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How bridges and pedestrian subways can be more than means for transportation

A study on how to raise social aspects in planning processes

Master's thesis in the Master's Programme Design and Construction Project Management

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Gothenburg, Sweden 2019

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Technical report ACEX30-19-06
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Abstract

The strive for building sustainable denser cities requires a knowledge for what sustainability is and how to apply it to our planning processes to achieve a sustainable built environment. Areas around and under bridges and in pedestrian subways can be utilised for creating social values and thus adding *additional values* rather than being structures for transportation means. This report seeks to find why social aspects should be raised in such environments, exemplify what social sustainability could be and finally how to raise social aspects in parity to ecological, economic and technical aspects. The discussion is based on previous research about social sustainability within urban planning and infrastructure *and* on interviews. Findings suggests that social sustainability is fundamental in built environment. Simply because there is a need to create attractive, usable, safe places where can interact with other, learn or perform activities. Further, adapting a new way of working, collaborating across disciplines and organisational boundaries is essential. In this report, social sustainability is regarded as a perspective that needs to characterise the other elements and there are different tools and methods for raising social aspects in planning processes.

Keywords: Bridges, Cost-Benefit Analysis, Infrastructure, Multi-Criteria Analysis, Pedestrian subways, Social Impact Analysis, Social Return on Investment, Social sustainability

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Acknowledgements

During the autumn of 2018 I have had the privileged to write my master's thesis about a subject that is not only up to date, but also very important. Social sustainability is about us, the citizens and what can increase our joy and identity to the place where we live, work and act. Yet, it will have escaped nobody's notice that it is a subjective and complex concept with differences in opinions. Thus, I have not found it easy to create my own opinion and to challenge others opinion. However, I had three competent supervisors guiding and supporting me along the way, took time to discuss the topic and whom challenged me. Thank you Daniella Petersen from Chalmers, Maria Nordin and David Lindelöw from Sweco for all your support and feedback that helped me accomplish this thesis with proudness – it has been fun and educational to have you as my supervisors. A thanks to Tobias Fredberg who always asks tricky questions I ponder about for days.

I also want to thank all my interviewees whom took their time to reflect and give their view of social sustainability in the contexts of bridges and pedestrian subways – it was not an easy task but thanks to you I made some interesting findings.

My five years at Chalmers have provided me with a lot of knowledge within the area of Civil Engineering and this knowledge needs to be put into practice. Sweco has during this thesis given me the opportunity to create practical knowledge, extend my personal network by getting to meet consultants and clients, and to experience how the company work and aim to develop their work with sustainability. I want to thank the employees at Sweco whom made this autumn worthwhile and my days at Sweco cheerful.

The past 19 years I have been a student with great support from my parents and sister. This thesis is closing a chapter but also starting a new one in my life. It feels weird but I am also excited! Without encouragement from my dad Fadi and mom Enaame, I would not have been starting this new chapter in my life with so much joy and excitement. A special thanks to the both of you, and a special thanks to my sister Dalia and my partner Philip. The four of you are always encouraging me to challenge myself and supports me along the way – I am thankful to have you by my side. Also, thanks for celebrating my accomplishments with me!

My final words are an encouragement to all of you who read this thesis to challenge yourself. Though I have been spending five months delving into its details I still find social sustainability complex. However, I learned that we need to dare to challenge our self, dare to define what social aspects are in each specific project and how we can fulfil them. I challenge you to raise social aspects in your projects – will you take on this challenge to help building usable and valuable environments?

Terminology

Swedish words and organisations related to society development are described under this headline. The Swedish word will also be written in *italic* after the English word.

Comprehensive plan *(Översiktsplan)* (Skanska, 2018)
This plan comprises the whole geographical area of a municipality and gives guidance for the utilization of the built environment but also for future development decisions. It has a central role for the long-term strategies of a municipality (Boverket, 2018).

Construction Documents (*Bygghandling*) (Skanska, 2018)

Detailed development plan (*Detaljplan*) (Skanska, 2018)
This plan regulates the utilisation and design of an area. It includes multiple details such as *what* is going to be built and *where*, the size and can in some cases also regulate the design of the buildings (Göteborgs Stad, 2018).

Planning and Building committee (*Byggnadsnämnden*) (Göteborgs Stad)
Their responsibility is regulating the development of the built-up area of Gothenburg including water and lots. The planning for Gothenburg's infrastructure, trade and industry, housing, and urban environment is the main focus of this committee (Göteborgs Stad, 2018).

Traffic committee (*Trafiknämnden*) (Göteborgs Stad)
Their responsibility is accommodating safe and reliable transportation in the region of Gothenburg. Also, they are responsible for the development and maintenance of the region's roads for all kinds of traffic, bicycles and pedestrians (Göteborgs Stad, 2018).

Project planning document (*Systemhandling*) (Skanska, 2018)
This document includes technical analysis, structural design, financial assessments and profit analysis (Göteborgs Stad Trafikkontoret & Stadsbyggnadskontoret).

Purchasing and Procurement Committee *(Inköp- och upphandlingsnämnden)*

The Swedish Transport Administration (*Trafikverket*)

Traffic and Public Transport Authority *(Trafikkontoret)* (Göteborgs Stad)

Urban Planning Department (*Stadsbyggnadskontoret*) (Sveriges Kommuner och Landsting, 2008)

1. Introduction

As cities are growing, developing authorities and companies as well as politicians are facing multiple challenges simultaneously. The strive for building denser in sustainable manners is one challenge (Ström, Molnar and Isemo, 2017). Another challenge is the competition between residential areas, green areas, cultural and social life among other that all are competing about the same areas (Boverket, 2016). Back in 1987, the World Commission on Environment and Development addressed that an increasing urbanisation and the need of thinking in sustainable manners would require a new way of thinking when it comes to how we design our cities (World Commission on Environment and Development, 1987). In cities of today, this has become an inevitable concern. The strive for sustainability is setting requirements for how to create equal accessibility, design our urban areas and utilise built environment (Brorström et al., 2018, Gustavsson and Elander, 2013).

In many countries, sparsely designed cities are becoming denser and to do so in a sustainable manner, there is a need of smarter planning with an optimal use of urban spaces (Legeby, Pont and Marcus, 2015). In this context, massive structures, such as bridges and pedestrian subways has traditionally fulfilled the purpose of offering accessibility through connecting different geographical areas (Firth, 2015). Sometimes, the intended result is not achieved, and they are often not used and/or perceived as barriers. Such structures are not sustainable in any matter - not ecologically, economically nor socially. However, there are ways of letting these structures fulfil their purpose but also other functions. In new expanding cities these structures could, besides being built for mobility purposes, fulfil functions like being social connectors, reduce barriers and create spaces for other activities by using the vacant areas that the structures create (Sweco Urban Insight, 2018).

Although sustainable development has become an important achievement to strive for, a struggle remains regarding what constitutes *social sustainability* and how to work with it (Gustavsson and Elander, 2013, Legeby et al., 2015, Ström et al., 2017). Social sustainability is perceived as subjective and difficult to concretise into goals and measurable factors. In the context of structures such as bridges and pedestrian subways, social sustainability could be the perspective that add the *additional values* making them more attractive, usable, safe and possibly sustainable from the other two perspectives: economic and ecologic.

One of the first cities in Sweden to develop a tool used in planning processes for changing the old way of thinking, is Gothenburg. The City's authorities, together with politicians, developed the tool *Social Impact Analysis* with the purpose to raise social aspects in urban planning (Göteborgs Stad, 2011). Besides, Gothenburg is a growing sparse city with numerous ongoing development plans, ambitions to become both dense and sustainable (Göteborgs Stad Trafikkontoret, 2014) which makes the city an interesting place of context to study.

This report investigates the importance of creating bridges and pedestrian subways for purposes beyond transportation means and traffic safety. It is inspired by Sweco's report Urban Insight (2018) which exemplifies *what* can be done and some of those examples are presented in chapter 3. According to Sweco's report these structures already bring value to a city and its citizens in terms of security, traffic flow and transportation time (Sweco Urban Insight, 2018), but what if they could add *additional values* and thus being socially sustainable?

1.1 Problem Identification

Previous research and studies about social sustainability within infrastructure and urban planning are still scarce. The few studies that have been conducted in Sweden indicate that clients, consultancy firms and other actors and stakeholders could have very different interpretations of what social sustainability is and its potential for what it could be, see i.a. Eken et al. (2018), Gustavsson and Elander (2013), Ström et al. (2017) and Winter (2015). Consequently, organisations are fumbling with how to raise social aspects in projects and discuss them in parity with other aspects such as economic, ecologic and technical.

Gothenburg has many ongoing development plans with the aim of becoming denser and a vision of a sustainable growth (Göteborgs Stad Trafikkontoret, 2014). Due to Gothenburg's hilly topography and water separating its districts, densification forces physical barriers to be bridged by grade separations. Moreover, old built environments such as dark and unwelcoming pedestrian subways are being demolished or renovated. These measures raise questions regarding the role of bridges and pedestrian subways in cities. How can the planning of bridges and pedestrian subways focus on more than just transportation means and thus add further values to the citizens? Today there is no obvious answer to these questions because of the difficulties of raising social aspects in parity with other aspects. Besides, if suggested measurements are hard to measure or lack incentives, there is a risk they might be ignored (Ström et al., 2017).

1.2 Aim

The aim of this report is to argue *why* social aspects needs to be considered in the context of bridges and pedestrian subways, exemplify *what* social sustainability could be in those contexts, and *how* social aspects can be raised in equal terms to economic and ecologic sustainability.

1.3 Research questions

1. What are the added social values that can be achieved by having a socially sustainable perspective in the design of bridges and pedestrian subways?
2. How can specific tools and/or methods help raising social aspects in parity with other aspects in urban planning and infrastructure processes?

1.4 Limitations

This report focuses on two types of infrastructures in urban areas: pedestrian subways (passages) and all kinds of bridges that has usable area underneath or is characterised as a bridge for pedestrians and/or cyclists. The emphasis is on social aspects and how to make them equally important as other aspects in the urban planning process.

For the purpose of widening the perspective of what social sustainability might comprise, the report includes examples of bridges and pedestrian subways outside Sweden that are deemed socially sustainable. However, since cities have different preconditions and administrative structures, the issue of urban planning processes have been geographically limited to Gothenburg. The city makes an interesting case with its extensive building development plans. However, there are no geographical limitations regarding social values, nor the tools/methods presented in chapter 5.

Previous research is limited to the field of urban planning, transport planning and infrastructure and what social value could comprehend within these processes. Hence, the focus of this report is not transportation itself, rather how the area of a bridge and pedestrian subway can be utilised for other purposes. *Corporate Social Responsibility* is not regarded in this report.

1.5 Report outline

This subchapter aims to give the reader an overview of this report's outline from chapter 2 and forward, which is illustrated in Figure 1. Chapter 2 aims to give readers who are not familiar with planning processes a general overview of how one could look like. The chapter also illustrates an example of how a bridge is aimed to be more than a structure for transportation means. This is followed by a literature review, the used methodology to collect and analyse data, findings from conducted interviews a discussion and conclusion.

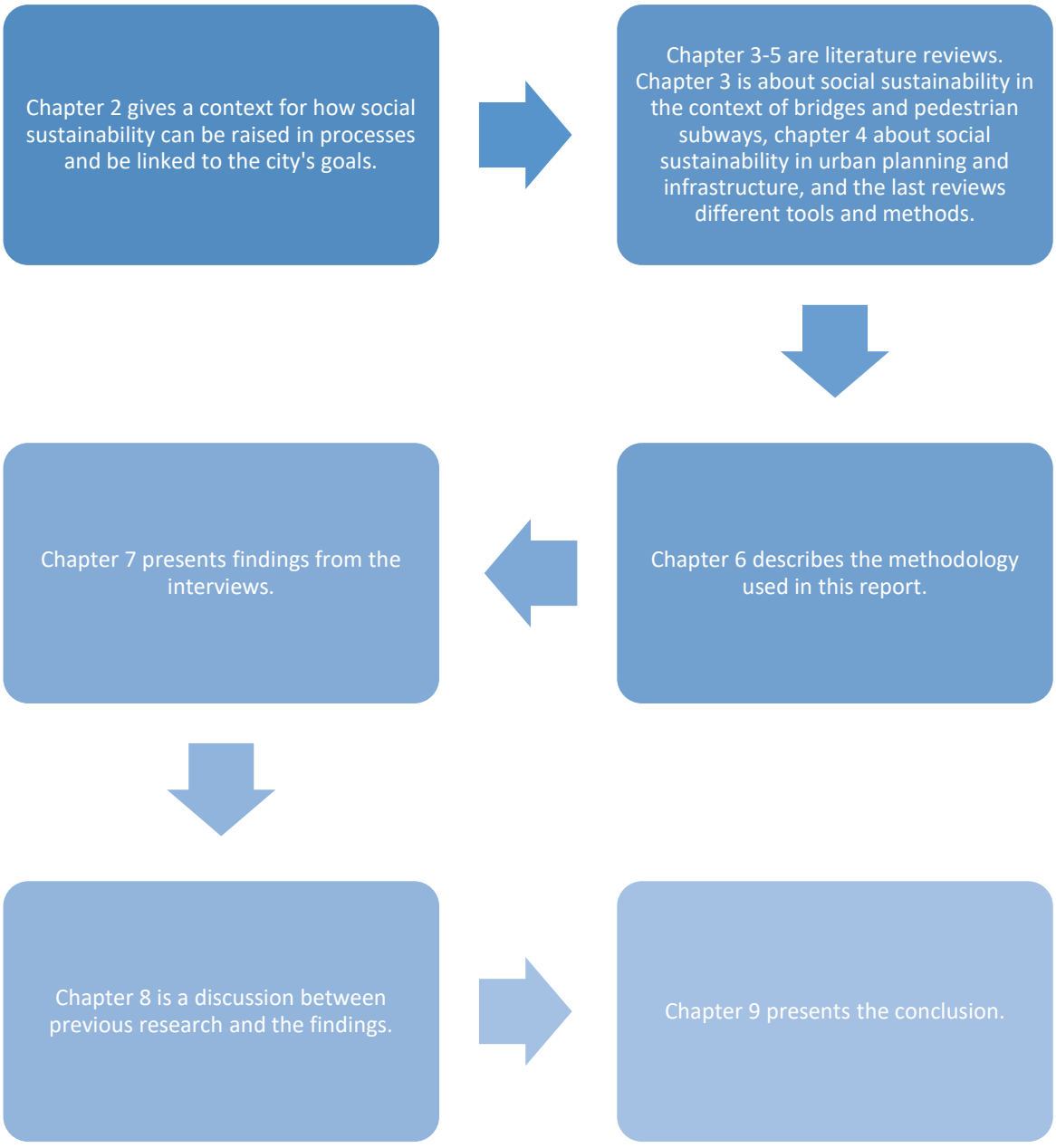

Figure 1 A description of the report outline

2. Place of context: Gothenburg

Gothenburg is Sweden's second biggest urban city (Nationalencyklopedin, 2018). Through the years, visions, plans and demand regarding housing have changed in the city. In the middle of the 1970s the housings were moved away from the inner city and located in the outer city, resulting in a sparsely designed urban landscape (Nationalencyklopedin, 2018). The urban design existing today is a result of the strategy at that time, which somewhat aimed to separate areas and people from each other (Legeby, 2012). In the context of transport planning, the so called SCAFT guidelines constitutes a striking example. The guidelines were developed at Chalmers University of Technology during the 60's (Statens planverk, 1968). SCAFT became a guideline for urban planning with regard to road safety and the aim to reduce traffic accidents. Thus, by grade separations and with a minimum intersection between cars and pedestrians/bicyclists. One of the results of SCAFT was the many pedestrian subways in the intersections close to schools and residential areas that we see today (ibid.).

Today, the vision and strategy for Gothenburg City is making the city denser by connecting its sparse areas to the inner city and make the inner city more walkable (Göteborgs Stad Trafikkontoret, 2014). In 2011 *the Planning and Building Committee* together with *the Traffic Committee* started to work on an infrastructure strategy for the development of Gothenburg's land-use the coming 20 years. The strategy has been launched with help by different local actors, politicians and consultancy firms with the aim to give a guidance to all kinds of decisions regarding other future development. One of the strategy's main focuses is 'how urban design shape places where people want to live, work, socialise and do other necessary needs' (Göteborgs Stad Trafikkontoret, 2014:29).

The vision is creating a Gothenburg for everyone with places to meet and socialise (Göteborgs Stad Trafikkontoret, 2014). Transportation between different main nodes will mostly rely on public transportation and bicycles, while the inner city will emphasise pedestrians. The goal is creating less barriers and more public spaces that enhances meetings and social interaction, thus by working with the urban design and the structure of the city's routes. In fact, today the main social barriers are results of the traffic routes and traffic flows of different characters (public transport, cars, bicycle lanes) and railways. Thus, aiming for being the foremost transportation hub in the Northern countries requires great knowledge of social aspects and how to support these (Göteborgs Stad Trafikkontoret, 2014).

Another contributor of the social barriers in Gothenburg is its topography. Gothenburg's inner city situated on clay and is surrounded by primary rocks and valleys, which characterises the rest of Gothenburg. The river Göta Älv runs through Gothenburg and is consequently dividing the city (Nationalencyklopedin, 2018). It is therefore no surprise that tunnels and bridges will be part of the solution for connecting different areas to each other.

2.1 Process of infrastructure projects

This subchapter only illustrates a general infrastructure process when it is initiated and controlled by the City of Gothenburg. It aims to give the reader an overview of how an infrastructure process could function, what the different stages of a process includes and what role the private actors have. Later in this report it will also demonstrate at which stage social aspects should be considered. Hence that this chapter is just a simplification of reality, the process described in Figure 2 is only valid for a design-bid-build procurement and for public areas in the *detailed development plan*.

A *comprehensive plan* is the initial step setting the basis for utilizing and developing the physical environment in whole Gothenburg (Boverket, 2018). Since it is only a guidance and not regulations, all the development ideas for Gothenburg's' development has to be verified within the *detailed development plan* that is a legally binding document (Göteborgs Stad Trafikkontoret & Stadsbyggnadskontoret). Development ideas usually comes from an identified need and several measures could be possible solutions to the need. These measures are analysed and compared through different parameters with each other during a feasibility study.

Figure 2 is an illustration of a general process, from the planning phase to the operation and maintenance. A feasibility study is performed by consultants, such as Sweco, by request from the *Urban Planning Department* and the *Traffic and Public Transport Authority* and result in general drawings, reports and describing documents attaches with the *detailed development plan* (Göteborgs Stad Trafikkontoret, 2018b). Usually different suggestions are reviewed and the end-product of a feasibility study results in environmental, technical, geological, economic and social analysis for the chosen suggestion. The project planning (see step 2 in Figure 2) pursue the documents from the feasibility study by going into more details. Also, this phase is performed by consultants and result in i.a. *construction documents* that a contractor follows. Each phase is normally performed by a new project team.

Figure 2 A general overview of planning processes regulated by a detailed development plan (cf. Göteborgs Stad Trafikkontoret, 2018b)

2.2 Hisingsbron

Hisingsbron is chosen for exemplifying what a feasibility study can include and what role the social aspects play. From the initial proceedings in its planning process the project has had the aim to be more than 'just a bridge', which seems to be a consistent vision when studying the planning documents (Göteborgs Stad Stadsbyggnadskontoret, 2013). Hence, Hisingsbron is still in the construction phase, which makes it hard to study the actual result. This subchapter presents general parts from its feasibility study to illustrate how social aspects can be raised but also how a city can create a landmark and an identity connected to the city's vision.

Hisingsbron is a bridge that is supposed to substitute the current Göta Älvsbron; one of the three bridges connecting the island Hisingen to the main land (Göteborgs Stad Stadsbyggnadskontoret, 2013). In the *detailed development plan* one ambition was including social aspects thus a Social Impact Analysis (SIA) was executed, using the frameworks set up by the City of Gothenburg. Chapter 5.3 describes this analysis more detailed.

The SIA analysed the following aspects: a connected city, synergy, everyday life, identity, health, and safety (Norconsult, 2011). Since it was enclosed to the *detailed development plan*, the analysis was performed on a visionary stage without any concrete suggestions for the bridge. Hisingsbron is marketed as more than a physical bridge, it aims to function as a social connector as well. The goal is having a physical bridge that encourage people to use it but also a place boosting both planned and unplanned meetings. For reaching this ambition both the bridge itself and its attachment on both sides has to be considered; integrating both sides of the bridge with their environment and creating coherent passages is essential. Also, creating environments that

are alive 24 hours a day and avoiding generating deterrent places are other considered aspects (ibid.).

After the *detailed development plan* including the social sustainability aspects was confirmed, an investment decision had to be made based upon what was suggested. Also the investment decision highlights different social aspects that Hisingsbron both will emphasise and enable – which a majority of the local politicians in Gothenburg approved (Kommunfullmäktige, 2016).

3. Bridges and tunnels as part of urban planning

Research about social sustainability in urban planning or infrastructure are mostly general and do not consider specific structures, squares or areas (Winter, 2015, Ström et al., 2017). This report's focus is to zoom in more specifically at the bridges and pedestrian subways for exemplifying what social sustainability is in those contexts but also for analysing whether there is any importance of looking at specific structures and areas in the planning process, more importantly within the feasibility study. Examples of the structures being more than transportation means are presented in this chapter. Likewise, how they are observed by experts and how they can be a part of the urban room.

Urban areas are physically shaped by their built environment and infrastructure while their function is to support economic, social, cultural and environmental processes (Hillier, 2007). The design of infrastructure, as part of the physical urban area, is what creates the behaviour of people's movement patterns, but also what could either encourage high-scale movement or low-scale movement (Hillier, 2014). How the design of the network of our streets and utilise areas is executed will in other words shape how people move and interact with others – in fact, public spaces such as parks, streets and paths are argued to be meaningful spaces for creating relationships and social values (Legeby and Lars, 2011). For this purpose, bridges and pedestrian subways can play a large role in complementing such networks.

Sustainability is connected to the functions of an area and to build sustainable cities we must understand the relation between the area's physical shape and its function (Hillier, 2007). The built environment influences on *who* uses the space and consequently encourage some groups while discouraging other (Legeby and Lars, 2011). Vranken, Decker and Nieuwenhuyze (2002) described social sustainability as 'social inclusion', 'social integration', 'local identity' and 'participation' which are all entailing on how urban spaces are used. Likewise does the connotation of *the preservation of health and identity* as well as *the development of education opportunities and social unity* (Ström et al., 2017) entail the use of urban spaces.

Bridges and tunnels are parts of the infrastructure and have been built for centuries to cross an obstacle and as a result connecting two areas to each other. Their design could in some places be a symbol or identity for the city, while in other just fulfil their function to cross the obstacle (Firth, 2015). In Sweco's report *Sweco Urban Insight (2018)* it is argued that these massive structures should be used in more optimal and sustainable ways. There is a need of rethinking how we re-use them when they become irrelevant for their time or when we build new ones. Though tunnels and bridges are intended to connect two areas to each other and reduce barriers, without any deeper thoughts about the adaptability to their surrounding the outcome could be an increase of barriers with empty and dark spaces (Sweco Urban Insight, 2018).

The British structural engineer and bridge designer Ian Firth has a similar view of bridges. Firth (2018) describes how a bridge is much more than just transportation means; bridges are important social connectors, symbols of their location, sometimes enormous and significant features. Bridges link communities and ease for building new ones (Firth, 2015). For example in The Cap in Columbus, Ohio of United States where the old bridge was a deterrent for pedestrians (see Figure 3) that wanted to cross between the Arena District and the pedestrian storefront of the Short North. The construction of the bridge in the end of the 90's resulted in a more living area and an increase of visitors in the shops and restaurants at the Short North (see Figure 4 & Figure 5). As a fact, the investment in rebuilding the bridge resulted in economic

growth at the Short North side but in hindsight, it also created social values through spaces for connecting people (AIA Columbus, 2008, Speck, 2013).

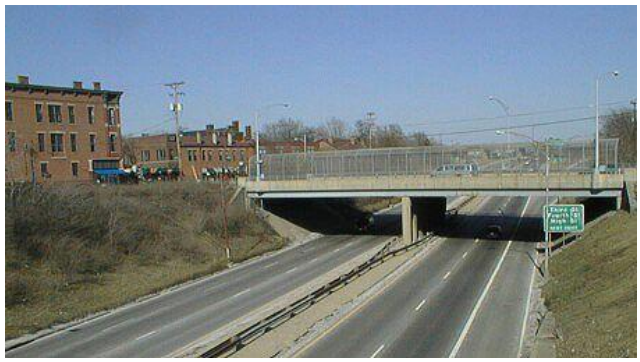

Figure 3 How The Cap looked before re-building. Credit to David B. Meleca Architects (2004b)

Figure 4 The Arena District on the left side and the shops and restaurants of the Short North on the right side after being re-built. Credit to David B. Meleca Architects (2004a)

Figure 5 The Cap after being re-built. Credit to David B. Meleca Architects (2004a)

Structures such as bridges and pedestrian subways have sometimes created unused deterrent areas. Taking New York City as an example, Bauer et al. (2015) analysed and mapped unused areas under elevated structures and found a result of nearly four times the size of Central Park that is deserted. Though the elevated structures have created many opportunities and economic growth, the deserted area was not only dark and deterrent but also created barriers between districts in an urban area (Dovey, 2015). Also, the example of the London Underline with shut down tube tunnels with the plans to be reinvented and re-used for other matters (Gensler, 2018). The idea is to create bicycle and pedestrian paths that are isolated from pollution and other traffic, but also to create cultural and retails spaces.

In Ammerud in Oslo (Norway) there is a 30 metres tunnel under the subway that used to be a dark and deterrent space, causing travellers with the subway to take detours (Johnsen, 2015). It was clearly that the avoidance of walking through the tunnel was just created by imaginations and feelings because there were no reports of more violence in the tunnel compared to its surrounding.

On one side of the tunnel there was a plan for building a ‘Muscle beach’ with an outside gym and the tunnel would be a supplement by adding climbing walls and monkey bars (Johnsen, 2015). By integrating the tunnel with its surrounding environment, the project created a social

arena and a new meeting place for the habitants of Ammerud. As Firth (2015) argued about bridges, adaptability is an important characteristic: and he asked questions like ‘what does people want to see and do?’, ‘where are people coming from and heading’?. These questions seem as justified for tunnels as for bridges.

4. Social sustainability within urban planning & infrastructure projects

This chapter will examine how research and previous studies argue for and define social sustainability within both urban planning and infrastructure. There are several concepts of social sustainability: social benefit, social consequence, social effect, social impact, and social value. In this report, the concept *social value* is used and comprises all the other concepts. However, only in this chapter the original concept will be used since it focuses on previous studies. In the cases where there is a clear distinction between these concepts, their original definition will be explained in relation.

Statistics clearly indicate that more people are moving from rural areas into urban areas in Sweden *(Boverket, 2012).* At the same time, the population is increasing, cities are expanding as well as the competition for land: housing, infrastructure, companies and social life are all competing about the same areas (Boverket, 2016). As the World Commission on Environment and Development (1987) argues, politicians need to find a way of managing urban planning to form a sustainable city.

A 'sustainable city' often refers to the three elements of 'sustainability': environmental, social and economic (Regeringskansliet, 2015). Ignoring one of the elements would suggest that only the two other are considered as important (Geurs, Boon and Wee, 2009) while in fact sustainability includes all three and implies they are associated with each other (Regeringskansliet, 2015). However, this report's focus is on social sustainability and not much focus will be laid on the other two sustainability elements.

Regarding the social impacts in infrastructure the following definition is proposed by Geurs et al. (2009:71): "… *changes in transport sources [infrastructure, vehicles and movement] that (might) positively or negatively influence the preferences, well-being, behaviour or perception of individuals, groups, social categories and society in general (in the future)*". In this definition the authors refer to the presence of infrastructure (partially). They also suggest a broad definition to not risk ignoring any social impacts of importance.

Ström et al. (2017) stated that social sustainability is characterized by two dimensions. One is the *preservation* of human values, such as health and identity, whilst the other is *development* of values we want to increase within our society, e.g. education or social unity. Another way to describe social sustainability is by using words as 'social inclusion', 'social integration', 'local identity' and 'participation' (Vranken et al., 2002). According to Gustavsson and Elander (2013) social sustainability needs to correlate to the project's vision and goals, and the city's political vision.

In 2014 the committee 'National Negotiation on Housing and Infrastructure' was appointed by the Swedish government to lead the negotiations between different municipalities, regions, and business sector for development of sustainable infrastructure across Sweden but also connecting Sweden with Norway and Denmark (Sverigeförhandlingen, 2014). The aim was to engage different actors to highlight the different needs, possibilities and influences that could occur for developing suitable tendering documents. One of the released reports had the special focus on 'social values' and mapped how they were defined by different actors and which methods were used. Some findings in the report were: the widely different interpretations for 'social sustainability'; the different methods used to identify and to measure; the huge focus on positive

consequences and less on the negative ones; and that *socioeconomic benefits* and *specific values as a consequence of an investment* were regarded as synonyms (Winter, 2015).

The many interpretations made it difficult to create a possible definition. In a report, Winter (2015) mapped four major recurring concepts regarding 'social sustainability', these are presented in Figure 6. Different social values and their related social benefits are presented in Table 1. Additional social values were identified, that are not shown in Table 1: such as the "wow-feeling" of new construction/infrastructure attracting more people and tourists and creating identification and proudness among citizens; a new construction/infrastructure being a symbol of its region or time period with a positive influence on growth; an increased population and economic growth; an increased mental attachment to a city and its business market; and increased public health (Winter, 2015).

Ström et al. (2017) and Vranken et al. (2002) argues that though there are several words describing 'social sustainability', it remains vague because of the many interpretations these words can have, with varying indicators and solutions. Continuously Ström et al. (2017) argues that without an understanding for the values that urban planning changes can, and cannot, influence, social sustainability will remain vague – mainly because it means different things for different people in different contexts.

Owing to its complexity and the many occurring dimensions of social sustainability, there seems to be no widely accepted practical approach (Ström et al., 2017, Winter, 2015). This does not necessarily pose a problem, however it is clear that public agencies, such as the City Authority or The Swedish Transport Administration, need quantified benefits and measurable arguments to base their investment decisions on (Ström et al., 2017). This topic will be further elaborated in chapter 5.

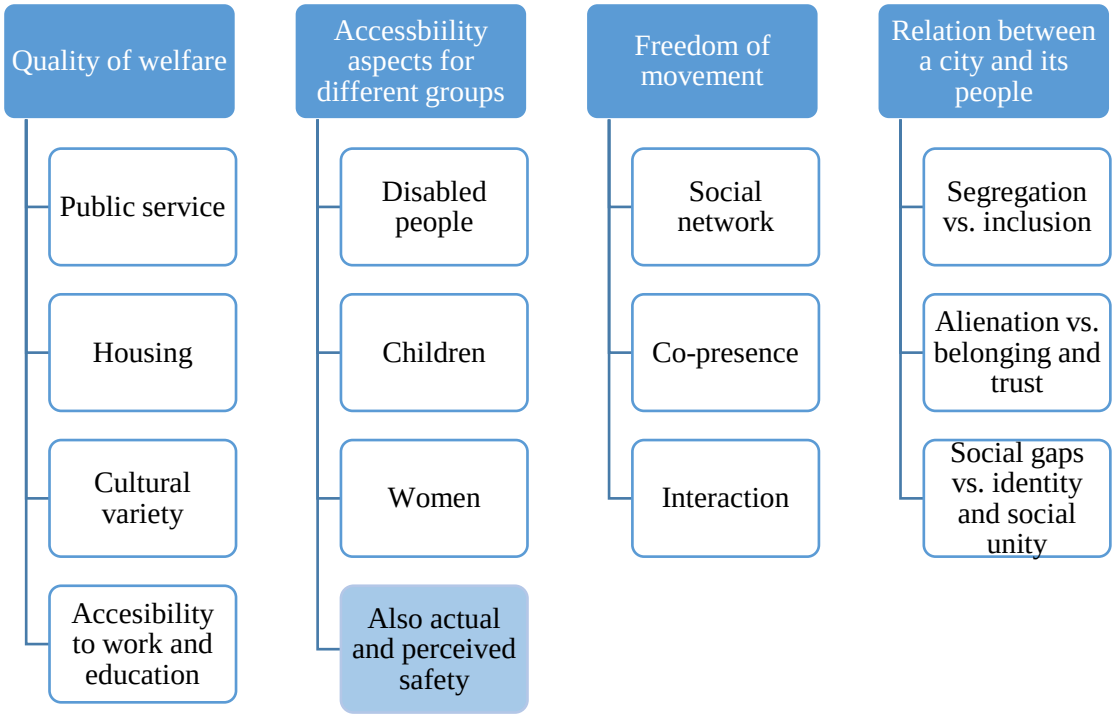

Figure 6 The four major concepts (cf. Winter, 2015:23-25)

Table 1 Social values and social benefits (cf. Winter, 2015:23-25)

Social value	The social benefits resulting from achieved social value
Accessibility	• Getting a job → inclusions and trust • Commuting or not → more job opportunities • Accessibility in itself
Meetings/interactions	• In the urban space: e.g. parks, streets, stops etc. • Influencing social norms • Interaction itself
Urban construction	• Ensuring qualities for good environment and spaces • Urbanisation and density lead to higher perceived safety • Mixture of different real estate
Connections	• Physical: new infrastructure, increased traffic, linking two areas • Mental: linking areas with different socioeconomic status
Equality	• Increased equality between different genders but also different socioeconomic groups

4.1 Pitfalls with social sustainability

Researchers seems to agree that there are pitfalls with the concept of 'social sustainability'. Vranken et al. (2002), Ström et al. (2017) and Winter (2015) point out that working with social sustainability is not necessarily sustainable for all groups within the society in the sense that it does not provide social justice for everyone. Social inclusion and social cohesion could have contradictory effects. Vranken et al. (2002) gives the example of a strong social cohesion at a neighbourhood level and a decrease social inclusion of the neighbourhood's inhabitants at the city level. Ström et al. (2017) identify that efforts in one area might lead to improvements but at the same time failure within other areas. According to Geurs et al. (2009) the distinction between ecological, economic and social impacts is not clear and there can be cases in which the three are mutually exclusive.

Additionally, Winter (2015) explains in her report that many of the actors never made any conclusions from their discussion about social values arising from the infrastructure project, mainly because they found it hard. She also mentions that many focused mainly on the positive effects that the new infrastructure projects would lead to but only a few looked at negative impacts. Sweco was one of the consultancy firms that helped Blekinge region to perform their analysis and identify social benefits and, in their report, they argue:

"*In order to describe social benefits, it is necessary to discuss the negative social impacts. The risks of ending up with negative social impacts could sometimes be even greater and only by identifying them and creating awareness for reducing them can they transform into social benefits." (Region Blekinge, 2015:31)*

5. Assessing Social Sustainability in infrastructure projects

The vague and contextual definition of 'social sustainability', with no or few relations to financial measurements, is argued by Winter (2015) to be a challenge in infrastructure projects. Other comparable studies made by Ström et al. (2017) and Brorström et al. (2018) conclude the same – actors within the construction sector were missing tools and indicators when working with social sustainability. Within this chapter, previous research and studies about ways of assessing social value(s) will be presented. Firstly, this chapter begins with raising why assessments are demanded and their purpose. Thereafter different tools are presented with a critical analysis of each tool.

One of the risks that actors and stakeholders face is making decisions about what is 'socially sustainable' based upon feelings and opinions rather than true facts (Ström et al., 2017). This challenge was something that the actors working with *River City Gothenburg* also faced – a project that focused on the future of Gothenburg and how to combat barriers that caused segregation (Brorström et al., 2018). The same study also show that the project faced an additional difficulty; translating the vision and strategy into real practice due to a lack of goals, numbers and indicators to measure. The challenge was the gap between the 'soft values' in the vision, that were hard to measure, and the other measurable parts of the project. They stressed that the focus easily shifted to the measurable goals (Brorström et al., 2018). Another study made by Emilsson and Hollander (2016) indicated the same. Emilsson and Hollander (2016) argued that 'social sustainability' was highly discussed in the very beginning of projects. However, when projects reach the level of project planning and became more concretised, there was a tendency that 'social sustainability' was put aside.

As mentioned in chapter 4, Winter (2015) found that only a few actors succeeded to draw any final conclusion about social values created by the new infrastructure project. Only one municipality performed analytical measurements for achieved social values, yet the intention for the 'National Negotiation on Housing and Infrastructure' was gaining more knowledge on how to measure social benefits arising from investments in infrastructure projects. Additionally, there was a wide variety among the approaches, methods and tools that were used for defining and measuring social sustainability.

Ström et al. (2017) pointed out the need of working systematically and more rationally with social sustainability within infrastructure projects. Furthermore, the authors challenge the demand for 'one perfect tool' to raise social aspects and express the need of a process with good collaboration instead. Similarly, Brorström et al. (2018) argue for the importance of collaboration across organisational boundaries. Nevertheless, practice and research seem to agree that there are difficulties when working with social sustainability in infrastructure projects (Geurs et al., 2009, Brorström et al., 2018, Winter, 2015, Eken et al., 2018). There is also a unity that different approaches, tools and methods have an impact on how we develop our cities and infrastructure. Furthermore, the shape of our cities and infrastructure has a direct impact on both society and individual level. By creating an understanding of the impacts, it is easier to choose the correct approach, tool or method to attain a specific purpose (Eken et al., 2018) and also to identify and control the outcomes, be they positive or negative (Winter, 2015).

Though the difficulties with 'social sustainability', ignoring social impacts in assessments of infrastructure projects would result in that only ecological and economic impacts are considered (Geurs et al., 2009). According to Brorström et al. (2018), goals that cannot be measured could

neither be evaluated. Here *goals* refer to 'social values aiming to achieve'. In the case of the project *River City Gothenburg* these *goals* were not only used by actors involved in the project, but also by the local politicians – the investors of the project – to make budget decisions. It was clearly asked that social values needed to be translated into financial incentives. Similarly, Winter (2015) point out that her notion of the aim of the 'National Negotiation on Housing and Infrastructure' was to capitalize social values to compare them with other values.

In the subchapters below, some tools and methods used within urban planning or infrastructure processes will be described. The purpose is to identify their strengths and weaknesses but also illustrate how they can be used to assess social value.

5.1 Social return on investments

Social Return on Investments (SROI) is an *impact analysis* based upon traditional Cost-Benefit analysis (see subchapter 5.2) (Then et al., 2017). The tool is used to value achievements and impacts by converting them into monetary terms, whenever possible. The choice for monetisation is argued to be corresponding the traditional way of valuing achievements (Serus, 2018). However, the focus is never on the money but rather on the values that are created by different activities (also called interventions).

The tool analyses the relation between each activity and change, what impacts the interventions will lead to and what values these impacts will have (Serus, 2018). There is no one form of SROI and they can be performed in simple and advanced manners (Then et al., 2017). An example of how SROI is applied is presented in chapter 10 in Then et al. (2017) and in the report of Watson and Whitley (2017). A comparison between SROI and Cost-Benefit Analysis can be found in Appendix A.

Then et al. (2017) stated that SROI is developed for for-profit businesses, but also for other types of organisations that wish to see what impacts their contributions achieve. Further, SROI is also argued to not be a step-by-step tool, but rather a way of identifying impact characteristics. Furthermore, SROI is a hypothetical prediction about the impacts, similar to how business predicts future profits. Thus, when performing SROI the model design needs to be supported by hypotheses, complex enough to allow verification of strategic objectives of an intervention, but simple enough for avoiding high costs and difficulties. However, when choosing the SROI one must bear in mind that *"... not everything which can be recorded must be measured, and similarly, not everything that can be measured must be monetised. The standard for prioritisation and focusing should be the causality of the impact model"* (Then et al., 2017: 149). To put it in other words, not everything can be assessed in monetary terms and there are different ways of assessing those objectively (ibid.).

5.1.1 Pitfalls with Social return on investments

SROI as a tool has both advantages and disadvantages. Even though SROI is developed to make thoughtful and better planning, it can also be misused by politicians to serve political ends (Yates and Marra, 2017). SROI is nothing new in decision-making processes, rather a formalised and explicit version of what decision-makers already do, and it can be used to construct and manipulate aspects for finding the optimal resource allocation.

It is not obvious who can or should use SROI according to Yates and Marra (2017), also it requires a lot of training and competencies. Thus, it is an investment in itself for those choosing

to apply SROI and work with it. Additionally, there is no meta-evaluation of SROI to find out whether it is a profitable investment for companies (Yates and Marra, 2017).

If choosing to work with SROI, one must consider that SROI is not an outstanding tool compared to other tools, it is rather *one* tool clarifying some social perspectives among other tools that might clarify other social perspectives (Yates and Marra, 2017). Furthermore, the decisions based on SROI, as well as on other assessment tools, are only as good as the input data and only valid as the variety of stakeholders involved. Gustavsson and Elander (2013) discuss two risks with measuring which are: (1) measuring might be used for grading the project and (2) it might cause more damage than good because stakeholders would focus on the measurements rather than trying to understand the process of social sustainability in a project.

5.2 Cost-Benefit Analysis

The Swedish Transport Administration (STA) has developed a guidance for how to use a Cost-Benefit Analysis (CBA) for transportation purposes and it is this guidance that will be presented here. Though it is for transportation purposes and not for utilisation of unused areas or for creating social value, it has been presented as way to raise a perspective of how social value could be measured in a transportation/urban infrastructure context.

CBA is based on microeconomics, more specifically on welfare economics (Bångman, 2012). Its purpose is to give a guideline for which investment is possibly more beneficial (in a feasibility study) and it is primarily used within the public sector. A CBA calculates the net value of created resources and benefits (those generating the income) and the utilized resources (the costs). Since the public sector do not provide resources that are produced on an open market, a CBA acknowledges and values resources that does not have a market price. A CBA also considers the effects on all citizens and not just the effects influencing on its own organisation (ibid.).

The calculations can be performed in two different ways. In one of the CBA models the calculations are based on an action's net effects on tangible resources such as financial assets and cash-flows, for different categories among citizens and within a society. The second CBA model takes the sum of the tangible incomes and costs; using this model means that one only considers the value of what is produced and what is consumed without considering whom the producer nor the consumer is (ibid.).

A CBA should in include both direct and indirect effects caused by the measure. To exemplify direct and indirect effects, consider lowering the traffic speed on a road (Bångman, 2012). The direct effects will be a decrease in economic surpluses for private motorists and transport consumers because a decrease in speed is an increase in travel time. Other direct effects could also be a decrease in accidents and an increase in economic surplus for non-motorists. One example of indirect effects is an increase in utilisation of public transportation (ibid.).

Similar to the SROI, CBA transforms the benefits into monetary values, whenever possible (Bångman, 2012). Figure 7 illustrates the six steps in a CBA. The starting of the analysis is after a need has been observed and an action to cover that need is raised. The first step is to specify the measure and comparing it with another measure, alternatively with *no* measure. To put it in other words, the definition of comparable suggestions is done in the first step. This is followed by an identification of both direct and indirect effects for each suggestion and also a limitation over the period that will be analysed. The third step is the valuing of the effects in monetary

terms, with varying difficulties among valuable and non-valuable effects. Some benefits have a market value while others do not, such as reduced travel time, a decrease in accidents or noise. Those effects are instead valued by using a shadow price. If it is impossible to assess the benefits in monetary terms it is possible to try to describe them by using words and through that assess whether they are positive or negative benefits. The fourth and fifth step includes discounting to present value and summing all monetary values to a net value, which is then the value that is compared with among the different suggestions. The final step, step six, aims to reduce the risks of inaccurate net values. A re-calculation of the net values is performed with changes in some assumptions (ibid.).

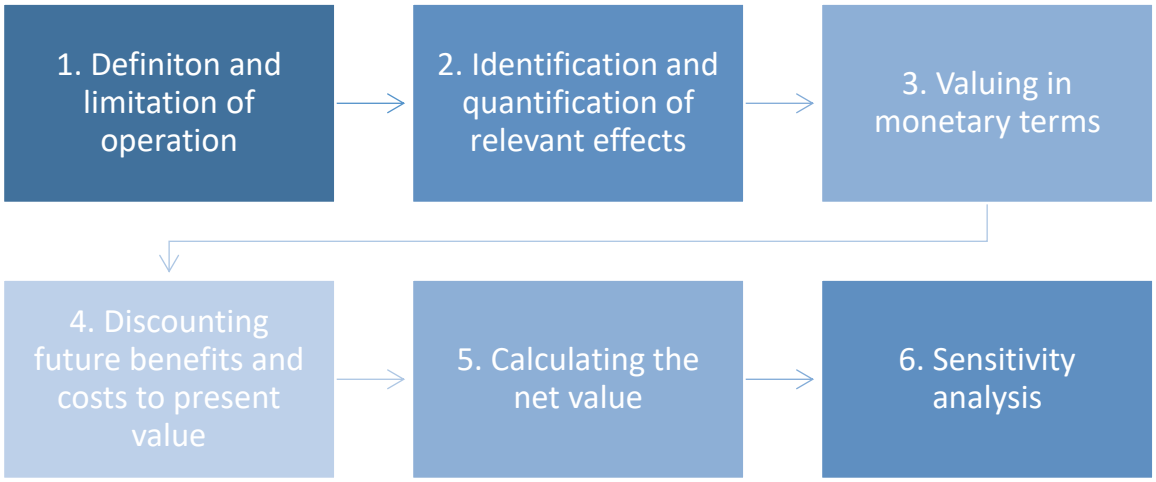

Figure 7 Six steps of a Socio-economic analysis (cf. Bångman, 2012, p.16-18)

5.2.1 Pitfalls with Cost-Benefit Analysis

Then et al. (2017) argue that a CBA and SROI are relatively similar, the main difference is the use of terminology. In such case the critiques presented for SROI in subchapter 5.1.1 from both Gustavsson and Elander (2013) and Yates and Marra (2017) are true for this tool as well.

As previously mentioned, CBA is a monetised appraisal methodology with the aim to calculate a value of resources that are not provided on an open market (Dimitriou, Ward and Dean, 2016, Bångman, 2012). Whilst some are easier to give a value there are aspects that are harder to monetise, and the weighting is subjective (Dimitriou et al., 2016). Another criticism is that CBA only recognizes measures that increases the speed and consequently traffic growth– merely because the lion part of the benefits comes down to any decrease in travel time (Metz, 2008). Thus, it does not recognise pedestrians as means of transportation.

According to Bångman (2012) there is a risk that CBA can be used to serve political ends and strengthening a political view if the calculations are influenced by political values. Transparency is also important which raises the importance of documents explaining the calculations and clarifying what lays behind the decision making. A lack of transparency could lead to dissatisfaction and questioning of the project among citizens. Two other risks that are brought up by Bångman (2012) are the counting of a benefit twice which happens in the second step in a CBA and the uncertainties when predicting future conditions.

In a study made by Vigren and Ljungberg (2018) in which they compared the use of CBA in 2003 and in 2016, it is concluded that the use of CBA is not increasing. The reason behind this seemed to be lack of knowledge among the employees within the Traffic and Public Transport

Authorities and remarkably that there were other more important support tools for decision making (ibid.).

5.3 Social Impact Assessment

A way of analysing and highlighting impacts and social aspects in urban development, is by using the tool Social Impact Assessment (SIA) that uses text to analyse different social aspects (Tahvilzadeh, 2015). Gothenburg City Authority was the first in Sweden that developed such a tool, by request of the *Planning and Building Committee* (Eken et al., 2018). It is supplemented with a digital tool illustrating examples of how to use SIA in infrastructure processes, which is specially consulting politicians and civil servants in their work. The idea is to use SIA during the process of the *detailed development plan* within urban development projects (Göteborgs Stad, 2011).

Its purpose is to create a common understanding among the collaborators in the project team regarding social aspects that impacts on the project area (Göteborgs Stad, 2011). SIA focuses on four main social values: cohesive city, interactions, everyday life and identity. SIA can be used to create a deeper understanding and knowledge of an area, to create actions and proposals for how to plan a certain area but also to evaluate the impacts of the suggested actions and proposals (Göteborgs Stad, 2011).

5.3.1 Pitfalls with Social Impact Analysis

According to Tahvilzadeh (2015), evaluations of SIA indicates that the tool support the possibilities of discovering values and impacts outside the area of interest, and making end-users interests a part of the decision process for the *detailed development plan*. Furthermore, the tool has been perceived as useable and has been applied frequently in the processes. While some used the tool according to its purpose, other treated it as a checklist. This can be discussed further whether it is a positive or negative aspect that it is used in different ways. Additionally, Tahvilzadeh (2015) identified that the tool inhibited critical thinking and critical discussions about how impacts could be mutually exclusive.

5.4 Multi-Criteria Analysis

Multi-Criteria Analysis (MCA) originates in decision theory and is a long-established method (Rosén et al., 2009). It is widely used across different sectors with many ad hoc methods developed for solving a specific issue (Ishizaka and Nemery, 2013). This subchapter presents the idea of Rosén et al. (2009), whom are studying how the three sustainability elements, ecological, economic and social, can all be considered in one analysis.

Comparing ecological, economic and social capital requires different valuation methods because of their disparities (Rosén et al., 2009). As mentioned above, there are many ad hoc methods developed and an MCA can include several valuation methods used to value different sets of criteria. Examples of these is the cost-benefit analysis presented in subchapter 5.2, multi-attribute utility methods, linear additive methods, analytical hierarchy process, outranking and non-compensatory methods. For an explanation of these methods see Rosén et al. (2009:16-19). There are other authors like Ishizaka and Nemery (2013) presenting other methods and Guarini, Battisti and Chiovitti (2018) who reviewed different methods to select the most suitable for making decisions in development of Real Estate and Land Management. In the UK, the government has developed a manual for guiding the performance of MCA, see (Departement for Communities and Local Government, 2009). A combination of the different tools could be, e.g. using the linear additive method for ranking the alternatives and the

outranking method to identify which alternatives are non-sustainable. According to Dimitriou et al. (2016) a CBA could also be a possible tool to include in a MCA.

The purpose with MCA is to appraise different alternatives through set criteria within ecological, economic and social capital, and compare which of these alternatives is the most sustainable. The criteria for social capital could be based on general goals, e.g. Rosén et al. (2009) relate their criteria to Agenda 21. For more examples of criteria see Rosén et al. (2009:12). Most important is setting criteria that are clearly linked to the projects purpose and concretising them. Criteria can be both quantifiable and non-quantifiable, and can always be compared to each other or weighted in different ways, e.g. through points (ibid.).

Rosén et al. (2009) suggests that MCA is performed at an early stage – preferably it should be a part of the feasibility study. It should also follow an iterative process through the planning process to support the decision making between two or more alternatives with complex aspects. Furthermore, 'transparency' in the appraisal regarding which criteria are chosen and how they are evaluated is important. This is mostly because MCA is partly performed with quantified numbers and partly with subjective assessments which needs to be supported by reliable arguments (Guarini et al., 2018).

5.4.1 Pitfalls with Multi-Criteria Analysis

How to deal with subjectivity has been a recurrent issue among the different valuation methods and is so in this case as well (Bångman, 2012). Hence, the importance of being transparent through the process and provide an explanatory report including the valuation methods, how they were performed and arguments to why an intervention was chosen or declined. In contrast, Dimitriou et al. (2016) argue that MCA takes on a holistic approach and engages stakeholders at an early stage. The same authors claim that MCA is guided by objectives and policies.

One advantage with MCA is that it takes on many forms depending on the context, and different valuation methods can be used for different cases. Thus, it is also a disadvantage since it requires a wide knowledge about the different methods and the ability to choose the correct ones (Rosén et al., 2009).

6. Methodology

Social sustainability is both contextual and subjective (Ström et al., 2017), which is also true for the working procedures with social values. To avoid the risk of putting the concept in a box and instead emphasising its natural form – which is to be contextual and subjective – a qualitative research approach is preferable in comparison with a quantitative approach (Bryman and Bell, 2015). Thus, this report focuses on a qualitative research according to the definition of Bryman and Bell (2015:38):

[…] qualitative research is a research strategy that usually emphasizes words rather than quantification in the collection and analysis of data [...] takes a view of social reality as a constantly shifting emergent property of individuals'' creation.

In addition, qualitative research allows for studying what is important through the eyes of whom is being studied (Bryman and Bell, 2015). Because previous research and studies indicate that working procedures are still immature among practitioners, it has been an important element in this report to carefully listen to what is incomplete when it comes to raising social aspects in parity with other aspects. Therefore, to be able to grasp a comprehensive view of the issue of social value in urban development, both a literature review of previous research and an interview study have been conducted in this report to complement each other. The literature reviews are found in chapter 3-5.

In this report, Sweco is a business group that has provided specific knowledge within the report's topic of study and assisted with a network for the interview study. Most of the interviewees are representing Sweco. However, most of these interviewees that have contributed with their specific knowledge to this report, have previous experience in other organisations or authorities and raised those perspectives as well, which is presented in the interview results.

There are two purposes with the chapter about Gothenburg. One is to give the reader an example of how a sparsely designed city with segregation issues and a challenging topography causing barriers could aim to change this – and what their approach is. The second is to give readers with little knowledge about a planning process an illustration of how it could look like – this process is not the only practiced one in neither Gothenburg or Sweden. However, the findings and conclusion from this report are not specifically valid for Gothenburg and should be regarded as general concerns and practice.

6.1 Literature review

Research has tried to define terms that are related to 'social sustainability' and urban planning, yet there is a gap in knowledge and the practical use of the concept within urban planning (Ström et al., 2017). The literature review in chapter 3-5 comprises reports and projects from RISE (focusing on value creation and sustainable urban planning), other studies and research within social science and architecture regarding urban planning, and partly also research within the field of transportation and its social aspects. There is only one Swedish study within the field of infrastructure and social sustainability, and this study is also forming a part of chapter 4. Studying literature within different fields has been an important aspect to be able to cover the different perspectives of 'social sustainability', since there is no general understanding of the concept and it is rather contextual (Ström et al., 2017). The literature review will be used to

discuss and compare the previous research with the findings from the interviews and finally answer the aim of this report.

According to Bryman and Bell (2015), the literature review needs to hold a credibility by assessing its significance. Since there is no common consensus what social sustainability is, a critical assessment, embracing pitfalls pinpointed by different researchers, is performed for chapter 4 and 5.1-5.4.

6.2 Interview study

This report presents literature from different fields to describe social sustainability in the context of bridges and pedestrian tunnels. As a validation of this approach but also as a complement to the previous literature (Bryman and Bell, 2015), twelve semi-structured interviews have been conducted in order to investigate the practitioners view regarding social sustainability and how to assess social values. Semi-structured interviews were chosen in order to allow the interviewees a flexibility of reflecting about social sustainability and its specific relation to bridges and pedestrian subways, but also to allow for their point of view (Bryman and Bell, 2015). This was particularly important as social sustainability is subjective and contextual (Ström et al., 2017). The avoidance of standardisation also left a flexibility for focusing on what they know based on their professional expertise, which was a way of grounding the results and avoiding speculation.

With help from employees at Sweco, the technique 'snowball sampling' was used for finding relevant interviewees. Seven of the interviewees are representatives from different disciplines at Sweco. Two are politicians, one from the *Planning and Building Committee* and the T*raffic* Committee, the second one from the P*urchasing and Procurement Committee*. The remaining three are one researcher at RISE and within the field of social sustainability in urban planning and the other two both from the *Traffic and Public Transport Authority.* The interviewees and their professions are presented in Table 2. The main aim with the interviews was to get a grip of what 'social sustainability' is and could be in relation to bridges and pedestrian subways, and to get an understanding of how different actors work with social aspects.

Eleven interviews were recorded and transcribed. Recording the interviews made it possible to listen to the interviewee, sometimes also reacting on words and asking follow-up questions. Since there was one interview that were not recorded, the notes taken during the interview were double-checked with the interviewee. Thereafter, all interviews were coded in accordance with the structure for the interview-guide and analysed quantitatively. The interview-guide covered the following themes:

- the definition and the working process of social sustainability,
- how bridges and pedestrian subways can or cannot be socially sustainable,
- how social aspects could be a dimension of one's work: through tools, processes or other methods,
- evaluation of urban planning and/or infrastructure processes,
- and finally, potentials for improvement.

Table 2 Interviewees, where they work, their profession and key qualifications

Name	Company	Profession & key qualification
Axel Josefsson (1)	Planning & Building Committee *and* Traffic Committee	Politician
Charlotte Berglund	Sweco	Transport Designer with the key qualification on traffic security in urban areas
Christina Granér	Sweco	Transport Planner with the key qualification on Mobility Management and Project Information & Communication
David Lindelöw	Sweco	Transport Planner with the key qualification on pedestrian planning in urban areas
Emma Josefsson (2)	Traffic and Public Transport Authority	Transport Planner Society
Eva Ternegren	Purchasing and Procurement Committee	Politician
Karin Ahlbom	Sweco	Market Manager with the key qualification on infrastructure project management
Malin Sunnemar	Traffic and Public Transport Authority	Social Sustainability Specialist
Marit Sternang	Sweco	Group Manager: detail planning processes of foundation and roads.
Petra Bäckman	Sweco	Strategy and Evaluation with the key qualification on social sustainability
Stefan Molnar	RISE & Chalmers University of Technology	PhD candidate at RISE and Chalmers University of Technology with a focus on 'social sustainability in urban planning'
Åsa Lindgren	Sweco	Sustainability Coordinator with the key qualification on social sustainability

7. Interview results/Findings

This chapter presents the results of the interviews. The interviews were conducted to study three aspects:

1. finding out what social sustainability in the context of pedestrian subways and bridges in urban areas could be,
2. finding out the interviewees' view on how they do or aim to work with social sustainability,
3. and finally, whether finalised projects are evaluated or not.

The first subchapter raises social aspects and social values in the context of pedestrian subways and bridges but also pin points how the structures could be the opposite, from the perspective of the interviewees. The second part presents how the actors work with social sustainability or aim to work with it – is it a tool, a method or process; and do we need to measure or value the social aspects? The third subchapter is a complement to the second, but with more focus on the advantages and disadvantages of the tools. The last subchapter raises perspectives and thoughts regarding the evaluation of projects.

7.1 What is social sustainability in the context of pedestrian tunnels and bridges?

Regarding what social sustainability actually means in the context of pedestrian subways and bridges, the most typical answers from the interviewees were: creating mobility and accessibility, bridging physical barriers and grade separation for several reasons. Though these aspects might be the most familiar among practitioners, the focus of this report is investigating what creates additional value.

In the context of mobility and accessibility Josefsson 2, Granér and Lindelöw spoke about the structures as something that could decrease spatiality. Josefsson 2 remarked that Gothenburg has several neighbourhoods that are geographically close but perceived as difficult to move between. A bridge or pedestrian subway could create new accessibilities for these neighbourhoods along with new movement patterns and consequently also a sense of affinity. Likewise did Berglund, Granér and Molnar emphasize this understanding in their interviews. However, Molnar also added that new accessibilities between two neighbourhoods could have negative impacts if it is not accepted by the citizens, if it risks resulting in a loss of the local identity and damage the already existing neighbourhood.

Besides being structures for transportation, bridging both physical and mental barriers were emphasized as "fascinating creations" (Josefsson 1), "beautiful landmarks expressing a story" (Sternang) and "part of the urban form and their environment" (Molnar). Pedestrian tunnels could have the ability to "evoke certain feelings and behaviours for its users" (Molnar), "tell stories and be educational areas" (Granér) to attract people, make them stop and pay attention. Some interviewees mentioned some concrete examples of pedestrian subways that can be found in Gothenburg. These have music installations and there could also be paintings on the wall made by citizens. The importance of building attractive and safe environments that will be used by the citizens was raised by several interviewees. Through the use of fantasy, imagination and being creative through all phases of a planning process attractive and safe environment can be built. Berglund and Sternang stressed that if citizens are afraid of using the built environment then we are not building sustainably from any aspect, we are using both financial and nature resources, causing damage in the nature and still the citizens will use alternatives ways.

Examples of unsafe and unattractive environments, mostly in the context of pedestrian subways, was brought up by many interviewees, often as a result of SCAFT. The critique was not towards SCAFT itself but rather on the lack of putting the human and users' perspective in focus from more than the perspective of *road safety*. Ahlbom and Lindgren remarked the need of understanding the different users, how our built environment will be perceived and used because forgoing this might not lead to their actual purpose. Instead the result could be that we invest in harmful environments; some examples that the interviewees mentioned were environment for drug dealing, criminality and shabby hovel.

Though the aim is investing in attractive sustainable environments that are useful, some interviewees mentioned that the financial resources are not endless which always leads to a critique regarding whom the investments mostly benefit, where to make the investments, and *how much needs to be invested*. Ahlbom underlined that their placement will have an impact on the land development and Josefsson 2 stressed that investments in one area could lead to injustice because the investment might only favour some groups. Further, Granér and Josefsson 2 argued that grade separations need to be useable by *all* groups to be socially sustainable, both emphasizing accessibility for disabled people. Still, most interviewees regarded social sustainability as something subjective. Josefsson 2 mentioned that it is political to prioritise a certain group because investment will favour some groups and exclude other, and Granér and Molnar underlined that 'social effects' (generated by social values) can be mutually exclusive.

To summarise, for classifying bridges and pedestrian subways as socially sustainable, they should be attractive, used environments, that reduces both physical and mental barriers. They are used for more purposes than just transportation, should be integrated with the built environment at their two sides, and their social aspects are always contextual. The concept 'socioduct' was brought up by some interviewees in relation to 'social sustainable bridges' and discussed briefly with Josefsson 2. What a 'socioduct' is was ambiguous and there is an ongoing discussion within the City of Gothenburg on how to define it.

7.2 Making practice of social aspects in the planning process

The fact that social sustainability is contextual is both positive and negative from the perspective of the interviewees. Yet the real issue is rather how to 'make practice of ideas and thoughts'. There is a common understanding among the interviewees that social sustainability is not a 'box to tick of the checklist', but rather a part of the planning and building process (the building process is not treated in this report since the focus is on the planning for the end-result). Making practice of social aspects seem to be difficult for many different reasons.

According to Sunnemar a Social Impact Analysis (SIA) has been a part of the *Detailed Development Plan* for a couple of years. The further into the process and the more detailed the process get, the more social aspects seems to dissolve. Sternang, that has a previous work experience at the *Traffic and Public Transport Authority* in late processes, underlined that many of the studies, analyses and reasonings performed in the early processes were seldomly transferred further in the process. The focus is on the legally binding *Detailed Development Plan* and not on the more discretionary social aspects.

Many of the interviewees stressed that whether social aspects are included or not are dependent on the persons involved. Josefsson 2 and Sunnemar were talking from the perspective of a client and underlined that there is a variation in knowledge internally; many are fumbling with what social sustainability is, what it can and should be a part of. Bäckman, Granér and Lindgren stressed that Sweco's companies possess a varied internal knowledge and differing working methods.

Apart from the fact that organisations are fumbling to make social aspects part of the planning process to create social values, the twelve interviewees were all enthusiastic to talk about social sustainability and the improvements that needs to be done. Bäckman mentioned that the sector of society development has been working with some social aspects for a long time. However, it is not until recently those social aspects are seen as a part of the wider concept of social sustainability. She also underlined the importance of communicating the social aspects across the disciplines. Lindgren compares it with the ecological sustainability that were a fumbling subject in its beginning but today is an unquestionable part of the planning process. Furthermore, the interviewees recognised that social sustainability needs to be a part of the very beginning of a process, at the strategic level, and follow each step to the final structure. Social sustainability needs to be a part of an iterative process according to Lindgren who also underlined that the planning processes today are counteracting this. There is a need of change which will take time, but it has already started at some instances (Lindgren).

As an example of how social aspects become a part of the planning processes is the use of citizen dialogues. The interviewees exemplified how this could be performed in different ways but also underlined the importance of doing something with the collected feedback. Involving citizens also helps reduce the risk of making faulty assumptions, wrong investments and most critical of all, making truth of what is said in the room without knowing the reality.

A noteworthy reflection by Bäckman is whether there can be a change in the terminology from 'social value' to 'social infrastructure'. The reason was that 'social infrastructure' is perceived as an investment in contrast to 'social value' that is associated with costs. Whether it is the terminology used, the knowledge of the project group, or the persons' interest for social sustainability that impacts if social aspects are raised, the interviewees shared the view of having a tool and some kind of measurement system, internally in a project, that helped creating a common language and view.

7.3 Tools and measurements

Dealing with the knowledge gap internally in organisations is not the focus of this study, but it does affect how the project teams (that could consist of employees from different organisations) work. Some interviewees brought up the issue with having different interpretations and definitions among the individuals in the project team – two reasons for this were mentioned: one is because they have individual definitions and the second is that the organisational definition is different. For Granér this was not an issue, instead she suggests an early discussion within the initial proceedings in a feasibility study between the client and the consultants/contractors about the project's goals and what social aspects will be considered. According to Bäckman, Lindgren, Molnar and Sunnemar the SIA model should be used to create a common language and together identify the goals of the project. A tool, in general, is mostly to work with the same aspects and to visualise something together as a project team.

To work with social sustainability in projects there are tools and methods. Bäckman and Lindgren conveys that project teams needs to put on their 'sustainability glasses' when reviewing the suggestions. Both are often asked to do so in projects in which they come in as outsiders and leave the project thereafter (there are negative aspects of this which are raised later in this subchapter). Yet, their personal understanding is that social sustainability is a perspective and part of the whole process. Sunnemar underlined that the purpose of the SIA model is to identify – the social aspects impacted positively or negatively are supposed to be mapped. Further, she pointed out that a SIA is performed in the feasibility study, and the reasonings are supposed to follow the planning process as the project moves forward. To put it

in other words, when the project moves from one phase to the next (in which the project teams might be changed) the analysis and propositions need to move along. Molnar holds a similar reasoning. Yet, Sternang (whom works in the project planning phase) pointed out that it is not always that analysis performed in the feasibility study gets much focus in the next phase, it is more common that focus is on the *detailed development plan* because it is the only legally binding document.

Besides using tools and methods for creating a common language they are used to value or quantify social aspects. Regarding SROI and CBA, only a few were familiar with these tools. The interviewees were asked whether there is a purpose with quantifying (measuring by setting points or monetising), or valuing (in words) social aspects. Most interviewees were partly against measuring or monetising social aspects for several reasons. A common answer is that some social aspects are hard to monetise. Bäckman, Lindgren, Molnar and Sternang questioned whether we would have enough information to create liable analyses. In some cases, the investor would not be the one benefiting from the social values, instead it is a different organisation or institution gaining from the investment which means that it can be hard to argue for making the investment. Ahlbom asked "how much more is okay for social aspects to cost?" – investment money comes from taxes, and high costs can lead to questioning from citizens. Bäckman and Molnar stressed that it would be a problem with only valuing what generates money. The issue with measuring, according to some interviewees, is the risk of eliminating social aspects with 'lower points', though they might be important. A comparable example was mentioned by an interviewee, where social aspects regarding children's playground are quantified *and* monetised, still they are negotiated away in investment decisions.

Despite some negative issues, most interviewees stressed positive aspects regarding quantifying social values. Sternang challenged whether we could be able to understand the true effects of what we have built if we do not measure. Sunnemar reasoned that by quantifying social aspects it is easier to compare with other quantified values. Bäckman speculated if the 'creation of social values' is something that is perceived to create costs and an actual (positive) value – whether it is monetised or quantified with points – would instead give an indication for a loss if there is *no* strive to achieve it. She also gave an example of a project she was involved in and in which they had to value the social aspect in points. From her understanding, the people working in that project saw the social aspects and understood them, because they were quantified. A general view among the interviewees is that it is easier to grasp the broad definition of social sustainability if social aspects are measured, monetised or valued in words. It is also easier to carry on the reasonings about the social aspects through the planning process and to understand their association with other aspects (ecological, economic, technical, etc.) if they are quantified.

Because there are difficulties with quantifying all social aspects, Lindgren underlined that people working in the planning process need to 'take a stance' and dare to state which investment *will* generate a social value and a have positive impact on the environment. Ahlbom emphasises the use of global goals of Agenda 2030 by relating relevant goals to the project. Granér stressed that because social sustainability is so multifaceted, the measurements need to be so as well.

As has been mentioned earlier, sometimes the SIA is performed by outsiders instead of the project team. An issue that comes along is that it ends up in a report given to the client/project team that nobody understands. This is mostly because the client/project team did not build the knowledge about the social aspects in the project (simply because they were not a part of the process for creating the report) and could consequently lack engagement for these aspects. This

issue was raised by both Lindgren and Sunnemar and is a consequence of either that the project manager has poor knowledge about social sustainability or that social sustainability is brought in late in the process.

This subchapter has presented the interviewees' view regarding tools and measurements of social aspects. The purpose with a tool is to create a common language. Quantifying or measuring might be necessary for giving social aspects a concrete content – although there are some doubtful bearings. Besides making social aspects concrete elements of a process there are two additional positive aspects. One is the ability of presenting clear arguments for investment decisions. Because the inadequacy of transparency regarding the process or the choices made in infrastructure or urban planning will be questioned by citizens. The other positive aspect is the ability of being able to appreciate whether the aim was fulfilled or not through evaluation.

7.4 Evaluation: what do we know about the infrastructure we invest in?

Quantifying or describing social values in words has additional positive effects than the ones mentioned in chapter 5. With a clear description of a project's goals it is easier to follow up and evaluate the results – 'did we achieve what we aimed for'? This aspect was raised by Sternang that also underlined that 'fluffy' goals are hard to put into practice but even harder to evaluate.

Eight interviewees got the question whether there were any evaluations made of projects with a specific goal or if there were thoughts about evaluating planned projects. All recognised that evaluation within urban planning or infrastructure projects were seldomly done, if ever. Only two gave an example of two different housing projects in Gothenburg in which the property owner and developer had evaluated or aimed to evaluate, one project is in Gårdsten and the other one in Kvillebäcken. Sunnemar mentioned that the *Traffic and Public and Transport Authority* do have thoughts about bringing in a third part to evaluate performed SIA and whether they had missed any aspect. She also mentioned that there are thoughts for evaluating a whole area by looking at specific indicators, e.g. demography and what groups moved in and out.

Josefsson 2 explained that they are seldomly resources for evaluating, and the focus is mainly on upcoming projects. Yet, she believes that the sector must be better at evaluating by looking at specific aspects. Lindgren stressed that evaluation is an element that must be considered in the beginning of a planning process, certainly when social sustainability is a new component in our work and people are trying to understand what it is in their context and organisations forming working methods and processes. Also, Sternang underlined that it is in the beginning of a planning process a clear description of the goals are set, which should include the goals for social aspects.

8. Discussion

The aim of this study has been to argue *why* social aspects needs to be considered in context of bridges and pedestrian subways, exemplify *what* social sustainability could be in those contexts, and *how* social aspects can be raised in equal terms to economic and ecologic sustainability. This is done by comparing previous research with the interview results. This discussion starts with the 'why' before exemplifying the 'what' and thereafter the focus is to discuss the 'how'.

Gothenburg has many ongoing and planned projects for rebuilding the city to become 'dense and sustainable', 'reduce barriers and create more public spaces to enhance social interaction' (Göteborgs Stad Trafikkontoret, 2014). Today, its spatiality and design are disadvantaging social interaction between geographical areas, which results in increased issues of segregation. Its topography and old built environment are other issues contributing to both physical and social segregation. Despite these issues, Gothenburg has a great potential and opportunities to realise its vision considering all the ongoing plans. There are different ways of dealing with its barriers; one possible solution is through grade separations, e.g. bridges and pedestrian subways. However, to reach its vision of becoming a dense and sustainable city requires new ways of thinking, new ways of working through the planning processes and new tools – the SIA is not always enough.

The World Commission on Environment and Development (1987) addressed that politicians need to find a way of managing urban planning to form a sustainable city and create a new thinking. The design of the cities has an influence on the citizens behaviour both mentally and physically. Dark and unwelcoming areas are perceived as unsafe, regardless what statistics indicate about criminality. Legeby and Lars (2011) addressed that the utilisation of urban areas and its design have an impact on how people interact with each other. The report Sweco Urban Insight (2018) addresses the need of re-thinking how pedestrian subways can be more than just structures for transportation and how different parts of a bridge structure can be utilised for additional purposes. In an urban planning or infrastructure process in Gothenburg these structures could be a part of a whole *detailed development plan*. However, in reality they are a part of a city and they are an important part of the city's infrastructure network that according to Hillier (2014) will either encourage or discourage movement. It is with these thoughts as arguments, this report argues *why* there is a need for looking at specific structures and how they can be designed and utilised for other purposes as well.

Working with this report to study how bridges and pedestrian subways can be utilised for other purposes than just transportation means has resulted in a finding that previous research and practitioner's knowledge for this specific subject is poor. Even though it is poor, there are still very interesting findings made to *what* social sustainability could be in those contexts. Firth (2015) expressed that bridges could be an identity and a symbol of their location, which directly could address the social values found by Winter (2015): evoking the "wow-feeling" and attracting more people and tourists, creating a local identity and proudness among citizens because the structure is a symbol of its region. The example in Ammerud (see Figure 8) – where a climbing wall and monkey bars were added to a 30 metres pedestrian subway which resulted in people using the pedestrian subway – exemplify the importance of building a transportation structure having in mind what Firth (2015) claimed is important: "where are people coming from and going", and "what does people wants to see". This example also shows that social values can be added to these structures not only by integrating it with its environment and by

creating perceived and actual safe environment, but also by encouraging good health among the citizens and creating a new meeting place for social interactions.

Figure 8 The Tunnel in Ammerud in Oslo, Norway. Credit to Bugge, Jansen and Levang

An observation made from the interviews is that many practitioners find it challenging to envision the structures as something more while giving examples of how these structures cannot be socially sustainable seemed easier. However, 'challenging' does not mean 'impossible' and the interviewees mentioned some concrete social values that these structures can add. Granér asserted that they could tell stories and be educational areas which directly address the findings by Ström et al. (2017) that social values can be development of values we want to increase within our society such as education but also the findings by Winter (2015) that social values could be representing a cultural variety (see Table 1). Molnar mentioned that their design can evoke certain feelings. Other social values such as co-presence, identity and meeting places for social interaction can be found in Figure 6 and Table 1. To standardise *what* social sustainability is in the context of bridges and pedestrian subways would result in putting social sustainability in a box and saying that it can only be those specific values. As this report has been exemplifying both with previous research and through interviews, is that social sustainability is contextual, subjective and will take on many forms depending on the project, its goals and vision but also on the city's vision.

Seemingly it is the way of working and the traditional process that might be inhibiting a collaborative and iterative way of working to raise social aspects. Take two examples, one is the legally binding *detailed development plan* that is very technical and the second is need of collaboration across different organisations with different interests and maybe different interpretations of what the social values are. It seems inevitable to not change any way of working if there is an aim to raise social aspects. In addition, social sustainability is perceived as subjective and hard to grasp. Because it is subjective there are no "right" or "wrong" which confuses practitioners, clients and authorities. In a long-stretched urban planning/infrastructure process social values get lost along the way if they are not clearly stated somewhere together with all the other measurable aspects (economic, ecological and technical). The question here is *how* social aspects can be raised in parity with other aspects and follow through the feasibility study, project planning to construction?

Before starting to discuss an answer to the question above, three noteworthy observations about how social sustainability is understood are discussed briefly. Firstly, it is not remarkable that organisations and practitioners are fumbling when social sustainability is perceived as an unexperienced field. On the other hand, many social values have for a long time been important parts across different professionals. What is sudden is that other professions need to adapt social values in their work because they are under the 'social sustainability umbrella'. Secondly is that social sustainability is a perspective and not a tool (Lindgren), however a tool can be used to concretise social values. The third and lastly is about the terminology: there can be differences in whether social aspects are perceived as costs or investments depending on what they called, social values, social infrastructure or something else.

Getting to the stage where social sustainability is an indisputable part of what is being constructed is a process itself. Both the public and private sector as well as politicians needs to better grasp what they do and for whom. There are two ways for working with the above-mentioned challenges. One is by raising social aspects in the feasibility study and using tools to create a common language across the project team and project organisation. As an example of how to create a common language across the project team and organisations was by 'defining project goals and relate social aspects to those in the initial proceedings', something Granér mentioned in her interview and Gustavsson and Elander (2013) pinpointed in their study. The interview study identified that by defining project goals and relating social aspects to those makes social sustainability concrete and easier to grasp. Social values are relevant in that specific context and to raise them through the planning phase. Further, it is more likely that social aspects follow through the different phases in the planning process. This can be seen in the case of Hisingsbron in which social values were related to the project's goals, raised early in the process and characterized the whole project.

The mentioned above is nothing new, Gustavsson and Elander (2013) and Ström et al. (2017) concluded the same in their research; the SIA is developed for this purpose and Gothenburg authorities (like the Traffic and Public Transport Authority and the Urban Planning Department) are working to make it a prevalent practice. The example of Hisingsbron indicates that Gothenburg's authorities has started to adapt a 'new way of thinking' when planning the future but since Hisingsbron is still in its construction phase it is hard to discuss its result. Further, the suggestions above might be enough to assess social values (in words), to create a transparency (by defining which social values are considered and how they are considered) and conduct a citizen dialogue to engage citizens in the early process. Still, social values tend to be forgotten along the way and there is a need of securing that the social aspects in the feasibility study will follow through to the project planning phase.

The second way is by changing the way of working across different disciplines and organisations. Brorström et al. (2018) pinpointed the need of working across the organisational bounds and Ström et al. (2017) found that there might not be any perfect tool, there should rather be an emphasis on good collaboration. However, this raises a discussion about the different tools raised in this report and why they are important.

Previous research as well as this study acknowledge that assessment of social values is not only useful for concretising social values. The assessment also raises the possibility of comparison with other elements in a planning process and gives a value that can be perceived as a loss if not achieved. Hence, there are negative aspects as well, e.g. if the assessed value is presented as a cost it is perceived negatively. CBA and SROI are seemingly similar with different terminologies and SROI with a focus on social values, but CBA is commonly used in Sweden in contrast to SROI. However, CBA is criticised for focusing on measures that increases the

speed and motorised transportation means (Metz, 2008) which is not regarded as a social value in this report. In addition, neither SROI or CBA are adequate to monetise all social aspects (Dimitriou et al., 2016, Then et al., 2017). SIA could help creating a common language and to identify social aspects but do value those in words only. However, the imperative for this report is to study sustainability from all its elements and giving equal importance to them when comparing different measures in a feasibility study – because sustainability is not about one element, rather about the three: ecological, economic and social (sometimes also technical). Neither CBA, SROI or SIA does so. In contrast, the method MCA is a mixture of different tools and can include a CBA and a SIA among other tools to rate and identify different aspects for the different measures. Thus, in a feasibility study the different measures can be compared to each other having all elements for each measure analysed. Further, when a measure is chosen, the social aspects has hopefully characterised the other elements and are still a part of the project thus they are concretised. In addition, MCA is a multi-faceted method that can be adjusted to the context, which was raised as important by Granér.

The methodology approach of this report has been to identify how different practitioners from different organisations and with different perspectives reflect and define social sustainability – whit the focus on bridges and pedestrian subways. The interview study resulted in distinguished findings regarding how the different interviewees work with social aspects in their every-day work, but a common view of what it can be and why it is essential. However, it might be of value for future research, with a similar approach, to conduct interviews with architects, contractors and citizens to distinguish their reflections about this subject.

A final remark from the interview study is about the evaluations. How do politicians, practitioners and organisations know that what they are investing in is according to what they aim for? How do we know what is being planned, assessed, quantified and built is what is needed? This study found that there is a wide-spread lack of evaluation of project outcomes, and without knowing if the aim is achieved nobody can know if any method for assessing sustainability is good enough to be sure that future investments are accurate. On the other hand, there is tendency to make prognoses and analyses about the future when it comes to budgeting, and these are just predictions without any guarantees, so why would it not be acceptable to make predictions regarding social aspects? Nonetheless, the are two options. Continuing with how it is done today with the fact that it will not be sustainable *or* taking liabilities to create opportunities for a change.

9. Conclusion

Social values need to be raised in all phases in planning processes. To be a sustainable city, one must be sustainable through all elements in sustainability: ecological, economic *and* social. This includes both old built environment and new planned environment. However, raising social values requires a knowledge for what they could be, which leads into the first research question: "what are the added social values that can be achieved by having a socially sustainable perspective in the design of bridges and pedestrian subways"? Given that social values can only be defined for a specific context there is not one correct answer to this question. It is rather a mixture of different social aspects with the following as examples: *educational*, *good health*, *identity and proudness among citizens*, *perceived and actual safety*, and *social interaction.* Nevertheless, what is more important to understand from this study is that social values need to be related to each project's vision and goals.

The second research question is "how can social aspects be raised in parity with other aspects in urban planning and infrastructure processes"? In dense cities where the competition of areas is high there is a need to be deliberate of the utilisation of resources and areas. This study concludes that social sustainability is not a single tool or process, rather a perspective that should characterise all the other elements. This study also concludes that social values are contextual, multi-faceted and subjective. For those reasons, there will not only be one way of identifying and quantifying, rather different tools to use depending on the project's size and formation. Based on the findings in this report, a suggestion for social aspects can be raised early in the planning is illustrated in Figure 9. The figure represents a feasibility study.

Further, the imperative is the willingness of creating good collaboration across the organisations and the ability to let social aspects characterise the project.

One implication for management is that planning processes need to emphasise an iterative and collaborative process rather than a traditional process, which is based on two findings. The first is the need of adapting a new way of working across organisational boundaries and disciplines. The other finding is that social sustainability should be observed as a perspective and as something that needs to characterise the project. Another implication for management and practitioners is to dare defining what social aspects are relevant for that specific context – only then they can be concretised. For researchers, this study has found that projects are rarely evaluated which can be desired for knowing whether the goals where achieved or not. Future research could therefore analyse this further. A final remark on the findings of this study, is the use of the different tools to assess social values. Future research should study which in more detail which tool is the most appropriate for specific size or types of projects, wherefore the suggestion in Figure 9 should be practiced and evaluated thereafter.

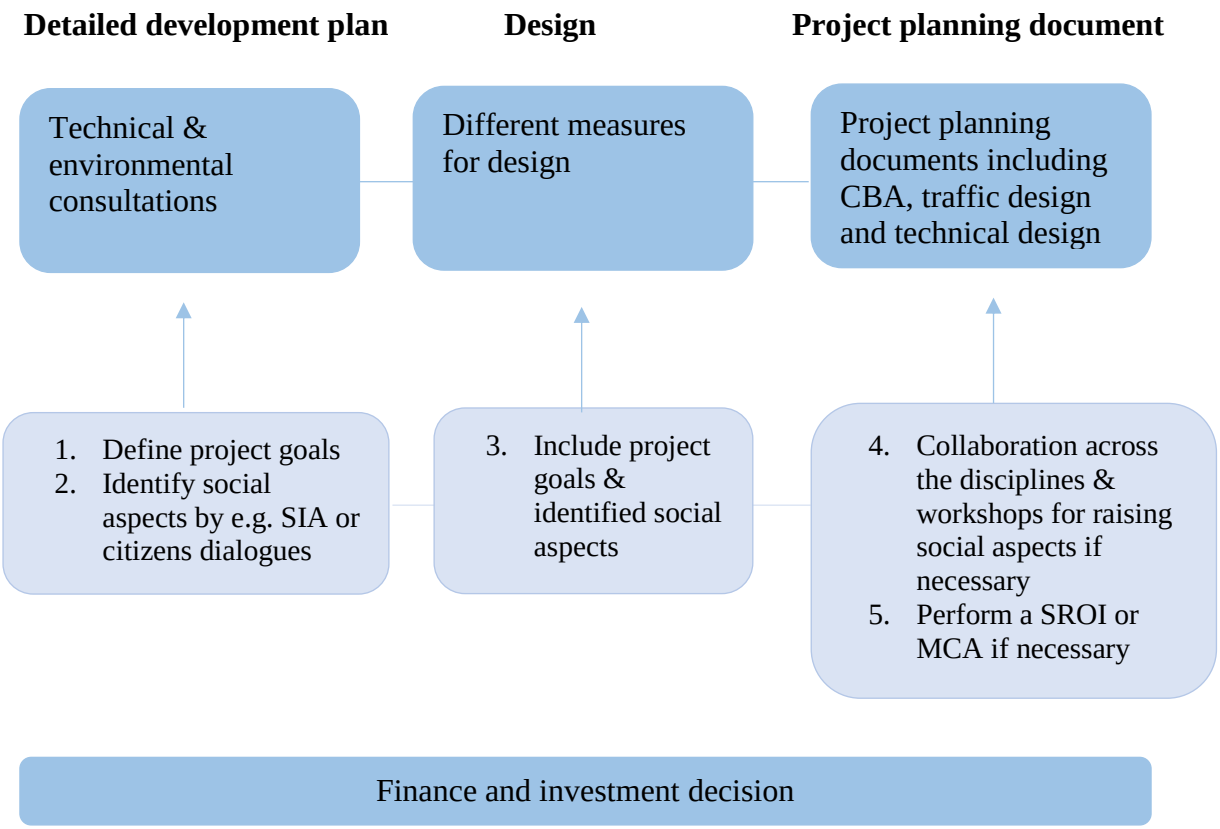

Figure 9 A suggestion for how to raise and value social aspects in a feasibility study

Reference list

AIA COLUMBUS. 2008. *I-670 CAP* [Online]. The AIA Guide to Columbus: Ohio University Press. Available: http://archallenge.aiacolumbus.org/project/i-670-cap/ [Accessed 2018-10-15].

BAUER, C., DRAKE, S. C., FLETCHER, R., TRAVIESO, C. & WOODWARD, D. 2015. Under the elevated: Reclaiming Space, Connecting Communities.

BOVERKET 2012. Vision för Sverige 2025. 1 ed. Sweden.

BOVERKET 2016. Titel: Rätt tätt – en idéskrift om förtätning av städer och orter. www.boverket.se.

BOVERKET. 2018. *PBL Kunskapsbanken - Planering* [Online]. Available: https://www.boverket.se/sv/PBL-kunskapsbanken/planering/ [Accessed 2018-11-13].

BRORSTRÖM, S., ARGENTO, D., GROSSI, G., THOMASSON, A. & ALMQVIST, R. 2018. Translating sustainable and smart city strategies into performance measurement systems. *Public Money & Management,* 38**,** 193-202.

BRYMAN, A. & BELL, E. 2015. *Business research methods,* United States of America, Oxford University Press.

BUGGE, M. B., JANSEN, T. & LEVANG, A. M. J. The Tunnel in Ammerud in Oslo (Norway). https://ifworlddesignguide.com/entry/192845-tunnelen-the-tunnel [2019-01-22]

BÅNGMAN, G. 2012. Introduktion till samhällsekonomisk analys.

DAVID B. MELECA ARCHITECTS. 2004a. The Cap After.

DAVID B. MELECA ARCHITECTS. 2004b. The Cap Before.

DEPARTEMENT FOR COMMUNITIES AND LOCAL GOVERNMENT 2009. Multi-criteria analysis: a manual. Wetherby: Communities and Local Government Publications.

DIMITRIOU, H. T., WARD, E. J. & DEAN, M. 2016. Presenting the case for the application of multi-criteria analysis to mega transport infrastructure project appraisal. *Research in Transportation Economics,* 58**,** 7-20.

DOVEY, R. 2015. How New York Plans to Elevate the Spaces Under Freeways, Subway Platforms. *The Next American City*.

EKEN, A., MAGNUSSON, J., HILDESSON, A., MOLNAR, S. & LICHT, K. D. F. 2018. Rätt verktyg för jobbet? En översikt över verktyg för sociala hållbarhetsanalys i städer. Mistra Urban Futures.

EMILSSON, L. & HOLLANDER, C. 2016. To Define and Measure Social Sustainability: A Case Study on Traffic Planning in Malmö and on Malmöringen as a Social Investment. Malmö Högskola: Urbana studier.

WHAT IS A BRIDGE? – BRIDGE ENGINEERING WITH IAN FIRTH PART 1-3, 2015. Video. Directed by FIRTH, I. www.expeditionworkshed.org.

Bridges should be beautiful, 2018. Video. Directed by FIRTH, I. www.ted.com.

GENSLER. 2018. *The London Underline* [Online]. www.gensler.com: Gensler. Available: https://www.gensler.com/projects/the-london-underline [Accessed 2018-10-15].

GEURS, K. T., BOON, W. & WEE, B. V. 2009. Social Impacts of Transport: Literature Review and the State of the Practice of Transport Appraisal in the Netherlands and the United Kingdom. *Transport Reviews,* 29**,** 69-90.

GUARINI, M. R., BATTISTI, F. & CHIOVITTI, A. 2018. A Methodology for the Selection of Multi-Criteria Decision Analysis Methods in Real Estate and Land Management Processes. *Sustainability,* 10**,** 507.
GUSTAVSSON, E. & ELANDER, I. 2013. Social hållbarhet inte bara "sustainababble"? Från mångtydig vision till analytiskt redskap vid uppföljning av stadsbyggnadsprojekt. *Cetrum för urbana och Regionala Studiers skriftserie.* Örebro.
GÖTEBORGS STAD Svensk-engelsk ordlista Göteborgs Stad.
GÖTEBORGS STAD. 2011. *Socialkonsekvensanalys - människor i fokus 1.0* [Online]. Available: www.goteborg.se/socialkonsekvensanalys [Accessed 2018-09-26 2018].
GÖTEBORGS STAD. 2018. *Departments for Administration* [Online]. Available: https://goteborg.se/wps/portal/start/kommun-o-politik/kommunens-organisation/namnder/facknamnder/ [Accessed 2018-10-17].
GÖTEBORGS STAD STADSBYGGNADSKONTORET 2013. Detaljplan för Bro över Göta älv: Samrådshandling. www.goteborg.se/planochbyggprojekt: Göteborgs stad.
GÖTEBORGS STAD TRAFIKKONTORET 2014. GÖTEBORG 2035: TRAFIKSTRATEGI FÖR EN NÄRA STORSTAD. *In:* TRAFIKNÄMNDEN (ed.). Göteborgs Stad.
GÖTEBORGS STAD TRAFIKKONTORET. 2018a. *Teknisk Handbok* [Online]. Göteborgs Stad Trafikkontoret. Available: http://th.tkgbg.se/sv-se/1start.aspx [Accessed 2018-12-13].
GÖTEBORGS STAD TRAFIKKONTORET. 2018b. *Teknisk Handbok/Förutsättningar/Arbetsprocesser* [Online]. Göteborgs Stad Trafikkontoret. Available: http://th.tkgbg.se/sv-se/2f%C3%B6ruts%C3%A4ttningar/2farbetsprocesser.aspx [Accessed 2018-12-13].
GÖTEBORGS STAD TRAFIKKONTORET & STADSBYGGNADSKONTORET Gång- och cykelbro över Göta älv. Göteborgs Stad.
HILLIER, B. 2007. Space is the machine. www.spacesyntax.com: Space Syntax.
HILLIER, B. 2014. THE GENERIC CITY AND ITS ORIGINS. *Architectural Design*.
ISHIZAKA, A. & NEMERY, P. 2013. Multi-Criteria Decision Analysis: Methods and Software. John Wiley & Sons, Incorporated.
JOHNSEN, H. A. 2015. Treningsapparater i tunnel skal gjøre Ammerud tryggere. *Aftenposten*.
KOMMUNFULLMÄKTIGE 2016. Kommunfullmäktige protokoll den 8 september 2016. *In:* STAD, G. (ed.). Göteborgs Stad.
Vad händer i Hovsjö?, 2012. Video. Directed by LEGEBY, A. KTH Arkitekturskola.
LEGEBY, A. & LARS, M. 2011. Does the Urban Structure of Swedish Cities Inhibit the Sharing of Public Space? *Built Environment,* 37**,** 155-169.
LEGEBY, A., PONT, M. B. & MARCUS, L. 2015. Delad[d] Stad: Stadsbyggande och segregation - 1 Perspektiv och utgångspunkter. *Dela[d] Stad.* Sweden.
METZ, D. 2008. The Myth of Travel Time Saving. *Transport Reviews,* 28**,** 321-336.
NATIONALENCYKLOPEDIN. 2018. *Göteborg* [Online]. www.ne.se. Available: https://www.ne.se/uppslagsverk/encyklopedi/lång/göteborg [Accessed 2018-10-05].
NICHOLLS, J. 2017. Social return on investment - Development and convergence. *Evaluation and Program Planning,* 64**,** 127-135.
NORCONSULT 2011. Ny Göta älvbro: Social konsekvensbeskrivning - analys och behovsbedömning. Göteborgs Stad.
REGERINGSKANSLIET 2015. Att förändra vår värld: Agenda 2030 för hållbar utveckling. www.regeringen.se: Regeringskansliet.
REGION BLEKINGE 2015. Blekinge i Sverigeförhandlingen - Redovisning av nyttoberäkningar.

ROSÉN, L., BACK, P.-E., SÖDERQVIST, T., SOUTUKORVA, Å., BRODD, P. & GRAHN, L. 2009. Multikriterieanalys för hållbar efterbehandling – Metodutveckling och exempel på tillämpning. Naturvårdsverket.

SERUS. 2018. *Social return on investment* [Online]. www.sroi.se. Available: www.sroi.se [Accessed 2018-09-27].

SKANSKA 2018. Skanska's Construction Dictionary.

4 ways to make a city walkable, 2013. Video. Directed by SPECK, J. www.ted.com.

STATENS PLANVERK 1968. *SCAFT 1968: RIKTLINJER FÖR STADSPLANERING MED HÄNSYN TILL TRAFIKSÄKERHET,* Karlshamn, AB Ragnar Lagerblads Boktryckeri.

STRÖM, L., MOLNAR, S. & ISEMO, S. 2017. Social hållbarhet ur ett samhällsplaneringsperspektiv - en kunskapsöversikt.

SVERIGEFÖRHANDLINGEN. 2014. *Om oss* [Online]. Sverigeförhandlingen. Available: http://sverigeforhandlingen.se/om-oss/ [Accessed 2018-10-26].

SVERIGES KOMMUNER OCH LANDSTING 2008. Sveriges Kommuner och Langsting - Begrepp för översättning till engelska.

SWECO URBAN INSIGHT 2018. Urban Move Report - Redefining Bridges and Tunnels for the Next Generation of our Cities. *In:* RANUM, G., HEYERDAHL, A. & GJØSUND, A. (eds.). Sweco Urban Insight

TAHVILZADEH, N. 2015. Socialt hållbar stadsutveckling? Stadsdelsnämnderna, stadsutvecklarrollen och sociala konsekvensanalyser i planeringen av Göteborgs stad.: Förvaltningshögskolan, Göteborgs Universitet.

THEN, V., SCHOBER, C., RAUSCHER, O. & KEHL, K. 2017. Social Return on Investment Analysis: Measuring the Impact of Social Investment. Palgrave Macmillan.

VIGREN, A. & LJUNGBERG, A. 2018. Public Transport Authorities' use of Cost-Benefit Analysis in practice. *Research in Transportation Economics*.

VRANKEN, J., DECKER, P. D. & NIEUWENHUYZE, I. V. 2002. Social Inclusion, Urban Governance and Sustainability: Towards a Conceptual Framework.

WATSON, K. J. & WHITLEY, T. 2017. Applying Social Return on Investment (SROI) to the built environment. *Building Research & Information,* 45**,** 875-891.

WINTER, K. 2015. Sociala nyttor i Sverigeförhandlingen. Sverigeförhandlingen.

WORLD COMMISSION ON ENVIRONMENT AND DEVELOPMENT 1987. Our Common Future. The Brundtland Report. *In:* OXFORD (ed.). UN - World Life Issues on Environment and Development

YATES, B. T. & MARRA, M. 2017. Social Return On Investment (SROI): Problems, solutions… and is SROI a good investment? *Elsevier,* 64**,** 136-144.

Appendix A

Table 3 A comparison between SROI and CBA (cf. Nicholls, 2017:129)

Social Return on Investment	Cost-Benefit Analysis
Involve Stakeholders	CBA doesn't implicitly require involvement of those effected in deciding what the outcomes are, though they may be consulted.
Understand what changes	Both CBA and SROI focus specifically on change, predominantly changes in situation, capacity or behaviour with related changes in wellbeing
Do not over claim	Both CBA and SROI consider benchmarks, counterfactual, attribution and displacement
Only include what is material	CBA is based on welfare economics, so often begins with perspective that all welfare effects will be included. In practice, However, it often focuses on a particular policy and desired outcomes with some recognition of unintended consequences. Whilst it is not possible to consider all welfare effects, focusing on a policy objective without stakeholder involvement risks omission of material outcomes.
Value what matters (using monetary equivalents in SROI)	Both CBA and SROI use money as a proxy for the relative value of outcomes.
Be transparent	Requires transparency
Verify the result	SROI follows accounting and some sustainability reporting by requiring appropriate verification of the result. This may well take the form of an external assurance process, but could include a range of other methods of verification (such as going back to the stakeholders and asking their opinion on the results of the report). An SROI analysis will inevitably include judgements about what is included or excluded, and these judgements need to be reviewed as reasonable. CBA does not require an independent assurance process of the judgements made relying on the knowledge and professionalism of the person carrying out the analysis to ensure that it is complete.