulfils the different aspects of sustainability whether there are three or four dimensions; the ecological and economic due to the circular economic approach, the cultural through the preservation of legacy and the social through the increase in perceived safety and the possibility to travel easily.
Circular economy versus linear economy

What have been noticed during this work is that the actors are more likely to use a linear economic model than the circular economic model. Reasons for this are that it is more profitable to use the linear model as it generates more money in the end and in a shorter amount of time. The circular economic model is of course more sustainable but according to the respondents there is not enough incentives that make the companies feel that they can gain something from it as well. A solution to this might be that the state provides grants for companies adopting the circular economic model to make it more profitable. Of course it may not be as profitable in economic terms as it is using the linear economic model, but with government grants this could lead to an increased insight into the environmental situation and condition. Although, this would most likely not be a solution by itself. Preferably the introduction of a grant for using a circular economic model would need to be combined with another solution as well. This since the economic profit in short terms would probably be larger than the estimated level of grants that could be given from the state.

Further, the attitude towards the circular economic model could be changed and improved if the incentives for using that model could be increased and concretized. If the companies would be more aware of the advantages with a circular economic model that they could benefit from they would more likely adapt to this model. The problematics is how these advantages and incentives can be concretized so that the companies would change their attitude. The companies have to be aware of other benefits that they can gain besides from purely economic. This such as CSR, a stronger brand or increased attractiveness as a current or future employer.

A solution can also be as simple as fixing the price of the land that the construction companies want to build on. If the municipality owns the land and has the option of selling it to two different companies, one that wants to demolish the buildings standing there to build everything new from scratch and one where the company wants to preserve the existing building, they can offer the land for a significantly lower price if the purpose is to preserve the existing building. This might bring the companies into understanding that it is important to have the environment in mind and that having a sustainable way of thinking is profitable in the long run. Here the aim is also to increase the incentives for the companies so that they will be more willing to act the way that is wanted. If the goal is to increase the companies’ attitude towards conversion and to increase the level of conversions in general, there have to be increased incentives. The question is yet again how this can be done. To increase the incentives for the companies to be more willing towards a more sustainable way of working and its importance could be to introduce a certification for the ones adopting this economic model. A certification might highlight the importance of circular economy and the goal
here would be to make this certification as honourable as a LEED-certification or BREAM-certification, for example. If this would be accomplished the companies would gain other values than purely economic values by adapting a circular economic business model.

To be able to implement circular economy as a business model this way of thinking needs to impregnate the entire process long-term. One example of this can be to realize the building block ‘circular economy design’ mentioned in the theoretical framework. The purpose with this building block is to minimize the leakage of materials from the circular flow. Further, the importance of design is also highlighted in the different definitions of circular economy. Design is an important parameter to enable circular economy as a business model, since this is a long-term concept which demands products with a long life-time. To be able to increase the life-time of products, and in this case buildings, within the construction industry the implementation of designing for circular economy is of essence. If the goal is to have a circular economic business model the industry needs to design for flexibility when constructing buildings from the beginning. If, for example, enabling flexibility in the construction and prepare for future flexibility in use this would allow and ease the process of conversion in the future. The building block of circular economy design would then be fulfilled within the aim of this study.

To be able to take the first steps towards circular economy, and to ease the process of conversion, the building block of designing for circular economy, such as preparing for future flexibility in the construction, needs to be realized. Not until then, the implementation of circular economy can be fully accomplished. If designing for circular economy the life-time of the buildings increases since they can adapt to future needs through conversion. Although, this would be time-consuming at first since there, for example, needs to be preparations for more shafts if the use is residential meanwhile a lower amount of shafts would be needed if the use would be commercial. Here it is important to design so that the load-bearing construction is not affected by the number of shaft, which best can be done by designing for this in advance when constructing the building and not during the conversion process. Another example of this is mentioned in the empirics, which is flexibility in the construction where the load-bearing construction allows the inner walls to be flexible and to be moved. Then the façade would primarily be the load-bearing parameter. So, if constructing for flexibility when constructing buildings this would allow a change of need in the future, which is linked to circular economy. Instead of demolishing the already constructed buildings when the need changes, preparations for flexibility allows a lower amount of materials and products to be used and the first steps towards a circular economic business model is initiated. Therefore, it would most likely be better to construct, prepare and ease flexibility in the construction, through conversion for
example, if constructing for it in advance. This would then lengthen the life-time of the products, which in this case are the buildings, and lower the amount of leakage from the circular flow.

The interest of implementing circular economy in the construction industry in a more extensive manner have grown, as mentioned in the introduction. There have recently been articles published in the Swedish trade magazine ‘Byggindustrin’ where the topic of circular economy has been highlighted and discussed. This indicates that the industry is aware of the concept of circular economy, which can be strengthened by the statements made by Szczepanowski and Gohary (Åfreds 2016c), even though the respondents from the interviews did not have any or little knowledge of it. Another indication that could be made from this is that there is a willingness within the construction industry to implement circular economy as a business model but that there is little knowledge of which aspects that could be problematic.

**Legislation**

The interviews we got helped us a lot during this thesis but of course there were actors that would have been valuable to interview to make this thesis even better. Except for an early adopter an interview with Boverket would have made this thesis more respected if their opinions would be looked at. Boverket are the ones making the legislation that are discussed by among the respondents and to get their point of view why the legislation looks the way it does would give the thesis more depth.

**Market incentives**

As mentioned in the empirics the actors on the market all agreed that there is one company that can be considered as an early adopter. If the market would consist of more companies with the courage to jump into unsecure businesses and search for more question marks that they do not know whether they will become stars or pets, according to the Boston Consulting Group matrix, maybe more companies would jump on this train, so to say. This might be a way to both get more early adopters on the market and also to increase the awareness of conversion.

Basically what is essential when it comes to getting companies into converting the existing portfolio into new applications is to make them see the value in the buildings. The feeling that they want to keep the already existing building and make something new out of it to preserve the townscape is a great start into adapting the circular economic model. Of course new buildings have to be built so that we also have a real estate heritage from our time but preserving old buildings will help us
increase the cultural value in the society.
Conclusion

*Below the conclusion of this research is presented based on the analysis with roots in the theoretical findings as well as the empirics. This in combination with the discussion.*

Conclusively, it can be concluded that the actors in the construction industry is unexperienced when it comes to conversion. As a result of that they do not want to jump in to this fragment of the market because of all the uncertainties and risks. Although, if managing to increase the knowledge of conversions and its risks as well as its possibilities the attitude towards conversion would hopefully change. The actors are willing to convert, but are limited by the legislation and therefore they do not believe that today’s regulations are fit for conversion and think that it is in need of a change. Possible changes that are suggested are to increase the flexibility in the detailed development plan as well as in the construction when constructing. This to increase the level of conversion in a long-term perspective and to prepare for future change of needs. But, to enable this the developers have a responsibility to not take advantage of this possibility.

The incentives for circular economy and sustainability is needed to be increased for the business to be willing to use this approach. As it looks today, the economic profit in short terms overweight’s the responsibility of taking care of the environment. Suggested solutions are grants, discounted land prices and certifications. Also in combination with concretizing the outcome of implementing circular economy and a sustainable approach in the business.

The market today agrees on that there is a small amount of early adopters today which no one, or very few, seem to be willing to become. Although, to be able to implement circular economy as well as conversion in a larger extent there is a great need of a larger amount of early adopters.

The primarily research question is; how is it possible to use the existing property portfolio to benefit the aspects of sustainability by conversion and a circular economic business model? Also, how can market strategy and incentives explain why this type of method when developing properties is not as frequently used? It is possible to benefit sustainable aspects through conversion and through a circular economic business model. Although, the market is not there yet and the conditions for conversion and circular economy is not in the stage where the companies also can benefit from this business idea and model. Therefore, the incentives for the actors do need to be raised and not until then conversion and circular economy can be implanted in businesses. But, there is a willingness towards implementing circular economy in the construction industry today. Because of that it is
likely that a circular economic business model will be implemented in the future, but first there is a need for a deeper understanding of the concept of circular economy in relation to the construction industry. Although, as mentioned by Åfreds (2016c), the new circular flow is slowly replacing the traditional sustainability working method within the construction industry.
Future research

In the future research chapter, suggestions for future research is presented. These are topics that have been brought up during the study and if these subjects were to be studied this would clarify subjects connected to this research.

When gaining knowledge within the area of the research some areas of interest have come up which would need further investigation. Therefore, suggestions for future research are presented below:

• **Level of utilization.** Some of the respondents continuously mentioned the level of utilization and that conversion do not benefit these levels as good as new construction. Therefore, it would be interesting to study the level of utilization in conversion projects compared to new construction.

• **Flexibility in the detailed development plan.** There would also be interesting to research whether there is possible to implement flexibility in the detailed development plan in a greater extent. Also, how common it is that municipalities implement flexibility in the detailed development plans.

• **Several possible uses as a value adding factor.** Another area that would be interesting to further research is if flexibility in the detailed development plan would increase the value of properties. In other words, if several possible alternative uses in a property depending on the need of the market would result in an increase of value of properties.

• **Grants from the state to increase the willingness towards circular economy.** It would be interesting to research how large the grants from the state would need to be to increase the willingness towards a circular economic business model. In addition to grants, what other method would be most efficient?

• **Investigation of how the legislation could be changed.** There would be beneficial if the legislation could be overseen and explore which exact laws that should be changed to ease conversion and if these changes are possible.
• **Modelling over the possibility for future flexibility in construction.** Investigate whether BIM could be implemented in the planning phase of construction projects to enable flexibility in the construction for future possible conversions.

• **Increase the incentives for conversion and circular economy.** Finally, it would be interesting to further research what incentives that could be implemented to change the attitude companies within the construction industry have to increase the willingness to use conversion as a strategy in a larger extent as well as implementing circular economy as a business model.
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