Interlinked

Planning and design of shared space and use in early stages

Exploring the interlinkage of preschool, elderly care, student housing and public use in Frihamnen, Gothenburg

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Architecture and Urban Design
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SE-412 96 Gothenburg
Sweden
Telephone: + 46 (0)31-772 1000

Preface and acknowledgements

This double thesis and research study has been performed and completed during the autumn of 2016 and the spring of 2017 as a final part of the Master's Programs *Design and Construction Project Management* at the Department of *Technology Management and Economics* as well as *Architecture and Urban Design* at the Department of *Architecture and Civil Engineering* at Chalmers University of Technology, Gothenburg.

I would like to extend gratitude and thankfulness to my examiner and supervisor Anders Svensson (Professor of the Practice at Chalmers University of Technology), my supervisor Nina Ryd (Professor and Architect MArch/MSA at Chalmers University of Technology) as well as my examiner Pernilla Gluch (Professor at Chalmers University of Technology). Anders and Nina have both been supportive as tutors, provided valuable insights and guidance throughout the process as well as contributed with great engagement, encouragement, knowledge and ideas. In connection, I would like to thank interviewees, participants and project groups within *Göteborgs Stad*.

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Foremost, a heartful thanks to my ever so loving and supporting family.

Gothenburg, 2017
Katrin Vikner Sjöblom

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ABSTRACT

An ongoing global societal movement and challenging major question within the municipal operations in Gothenburg is how to co-use and share spaces to establish value creation and economic feasibility. Gothenburg is undergoing a densification process through the urban development *Vision Älvstaden*, which results in need to balance the degree of exploitation with creation of qualitative environments. It provides opportunities to reconsider concepts and use along with exploring potential interlinkage through *shared space and use*. Planning and design are consequently presented with increased complexity, demands and uncertainty how to manage and organize processes. It emphasizes the importance of early stages, architectural programming, communication, collaboration and interdisciplinary approaches to align objectives, facilitate the process as well as ensure value and benefits in end results.

The purpose of the thesis is to investigate and review planning and design of *shared space and use* in early stages to provide a better understanding and gain further knowledge regarding sharing and utilization of space as well as management and communication of design. It furthermore has the purpose to explore synergies, use and interlinkage of preschool, elderly care, student housing and public use in Frihamnen, Gothenburg. The thesis aims to develop planning and design strategies for *shared space and use* as well as a design proposal with concepts and perspectives on usability and value creation.

The thesis is an empiric qualitative study with an inductive research approach that interlinks project management and architecture to achieve synergies. It is based on literature review, cases studies and interviews as well as analysis, synthesis and design. The result compiles and highlights potentials and perspectives on planning and design of *shared space and use*. Lastly, it discusses suggestions for improvement and development along with further studies within the area.

Key words: activity based, architectural program, baugemeinschaft, brief, communication, co-use, front-end management, joint use, mixed-use, multipurpose, multi-use, pre-design, usability, value creation, added value

Sammanlänkad

Planering och design av samnyttjande i tidiga skeden

En utforskande studie om sammanlänkning av förskola, trygghetsboende, studentboende och offentlig användning i Frihamnen, Göteborg

Examensarbete inom masterprogrammen
Architecture and Urban Design
Design and Construction Project Management

KATRIN VIKNER SJÖBLOM

Institutionen för Arkitektur och samhällsbyggnadsteknik

Avdelningen för Byggnadsdesign

Institutionen för Teknikens ekonomi och organisation

Avdelningen för Service management och logistik

Chalmers tekniska högskola

SAMMANFATTNING

En pågående global samhällsutveckling och stor utmanande fråga inom kommunal verksamhet i Göteborg är hur lokaler kan delas och samnyttjas för att uppnå värdeskapande och ekonomisk genomförbarhet. Göteborg genomgår en förtätningsprocess genom stadsutvecklingsprojektet *Vision Älvstaden*, vilket resulterar i behov att balansera graden av nyttjande med skapande av kvalitativa miljöer. Det möjliggör omvärdering av koncept och användning samt utforskande av potentiell sammanlänkning genom samnyttjande. Planering och design presenteras följaktligen med ökad komplexitet, krav och osäkerhet hur processer ska hanteras och organiseras. Det betonar vikten av tidiga skeden, programarbete, kommunikation, samarbete och interdisciplinära angreppssätt för att samordna målsättningar, underlätta processer samt säkerställa värde och fördelar i slutresultat.

Syftet med studien är att undersöka och granska planering och design av samnyttjande i tidiga skeden för att bidra med bättre förståelse och ytterligare kunskap om delande och nyttjande av lokaler samt ledarskap och kommunikation av design. Vidare är syftet att utforska synergieffekter, användning och sammanlänkning av förskola, trygghetsboende, studentbostäder och offentligt nyttjande i Frihamnen, Göteborg. Målet med studien är att utveckla strategier för planering och design av samnyttjande samt ett designförslag med koncept och perspektiv på användbarhet och värdeskapande.

Projektledning och arkitektur sammanlänkas genom en empirisk kvalitativ studie med en induktiv forskningsansats för att uppnå synergieffekter. Studien baseras på litteraturstudier, fallstudier och intervjuer samt analys, syntes och design. Resultatet sammanställer och belyser möjligheter och perspektiv på planering och design av samnyttjande. Slutligen diskuteras förslag till förbättring och utveckling samt fortsatta studier inom området.

Nyckelord: aktivitetsbaserad, användbarhet, blandad användning, byggemenskap, flerfunktion, kommunikation, programarbete, programhandling, programskede, programskrivning, samnyttjande, samutnyttjande, värdeskapande, mervärde

Content

Definitions, Glossary and Notations

Definitions

Architectural program (US terminology) is synonymous with architectural brief (UK, European and international terminology) (Faatz, 2009; Malmqvist and Ryd, 2006; Ryd, 2003), sometimes also referred to as construction brief, brief management (Malmqvist and Ryd, 2006) design brief or creative brief. Furthermore, architectural programming is synonymous with briefing and brief elicitation (Faatz, 2009; Ryd 2003). The terminology that will be used in the thesis is architectural program and architectural programming, within the context of planning and design in built environment.

Early stages in design and construction is synonymous with pre-design and front-end management. The terminology that will be used in the thesis is early stages, within the context of planning and design in built environment. It is defined according to the process stages *'strategic definition', 'preparation and architectural program'* and *'concept design'* in *RIBA Plan of Work 2013* (RIBA, 2016).

Shared space and use is not a defined or established concept, however related to other terminology such as shared space, shared use, joint use, mixed-use, multi-use and multipurpose. It could also be explained as a kind of *'baugemeinschaft'*. The terminology that will be used in the thesis is *shared space and use*, which refers to shared use and/or ownership of spaces and premises within built environment.

Glossary

agreed design guidelines	gestaltningsprogram
basis for decisions	beslutsunderlag
bid (UK: tender)	anbud
client	byggherre, beställare, kund
commercial analysis	handelsutredning
conflicting objectives	målkonflikter
conflicts of interest	intressekonflikter
contractor	entreprenör
decision-making order	beslutsordning
decision-making structures	beslutsvägar, beslutskedjor
design meeting	projekteringsmöte
design specifications	projekteringsbeskrivning
digital binder	digital pärm
entrepreneur	entreprenör (företagare icke-bygg)
environmental building certification	miljöbyggnadscertifiering
existing premises	lokalbestånd
facility area	lokalarea
feasibility study	förstudie
governing document	styrdokument
gross floor area	bruttoarea (BTA)
indicators	nyckeltal
market adjustments	marknadsanpassningar

meeting notes	mötesprotokoll
non-residential floor area	lokalarea (LOA)
operating cost	driftkostnad
operational boundaries	verksamhetsgränser
operational manager	verksamhetsansvarig
operational needs	verksamhetsbehov
operational representative	verksamhetsföreträdare
operations	verksamheter
performance requirement	funktionskrav
process of acquiring premises	lokalanskaffningsprocessen
project website	projektplats, projektportal
property development	fastighetsutveckling
quorate	beslutsmässig
regulatory document	styrdokument
retakes	omtag
room data sheet (RDS)	rumsfunktionsprogram (RFP)
senior apartments with social service	trygghetsboende
shared space and use	samnyttjande, samutnyttjande
specification	beskrivning
stakeholder	intressent
standard room types	typrum
statement of need	verksamhetsbeskrivning, intentioner
steering group meeting	styrgruppsmöte
strategic objective	mål, målbild
strategic program	lokalprogram
transdisciplinary meeting	tvärmöte
user representative	brukarföreträdare
work environment responsibilities	arbetsmiljöansvar

Notations

BIM	Building information modeling
DQI	Design Quality Indicators
IPD	Integrated project delivery
LCC	Life cycle cost
SALAR	Swedish Association of Local Authorities and Regions
SWOT	Strengths - Weaknesses - Opportunities - Threats

Unless otherwise indicated, images and illustrations are made by the author.

1 Introduction

In this chapter, the background is presented, followed by purpose and aim, delimitations, thesis outline and a description of the connected architectural case and design proposal.

1.1 Background

In an increasingly complex and ever-changing world, society is continuously presented with challenges and opportunities for innovation. Cities are growing as a consequence of the ongoing urbanization, which has resulted in scarcity of undeveloped land and responses such as densification and smart growth, also known by the planning concepts new urbanism, compact city and urban intensification (UN-habitat, 2016). According to forecasts, cities are expected to grow with 2.5 billion inhabitants within the next 30-40 years and will consequently hold close to 70 percent of the world population. In Europe, the share will constitute 14 percent and the degree of urbanization is projected to about 80 percent (United Nations, 2014). The growth of urban cities brings complexity to the construction sector regarding how to deal with increased density, balance resources and at the same time establish sustainable urban environments with quality of life (Sveriges Arkitekter, 2016; United Nations, 2014; S. Santa, Göteborgs Stad, 2016). In response, space is becoming more valuable with more users and stakeholders to consider and involve in planning processes. It gives need for management approaches and justifies reason to reconsider how cities and physical environments are used (IVA, 2015; Sveriges Arkitekter, 2016).

MONO - separated   MIXED - close / 'next to'   MULTI - connected / interlinked

INDIVIDUAL / INDIVIDUALITY ('I/me')
separated / divided

'more together than separately'
→

DIVIDUAL / DIVIDUALITY ('we/us')
together / mixed / sharing / interaction / networking
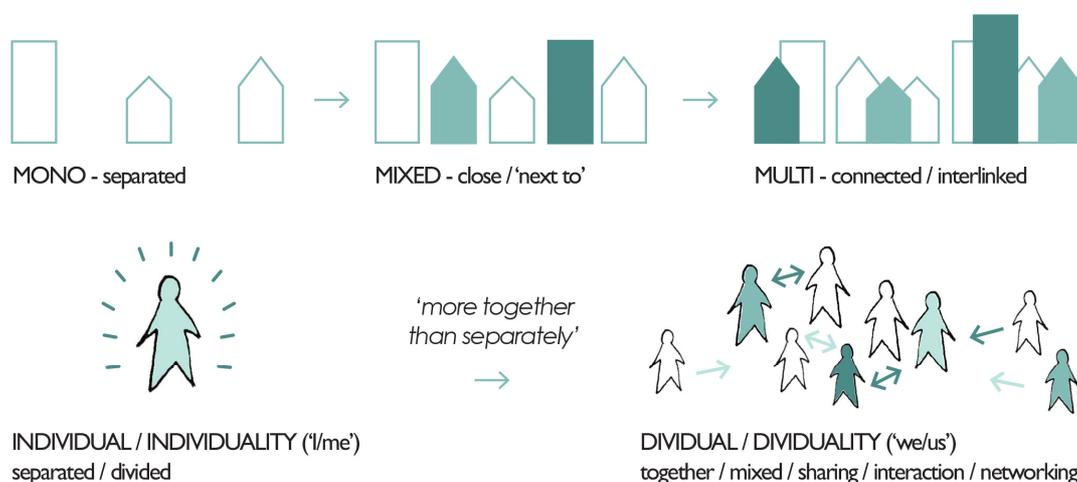
Figure 1 Interlinked society.

A relating ongoing movement is the development towards integrated planning with efficient, flexible and sustainable environments (Archipreneur, 2016; Brinkø et al., 2015; Botsman and Rogers, 2010) as well as establishments relating to sharing, collaboration, interaction and inclusion (PWC, 2015), see Figure 1. In organizations and workplaces activity based work has emerged along with concepts and typologies such as co-working, office hotels, pop-ups, science parks, knowledge incubators and hubs. On the housing market, there are parallels to home and hospitality sharing, co-operatives, collective housing and *'baugemeinschafts'*. In connection, the sharing economy, also referred to as collaborative consumption and collaborative economy, is emerging with rapid growth and attention (Brinkø et al., 2015; PWC, 2015; Botsman

and Rogers, 2010). It has already begun to influence built environment through the concept collaborative urbanism (Archipreneur, 2015; Brinkø et al., 2015; Sveriges Arkitekter, 2016). There is increased focus on networking and interconnectivity with developments such as activity centers, mixed-use and three-dimensional property units becoming more widespread. Moreover, there are movements towards redefining concepts and perception of spaces through smart design. There is a shift from mixed-use developments towards multi-use approaches, focusing on spaces with multi-function and multi-purpose as well as interlinking private with public use and ownership (Archipreneur, 2016; Brinkø et al., 2015). It has resulted in development of concepts such as flexible building design, where functions are changed by the user, performance based design as well as universal design. The emerging interest in rationalizing use and sharing resources highlights a change in societal attitudes, values and needs (Brinkø et al., 2015; IVA, 2015; Sveriges Arkitekter, 2016). It provides scope for ideas and development in planning and design, however also presents demands on processes, management and communication.

Figure 2 Location and extent of Vision Älvstaden and Frihamnen
(based on Göteborgs Stad, 2015b, p.2-3; Eniro vägbeskrivning, 2016; Openclipart, 2016;
Trafiken.nu Göteborg reseplanerare, 2016; Västtrafik reseplanerare, 2016).

Figure 3 Aspects to consider in planning of shared space and use
(Göteborgs Stad, 2016a, p.4-5, translated and adapted colors, published with permission).

In connection to societal movements, a current and challenging major question within the municipal operations and activities in Gothenburg is how to co-use and share spaces to establish value creation and economic feasibility (S. Ekberg, Göteborgs Stad, 2016). Gothenburg is undergoing a substantial transformation through the urban planning project *Vision Älvstaden*, wherein the central parts of the city will be developed and densified by year 2020 and onwards (Göteborgs Stad, 2012), see Figure 2. It is resulting in planning scenarios with uncertainty in the municipal organization how to manage and organize processes as well as design for future demands and sustainability. There is a need to balance the degree of exploitation with creation of qualitative environments, which poses challenges in aspects such as conflicting objectives, organizational boundaries and the extent of involved stakeholders (S. Santa, Göteborgs Stad, 2016). It

hence results in necessity to establish compromises, priorities and common goals, in which communication constitutes an essential part to facilitate collaboration as well as ensure effective decision making and management of design. In connection, ongoing work by the project group *Samnyttjande av samhällservicens inom- och utomhusmiljöer* within *Göteborgs Stad* has identified early stages as an important success factor for planning and design of *shared space and use* (Göteborgs Stad, 2016a), see Figure 3.

Project, planning and design processes are increasingly being presented with greater complexity and demands. It emphasizes the importance of early stages, architectural programming, communication and collaborative approaches to align objectives, facilitate the design process as well as ensure value and benefits in end results (Bogers et al., 2008; Faatz, 2009). Early stages are becoming more interlinked and condensed, with a greater extent of communication and information exchange. Moreover, as multi- inter- and trans-disciplinary approaches, participation, co-creation, design dialogue and interaction becomes more common in planning processes, the need to manage relationships and intentions early on in projects becomes apparent. It simultaneously imposes increased demands on leadership and highlights the importance of communication (Norouzi et al., 2015; Sveriges Arkitekter, 2016). There is agreement within research and practice that sufficient time should be allocated to early stages along with communication and specifications having great influence and importance. Still, it continues to be challenging in practice with little time spent on managing and defining projects in early stages (Faatz, 2009; Peña and Parshall, 2012; Ryd, 2008, 2003), which is recognized by research to be one of the main barriers regarding project quality and satisfaction (Norouzi et al., 2015). According to Ryd (2008), there is limited previous research and knowledge from practice on early stages, and so far mainly with a focus on client management and requirement management. In connection, Malmqvist and Ryd (2006) stress the evident necessity to develop methods for architectural programming. It motivates and highlights need of further research on current perspectives and approaches.

The architectural program constitutes an important communicative tool and documentation, both to outline projects in early stages as well as for control and management throughout the entire project process (Bogers et al., 2008). It has consequently been identified to have great potential of influential impact. Malmqvist and Ryd (2006) emphasize the architectural program as an efficient tool and framework with underutilized potential, along with the need to develop methods, tools and processes for management and communication to ensure that results are in line with project requirements. It is further underlined by Norouzi et al. (2015) referring to Ang et al. (2001) that *'by focusing on the process-tools, a creative approach can be developed, which can facilitate communication and interaction of participants and improve the control and management of processes'*. Bogers et al. (2008) stress that limited previous research has been carried out on architectural programs connected to the design process and Ryd (2003) the architectural program as a carrier of information to manage design, which emphasizes relevance to study the area. In addition, there is difficulty to establish a common language in the design process (Faatz, 2009). Traditional architectural representation methods are not considered to facilitate communication and sense making among various actors with different backgrounds (Norouzi et al., 2015). It provides arguments and reason to research alternative methods of synthesizing information.

In relation to societal movements and the expressed needs of *Göteborgs Stad,* it is motivated to focus the research scope on projects with *shared space and use*. According to Brinkø et al. (2015), sharing of space constitutes an emerging type of development with limited previous research on projects and spaces within buildings. Ryd (2008) characterizes the current development within built environment as becoming increasingly complex and moving towards greater emphasis on quality and integration. *Shared space and use* brings complexity to planning and design, which highlights and provides scope to investigate the topic with focus on early stages.

1.2 Purpose and aim

The purpose of the thesis is to investigate and review planning and design of *shared space and use* in early stages to provide a better understanding and gain further knowledge regarding sharing and utilization of space as well as management and communication of design. It furthermore has the purpose to support the connected architectural case and contribute to research on *shared space and use* as a concept within built environment.

The aim of the study is to develop and contribute with planning and design strategies for *shared space and use* as well as a design proposal for the connected architectural case in Frihamnen, Gothenburg, featuring interlinkage of preschool, elderly care, student housing and public use.

The thesis is intended to be of use and applicable for both researchers and practitioners in planning, design, discussion and evaluation to facilitate future development of *shared space and use*. It may inspire actors working in municipal, urban and sustainable planning as well as other projects in general or in relation to the topic. It furthermore provides a contribution to the societal discourse regarding movements and challenges with an enquiry on future visions, concepts and utilization in planning and design of space through sharing.

1.3 Research questions

In relation to the purpose and aim of the thesis the following research questions (RQ) have been developed and addressed:

Due to the emergence of shared space and use as a concept within built environment, with limited previous literature and research, the first research question aims to contribute to the field and future research:

RQ 1   How can the concept of *shared space and use* within built environment be understood and described?

In connection to the purpose, the next research question aims to contribute to the research on planning and design in early stages:

RQ 2   How are projects with *shared space and use* planned and designed in early stages?

In response to future changes and needs, the last research question aims to contribute and answer emerging challenges and opportunities:

RQ 3   What can be suggested to develop and improve planning and design of *shared space and use* in early stages?

1.4   Delimitations

The thesis focus is on early stages in planning and design according to the process stages *'architectural programming'* (UK: *'briefing'*) and *'concept'* as defined by Design Quality Indicators [DQI] (CIC, 2014) and further limited to the stages *'preparation and architectural program'* (UK: *'brief'*) and *'concept design'* as defined by *RIBA Plan of Work 2013* (RIBA, 2016); hence other process stages will not be elaborated on. *Shared space and use* is limited to projects on building scale in the geographical context of Sweden. It is furthermore limited to encompass physical environments within buildings, with focus on optimizing and facilitating functions and different types of use as well as providing spatial and qualitative values, see Figure 4. The empirical findings of the thesis are based on the limitation of ten case studies of projects with *shared space and use*, a review of two architectural programs and eight interviews with architects and project managers connected to the selected cases. The thesis results in planning and design strategies for *shared space and use* in early stages.

Early stages according to RIBA Plan of Work 2013
(RIBA, 2016)
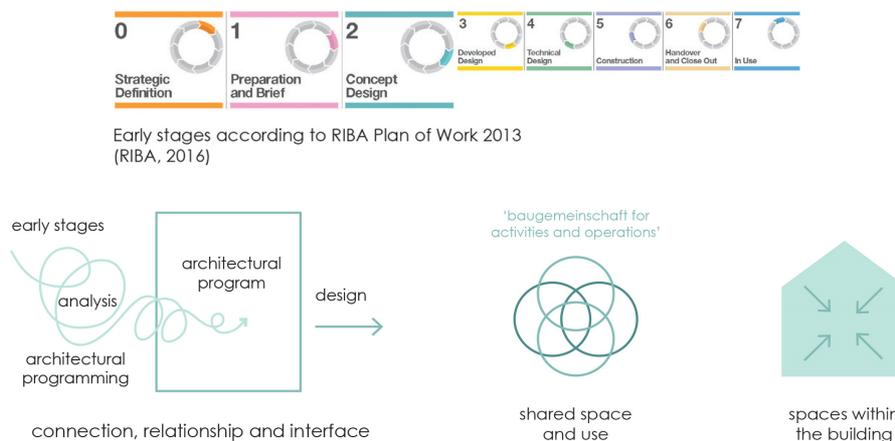
Figure 4 Thesis focus and delimitations.

In connection to the purpose and aim, the thesis focus is to highlight important aspects in planning and design of *shared space and use* as well as how to manage and govern common and collective issues in early stages. Focus is furthermore on communication to investigate and provide further knowledge regarding documentation, methods, tools and approaches applied in practice as well as how architectural programs are established. Architectural programs are studied as a format and document as well as a communication and design representation tool.

Economic aspects are important in planning and design of *shared space and use*, however has not been the main focus of the thesis, which instead has been focused to investigate and highlight quality aspects. In connection, emphasis is not on social constructions, organizational structures, legal or technical aspects, nor will the research analyze the usability of the architectural program as a communication tool in the construction process.

1.5   Thesis outline

This report composes one of two parts in a double thesis within architecture and project management. It comprises the main documentation with the majority of the thesis content and results. The report presents introduction, background, theoretical framework and research overview, which constitutes a common base for the two parts, as well as empirical findings and written results. The report is complemented with a booklet containing the architectural part, which constitutes an application and exemplification of empirical findings through analysis, synthesis and design. The booklet presents a design proposal for the connected architectural case, where outlined planning and design strategies for *shared space and use* in early stages are implemented, see Figure 5 and 6. The two documents are interlinked and based on the same process; consequently, there are some information overlaps.

The report consists of six chapters, where the first chapter provides an introduction and outline of the thesis. Chapter two gives a frame of reference according to literature and an overview of previous research within the area, whereas chapter three describes the method and research approach. Furthermore, chapter four is structured according to the process and presents the results and findings from the empirical research on case studies, architectural programs and interviews. It forms a base for the following discussion in chapter five where results are analyzed by triangulating methods and theory. Lastly, chapter six concludes and presents recommendations along with indications for future improvement and research.
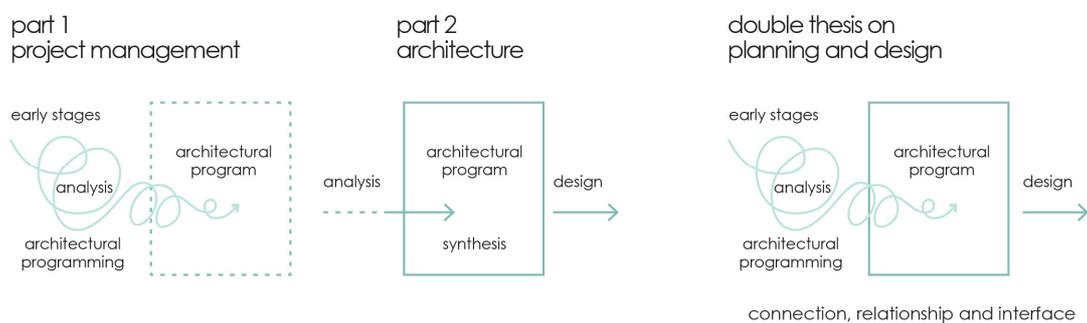

Figure 5 Double thesis in two parts, interlinking project management and architecture.
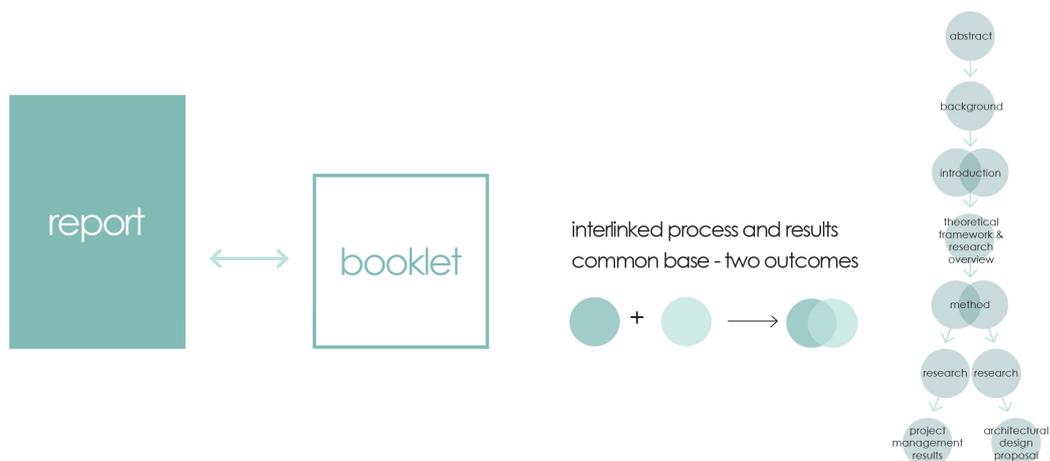
Figure 6 Thesis format and outline.

1.6 Architectural case and design proposal

In this sub-chapter, the connected architectural case is described, followed by an introduction to the design proposal. For more information, please refer to the booklet containing the architectural part of the thesis.

Gothenburg is undergoing a densification process through the urban development *Vision Älvstaden* (Göteborgs Stad, 2012), which results in need to balance the degree of exploitation with creation of qualitative environments. It provides scope and opportunities to establish additional values in reconsidering concepts, use and exploring potential interlinkage through *shared space and use*. Frihamnen constitutes a district within *Vision Älvstaden*, with specific focus on being a test arena for new ideas wherein the interlinkage of preschool, elderly care, student housing and public use has been discussed (S. Santa, Göteborgs Stad, 2016), see Figure 7 and 8. There is however uncertainty how the operations and activities could be configured, which has formed the inspirational background and foundation in developing the design proposal.
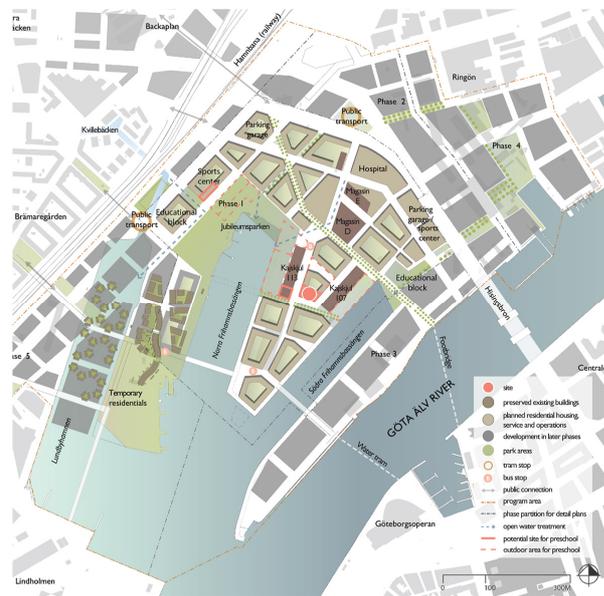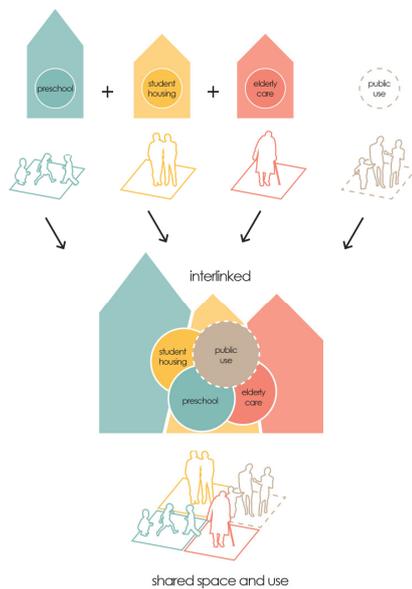
Figure 7 (left) Interlinkage of preschool, elderly care, student housing and public use through shared space and use.

Figure 8 (right) Frihamnen Illustration plan
(Göteborgs Stad, 2016b; site and additional information provided by Stadsbyggnadskontoret/ White arkitekter, 2016, translated and with some adaptation/additions, published with permission).

1.6.1 Purpose and aim of the design proposal

The purpose of the design proposal is to apply and exemplify the proposed planning and design strategies for *shared space and use* as well as explore synergies, use and interlinkage in the connected architectural case in Frihamnen, Gothenburg, featuring preschool, elderly care, student housing and public use. It opens up discussion on societal movements and development with future visions in relation to sustainability, change and resilience, efficient and versatile use, how to *'live, work, play'* as well as promote meetings, interaction and exchange.

The aim of the design proposal is to develop strategies and concepts of *shared space and use* as well as highlight potentials and provide perspectives on usability and value creation for the connected architectural case.

1.6.2   Design questions

In relation to the purpose and aim, the connected architectural case as well as the enquiry by *Göteborgs Stad 'how to co-use and share spaces to establish value creation and economic feasibility?'* the following design questions (DQ) have been developed and addressed:

DQ 1   What activities and functions can be interlinked for preschool, elderly care, student housing and public use through *shared space and use*?

DQ 2   What values and qualities can be created for children, elderly, students and the general public through *shared space and use*?

1.6.3   Delimitations of the design proposal

The design proposal is in line with the empirical research limited to the early stages *'preparation and architectural program'* and *'concept design'* as defined by *RIBA Plan of Work 2013* (RIBA, 2016); hence other process stages will not be elaborated on. The focus on early stages is motivated and considered to be of greater use with regards to the connected architectural case and the ongoing urban planning process of *Vision Älvstaden* and Frihamnen district, which currently is in early stages of planning. The thesis furthermore connects to ongoing work by the municipal project group *Samnyttjande av samhällservicens inom- och utomhusmiljöer* within *Göteborgs Stad* (Göteborgs Stad, 2016a) with the request to focus on strategies and ideas of physical environments. The design proposal hence focuses on analysis and program, which is limited to encompass design strategies and concepts, activities and functions, spatial typologies and configurations, correlations and qualitative values. Focus is not on maintenance, organizational structures, social constructions, law, economy and technical details.

The scale of the design proposal is limited to shared spaces within the building. Functional synergies and correlations within the block and neighborhood context are however considered. Exterior environments are not in focus of the thesis, since a strategy has been developed in the detail plan for Frihamnen, phase 1 (Göteborgs Stad, 2015a). The preschool is furthermore limited to municipal organization and the elderly care to senior apartments with social service, sometimes also referred to as social safety housing, independent living and retirement communities. In connection, the analysis of functions and area estimation for operations and activities is limited to the context of Gothenburg. It is based on recommendations and information on agreed guidelines and strategic programs as provided by *Göteborgs Stad* and local actors.

2 Theoretical framework and research overview

In this chapter, the theoretical framework is presented along with a contemporary research overview of previously conducted research and knowledge within the area, see Figure 9.
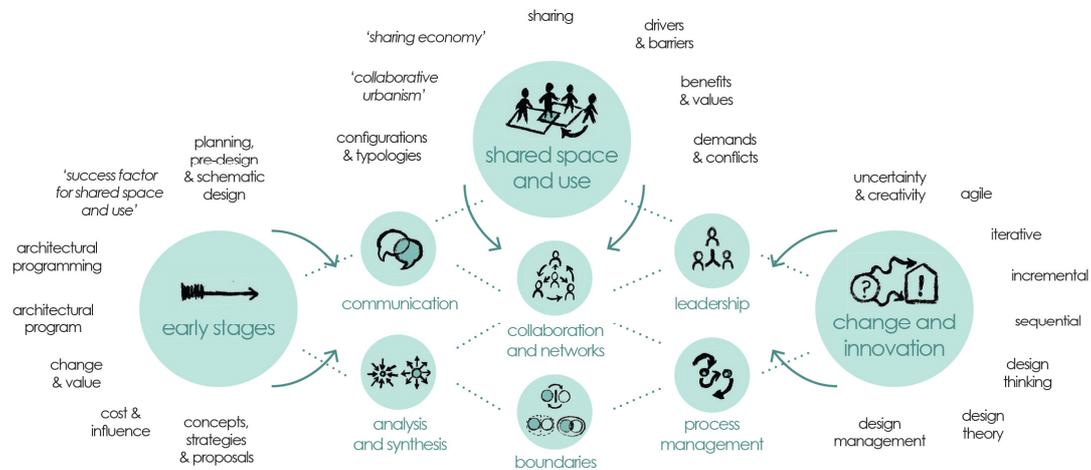
Figure 9 Theoretical map.
Areas and theories addressed in relation to the purpose, aim and research questions of the study.

2.1 Shared space and use

Sharing as a social construct, concept and phenomenon has existed since the beginning of time. It constitutes a part of our everyday lives as human beings and is something we learn early in childhood (Botsman and Rogers, 2010). It can be defined as to: *'divide and distribute in shares'*, *'partake of, use, experience, or enjoy with others'*, *'give or be given a share in'* or *'have a share used within'* (Encyclopedia Britannica, 2016). Familiar and established ways of sharing in society are e.g. shared premised in residential developments as well as public use, transport and ownership in relation to infrastructure, technical systems, public spaces, health care and education (Gustafsson and Park, 2015).

In recent time, sharing has revolutionized information technology as well as digital and social media (Brinkø et al., 2015) by allowing people to distribute knowledge, take part of information and take on an increasingly global and outgoing lifestyle (Botsman and Rogers, 2010). According to Clegg et al. (2011), it has enabled increased speed and efficiency, cost effective access to resources and customers, different sets of ownership and locations as well as organizational capabilities. It furthermore disaggregates existing designs, influences physical environments as well as segregates and specializes critical activities. Conversely, Brinkø et al. (2015) underline that modern technology and digitalization are equally influencing and facilitating sharing by contributing with new tools, possibilities and platforms. It has sparked the emergence of the sharing economy, also referred to as collaborative consumption and collaborative economy, as a new form of sharing that is gaining in focus and popularity (Brinkø et al., 2015; Kostakis and Bauwens, 2014; Botsman and Rogers, 2010). According to research within the field, the sharing economy can be explained and defined as *'a trend that is reshaping our service-based society'* (Voight, 2013), *'access rather than ownership'*, *'a mentality of live light, waste less, to protect the environment'* (Rosenberg, 2013), *'a way of sweating underutilized assets by building communities around them and turning consumers into providers'* (Silver, 2013), *'[an] economic model where the ownership*

and access are shared between corporations, start-ups, and people' (Owyang et al., 2013) and *'[to] allow individuals and groups to make money from underused assets. In this way, physical assets are shared as services* (PWC, 2015). Sharing through collaborative consumption can be categorized as *'product service systems'*, *'redistribution markets'* and *'collaborative lifestyles'*. Some examples from practice are transportation sharing, renting and pooling (car, ride, lift, bike, taxi), internet-based sharing (*'the Cloud'*), toy and baby goods rental, fashion and accessories rental and swaps, film rental, big marketplaces and swap sites (eBay, Craigslist, Blocket), co-working spaces, social lending and currencies, crowdfunding, sharing of gardens, parking spaces and storage (Botsman and Rogers, 2010; PWC, 2015).

The sharing economy is inducing a shift in societal focus, moving away from ownership and exclusivity into sharing, usability and circular economy. It is shifting from identity, individuality, consumption and profitability to de-materialization with value in collaboration, repeated use and community (Botsman and Rogers, 2010; Sveriges Arkitekter, 2016). New services are developing relating to sharing, renting and lending, which also has an impact on the use and need of space and facilities (Brinkø et al., 2015; Gustafsson and Park, 2015; Sveriges Arkitekter, 2016). It illustrates a transition from production into services and knowledge gaining in emphasis. It furthermore indicates a change in perception, values and perspectives on possibilities and resources as well as the individual's role in society (Botsman and Rogers, 2010; Sveriges Arkitekter, 2016). Instead of producing and consuming new resources focus is on maximizing use of what is already established (Brinkø et al., 2015; Gustafsson and Park, 2015), which implies that quality is gaining in importance. It consequently highlights need and potential in considering values and focusing on qualitative aspects as it together with time has ability to bring economical profit (Gustafsson and Park, 2015).

2.1.1   Shared space and use within built environment

Until recent decades, sharing in built environment has mainly had an influence within areas such as urban planning, outdoor spaces (Gehl 2010, 1997; Trinity Haus, 2012), inter-organizational sharing, facility management, open offices and activity-based workplaces (Alexander, 2009; Alexander and Brown 2006; Becker and Steele, 1995; Brinkø et al., 2015; Duffy and Powell, 1997; Michell, 2013; Moss et al., 2009; Roberts, 2004). Shared space as a concept can also be associated with urban street space and design (Trinity Haus, 2012) as well as internet-based communications platforms (Rafferty, 2012). It is however transitioning *'from stuff to space'* and consequently emerging as a concept within built environment in the form of *shared space and use* (Brinkø et al., 2015; Lee et al., 2010; Rafferty, 2012), which also is referred to as collaborative urbanism (Brinkø et al., 2015). It can be described as when functions or resources are owned, shared or used together by two or more actors. Locations and buildings can be categorized as resources, hence shared use of space and facilities, synonymous with co-location and joint use, can be considered as a form of sharing (Brinkø et al., 2015; Gustafsson and Park, 2015).

Characteristic for sharing of space and resources is a temporary duration and occupation through active use and value in repeated usability, opposed to exclusive ownership and individual identity (Botsman and Rogers, 2010; Gustafsson and Park, 2015). It furthermore features exchange, activation and adaptability, which involves people, process, economy and social aspects. Effective use of space essentially depends on the

variables and relationships between context, time and capacity. Brinkø et al. (2015, 2014) and Gustafsson and Park (2015) emphasize time as an integral part of space sharing together with the configuration of how space is used, see Figure 10. There may be differences in active use over the year, week or throughout the day as well as variations in the degree of space usage. Another central aspect to *shared space and use* is the presence and importance of human interaction as sharing essentially concerns establishment of social and physical relationships, both in terms of use and increased organizational requirements (Gustafsson and Park, 2015).
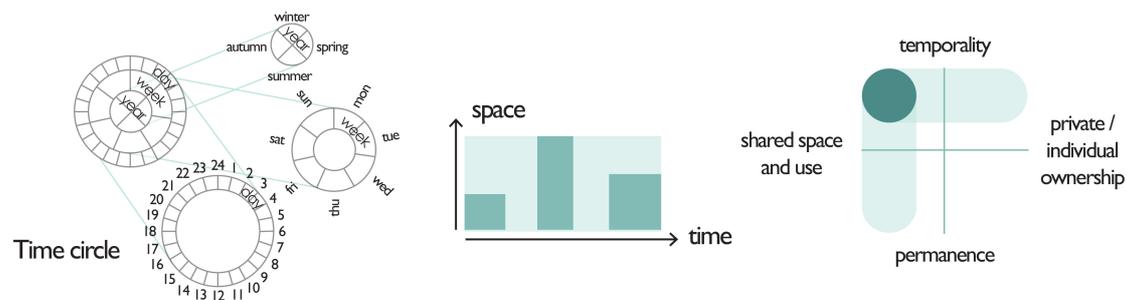

Figure 10 Variables and relationships of shared space and use
(based on Gustafsson and Park, 2015, p.10, 92, 192, 194, translated, adapted colors and some modification).

The construction and use of buildings for housing and service consumes about 30 percent of the global energy (EIA, 2016). In Europe, the share is about 40 percent for energy and over 50 percent for resources (Energimyndigheten, 2016; European Commission, 2011; Sveriges Byggindustrier, 2017), which constantly are increasing in cost and value. The current building stock in cities however has a low rate of facility occupancy and utilization as spaces mainly are used during daytime and working hours on weekdays. Spaces are furthermore seldom used to full extent or at the same time, along with buildings being less utilized or closed during evenings, weekends, holidays, vacations and summer time. The occupancy rate depends on building type, however is often between 25 - 50 percent, which implies a total utilization rate of 13 percent (Insightlab, 2014; ISS, 2017; IVA, 2015; PTS Forum/CVA, 2015; SKL, 2011). In addition, costs of spaces and facilities comprises between 8 - 44 percent of total operational costs depending on building type, usage and staff intensity, which is the second largest expense after personnel costs (ESV 2005:3; FM Fakta, 2009; Södertörnskommunerna, 2009). It highlights great underlying potential, capacity and scope in underutilized resources to rethink and optimize use as well as decrease total costs through sharing. The development towards *shared space and use* within built environment is opening up a new urban field with visions and possibilities regarding attitudes and perception of space and resources, however also brings challenges to planning and design (Brinkø et al., 2015; Gustafsson and Park, 2015; IVA, 2015; Sveriges Arkitekter, 2016). The sharing economy along with urbanization and densification imposes increased value in physical space and blurs the line between private and public. It furthermore provides reason to re-evaluate how cities and the resources and facilities comprising it are used and the benefits it may contribute with (Brinkø et al., 2015; IVA, 2015; Sveriges Arkitekter, 2016).

2.1.2   Configuration and typologies

The extent and configuration of shared, common or integrated spaces can take many different forms depending on the reason and purpose for sharing. It can be to establish

exchange by organizational networking with collaboration among actors and operations but activities not being located within the same space or facilities. Another scenario is a side-by-side configuration with actors and operations co-located in the same facilities but not integrated with each other, which is similar to mixed-use developments. A third alternative is to share space with common functions by maintaining private zones but sharing some features and resources. A fourth form is the integrated typology where spaces are used and shared by complete integration between activities and operations.


'pending/in anticipation of'   'in parallel'   'other times'
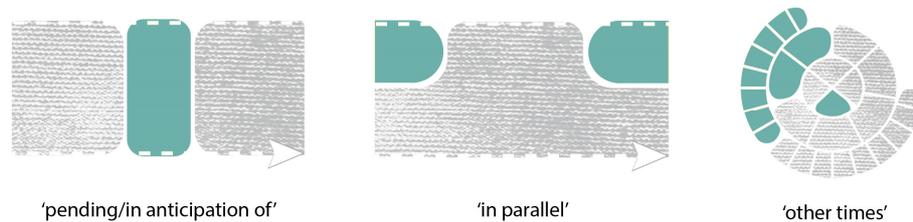
Figure 11 Three scenarios to share space and use
(Gustafsson and Park, 2015, p.33-36, 191, translated and adapted colors).

TYPE	Sharing a specific facility - a desk or a workspace in a semi-closed community	Sharing several facilities in an open or semi-closed community	Sharing physical space in a building or a building in itself in a closed community	Sharing facilities between users in a network of buildings/organizations in an open, semi-closed or closed community
GENERAL ATTRIBUTES	Sharing is facilitated by an owner and directed towards private individuals	Sharing in the form of a building owner making specific facilities available to the general public	Sharing of space inside a building between different groups or organizations	Sharing of facilities between users of different buildings with different owners
WHEN	Simultaneous use	Simultaneous and serial use	Simultaneous and serial use	Simultaneous and serial use
WHY	Keep costs down Synergy	Keep costs down Optimized use CSR activity	Keep costs down Optimized use Surplus space	Keep costs down Optimized use Synergy
WHO	Access is restricted to individuals approved by the owner	Access is available to a large group of people in addition to own employees	Access is restricted to preagreed groups or individuals decided by the owner	Access is available for employees/residents from the buildings involved
HOW	One party has ownership of the space, and individuals can gain access either free or for a fee	The organization with ownership opens up specific parts of their property for use for the greater public	One party has ownership of the space and makes it available for specific groups or individuals for a fee	Different building owners come together and agree on sharing specific facilities or buildings instead of each having one

Figure 12 Typology of shared use of facilities
(based on Brinkø et al., 2014, p.161).

In *shared space and use* it is important to establish demarcations, i.e. degrees and limits of sharing, in order to manage, support and facilitate activities and operations by avoiding misunderstandings and conflicts. According to Brinkø et al. (2015, 2014), it involves consideration and clarity regarding the aspects: *what* (object), *when* (time perspective), *why* (reason of sharing), *who* (actors, sharing between whom) and *how* (organization of sharing). Depending on the variables context, time and capacity, Gustafsson and Park (2015) define three different sharing scenarios: *'pending/in anticipation of'* (temporary), *'in parallel'* (at the same time) and *'other times'* (serial use, after one another), see Figure 11. Brinkø et al. (2015, 2014) furthermore classifies *shared space and use* into the four typologies: *'sharing a specific facility - a desk or a workspace in a semi-close community'*, *'sharing several facilities in an open or semi-*

closed community', 'sharing physical space in a building or a building in itself in a closed community' and *'sharing facilities between users in a network of buildings/organizations in an open, semi-open or closed community'*, see Figure 12.

2.1.3   Drivers, benefits and additional values

The strongest drivers and most influential factors to share space and use are social, societal and economic structures, which act on many levels and relate to each other within all aspects of sustainability (Brinkø et al., 2015; Gustafsson and Park, 2015; Malmö Stad, 2015). One of the primary objectives and reasons for sharing physical space is the economical savings or profits it may bring through optimized use of land, facilities, space and resources. Time acts as a central underlying facilitator and driver by composing frameworks and boundaries for use through time-dependency, which justifies investment (Brinkø et al., 2015; Gustafsson and Park, 2015). Economic benefits relate to aspects such as reduction of rent or expenses, more revenue and possibility to co-finance, shared services and maintenance as well as increased opportunity to access resources with quality. It may initially result in increased expenses, however has great potential to contribute with values and profit in considering long-term perspectives (Malmö Stad, 2015). Economic incentives are furthermore closely related to environmental benefits by providing synergy effects in saving of resources such as space, equipment and energy (Gustafsson and Park, 2015).

Sharing of space and use is apart from economy driven by social interaction with incentives in creation of community and additional values through collaboration and exchange (Gustafsson and Park, 2015; Malmö Stad, 2015). According to Malmö Stad (2015), *shared space and use* contributes with increased participation, safety and better understanding in between different community groups. It counteracts segregation and boundaries by promoting tolerance, diversity, equality and friendship. It may furthermore provide societal values and contributions by improving health, employment and integration as well as holistic benefits by increasing quality of life. *Shared space and use* has the potential to provide additional values for many different actors by establishing interdisciplinary relationships and networks, breaking barriers and encouraging spontaneous informal meetings, which in turn may promote knowledge exchange, ideas and innovation. It has the capacity to bring benefits and synergy effects not only to actors and stakeholders sharing physical space, but also to the surrounding context, community and city (Gustafsson and Park, 2015; Malmö Stad, 2015). Social benefits can be established by creating opportunities for different users to meet, share activities, collaborate, solve problems and exchange knowledge. In connection, benefits may emerge from the increased attention required in terms of organizational interaction (Gustafsson and Park, 2015), which also has potential to bring opportunities to professional management and employment (Brinkø et al., 2014). Another beneficial aspect related to networking through *shared space and use* is the connectivity it provides by creating and promoting a mix of activities with vibrant atmospheres, neighborhoods and environments through increased flow, movement and 24/7-activity (Brinkø et al., 2014; Gustafsson and Park, 2015; Malmö Stad, 2015). It may furthermore be advantageous in terms of proximity and distribution, a central location or by serving as a neutral space with non-attachment. Other connected drivers are novelty, newsworthiness, PR and brand association, image and favorable impressions as well as charity and goodwill (Gustafsson and Park, 2015).

2.1.4 Demands, barriers and conflicts

Shared space and use brings together different actors, which may have conflicting objectives and interests as well as differences in expectations, sense making and interpretation. The increased complexity introduced may result in emergence of demands and difficulties, which have to be managed through collaboration to define and establish compromises, common goals and long-term perspectives in order to avoid misunderstandings. According to Malmö Stad (2015), a potential limiting aspect is that there is not one obvious client and hence no clear ownership of projects and related issues that may arise during the process. Sharing of space and use introduces common elements and resources where confusion or misunderstandings regarding ownership and responsibilities may emerge. It emphasizes the need to define and manage relationships, social norms and regulatory structures (Brinkø et al., 2014; Gustafsson and Park, 2015). In connection, implementation and operational activities tend to depend on individual *'enthusiasts'*, which makes the system vulnerable and highlights necessity to develop formalized approaches. There is however a current lack of corresponding planning and political frameworks, regulations, policies, routines and guidelines for *shared space and use*, hence scenarios with uncertainty may emerge (Malmö Stad, 2015). There may furthermore be difficulty in how to deal with abuse and misuse, e.g. due to carelessness, neglect or lack of time. In response, Gustafsson and Park (2015) and Malmö Stad (2015) stress that there often is need for a facilitator, enabler, representative or host to coordinates actors and activities, manage opinions, requests, questions, concerns and maintain a sense of safety.

The social construction and interaction dependency along with the different typologies and configurations of *shared space and use* imposes increased demands and considerations in terms of flexibility, culture, trust and transdisciplinary collaboration. It is hence important to manage knowledge levels and establish frameworks, routines and conditions to facilitate process and implementation. There are furthermore mental barriers to sharing of space such as uncertainty in use, lack of incentives or perceptions of increased workloads, which may be influential or limiting (Malmö Stad, 2015). According to Brinkø et al. (2015) and Gustafsson and Park (2015), it is essential to provide sufficient information how spaces and resources should be used and shared among different actors in order to facilitate sense making and clarity regarding rules and principles. In connection, logistics may increase in frequency or difficulty as a result of the temporal duration of *shared space and use*. It may cause conflicts or challenges regarding access and availability connected to management of continuity and control (Brinkø et al., 2014; Gustafsson and Park 2015). It highlights need and necessity to maintain safety as well as not to make compromises that restricts core activities and operations (Malmö Stad, 2015).

Shared space and use can also be challenging in terms of bureaucracy and economy due to ambiguity of finance or limitations to a long-term financial perspective. There can furthermore be practical and organizational barriers and boundaries to overcome and adjust or sometimes lack of structure and organization (Malmö Stad, 2015). Problems may arise from psychological objections such as privacy and territoriality in organizational structures, resistance to change, risks in change of demands or from unclear and undefined areas of responsibility, which induces lack of transparency and accountability (Brinkø et al., 2014; Gustafsson and Park 2015; Malmö Stad, 2015). In

connection, challenges may emerge regarding identity, context, brand associations and secrecy (Gustafsson and Park 2015; Malmö Stad, 2015).

2.1.5 Planning and design of shared space and use

Planning and design of *shared space and use*, flexibility and multi-purpose increases the degree of complexity as more actors and stakeholders are involved in processes. It introduces diverse needs, values and objectives that have to be understood and balanced with economic preconditions to avoid conflicts, obtain shared common values as well as allocate and make use of resources efficiently (Malmö Stad, 2015; Gustafsson and Park 2015). Communication among actors and stakeholders is hence of crucial importance to establish agreements on goals and objectives for project development. It may furthermore require specific considerations in planning as well as interdisciplinary teams with different backgrounds and professional specialization (Malmö Stad, 2015). There is need for increased tolerance, compromise, priority and coordination through management of expectations and conflicting objectives (Gustafsson and Park, 2015).

According to IVA (2015), planning and design of *shared space and use* involves reconsidering, challenging and optimizing use with an innovative mindset focusing on activities rather than static rooms divided into separate functions. It implies taking an objective perspective on possibilities and questioning if activities and operations can be performed differently or elsewhere (Gustafsson and Park, 2015; Malmö Stad, 2015). It consequently demands time, participation and engagement in process and implementation in order to adapt activities to users (Malmö Stad, 2015). It furthermore requires evaluation of activities to determine preconditions, demands, spatial relationships, time and scheduling of different actors and operations. If there are established activities, these may influence the design and configuration of physical environments. It is furthermore necessary to clarify what activities are included in different operations of involved actors as well as what parts and activities are shared or not. The lowest accepted standard or conditions have to be defined in order to facilitate compromise and efficiency (Gustafsson and Park, 2015). In connection, Malmö Stad (2015) stress it as essential to determine priority and hierarchy in actor relationships to define if all actors have equal influence or if there is a core activity, operation or actor. If there is a core actor, it is important to establish limits and demands that may not be compromised by others sharing the same space or use.

Projects with *shared space and use* are constantly subject to change in relation to time and temporality of use, needs, demands and priorities. It also applies to society in general with rapid pace of transformation, uncertainty of changes and future development. Change consequently has to be considered in planning and design processes with development of relating management strategies. It furthermore motivates *shared space and use* as a sustainable typology with management of change through flexibility and adaptability. There is however need to balance temporality with long-term perspectives as well as ensure trust, control and security (Gustafsson and Park, 2015). According to Gustafsson and Park (2015) and Malmö Stad (2015), it can be managed through partition or zoning of private and shared spaces, flexibility in openness, smart storage possibilities or clarity regarding demarcation. In connection, Malmqvist and Ryd (2006) emphasize built environment as developing towards increased focus on function, quality, flexibility, generality and more efficient use of space. Architects are furthermore underlined as well-equipped actors with a holistic

perspective, competence, skills and knowledge to handle complex problems. *Shared space and use* imposes challenges on communication and planning processes with strong connections to interaction and cooperation (Malmö Stad, 2015) where definition of space, correlations and activities have an integral part (Gustafsson and Park, 2015). Early stages together with architectural programs are consequently of importance with great potential of influential impact (Göteborgs Stad, 2016a). The purpose of early stages and architectural programs are to manage design through communication and may hence be of use to achieve a better understanding of *shared space and* use.

2.2   Planning and design in early stages

In recent time, project based work has become more common as projects have the ability to drive and manage development and change processes. Projects are furthermore adapted to users and may hence provide new systems and methods as well as facilitate and inspire innovation. A project can be defined as *'a temporary endeavor undertaken to create a unique product, service or result'* (PMI, 2016), along with a process as *'a set of activities to achieve a goal'* (Norouzi et al., 2015), *'a bounded group of interrelated work activities providing output of a greater value than the inputs by means of one or more transformations´* (Melan, 1992) or *'systematic series of actions directed to the achievement of goals´* (Juran, 1988). Project process stages within built environment can according to *RIBA Plan of Work 2013* be defined as comprised by strategic definition, preparation, design, pre-construction and construction, followed by operational usage, maintenance and facility management once buildings are completed (RIBA, 2016), see Figure 13. In connection, Peña and Parshall (2012) describe the total design process as consisting of the phases architectural programming, schematic design and design development (comparable with RIBAs *'preparation and brief'*, *'concept design'* and *'developed design'*), which is followed by construction documents, bidding and construction in the total project delivery system. Processes are often illustrated as linear sequences, however in practice phases are rather interlinked and overlapping due to the unique and dynamic character of projects and design with ongoing feedback and cyclic iterations (Bogers et al., 2008; Malmqvist and Ryd, 2006; Ryd, 2003).
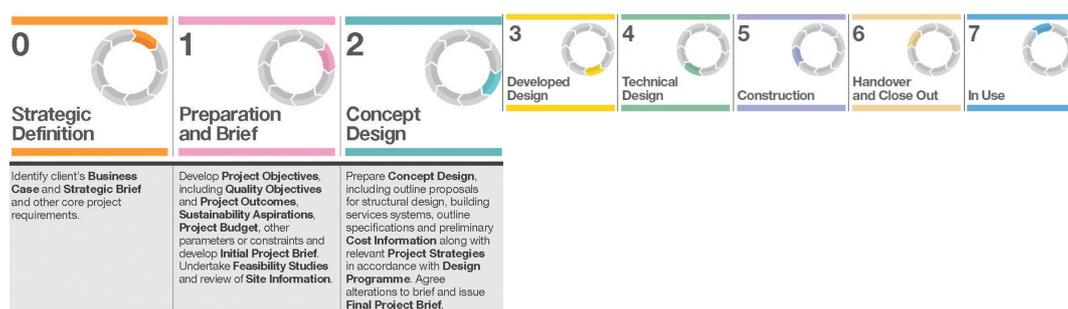
Figure 13   RIBA Plan of Work 2013
(RIBA, 2016).

Early stages in planning and design can be defined to encompass planning, pre-design and schematic design (comparable with RIBA's *'strategic definition'*, *'preparation and brief'* and *'concept design'*). In the pre-design stage, the problem statement including goals, visions, objectives and priorities is developed. A large extent of research is furthermore carried out and the project budget is analyzed and outlined. During the pre-design and schematic design stages, an architectural program is developed through a

process referred to as architectural programming in order to specify requirements and constraints. In connection, different concepts and design alternatives are explored, compared and analyzed from which strategies and proposals are outlined (Peña and Parshall, 2012; RIBA, 2016).

Early stages involve identification and definition of problems in order to determine the project scope and direction. The stages are furthermore characterized by strategies, ideas and concepts with the aim to inflict or create some kind of change and value (Ryd, 2008). Analysis and synthesis are integrated in an open process with both creative and systematic approaches of definition, specification and design (Barrett and Stanley, 1999; Blyth and Worthington, 2001; Faatz, 2009). The approaches complement each other in the process of investigating and framing the problem, extracting useful information as well as outlining potential solutions from endless possibilities. The purpose of early stages can according to Ryd (2008) be described as *'through creative work transform the user's (construction client's) requirements concerning function and quality as well as other desires into an architectural and engineering solution and a basis for production which is economical for both the user/client and contractor/supplier and which also allows for other requirements stipulated by society and affected parties (stakeholders) and the existence of existing buildings regarding safety and the environment also to be met'.*
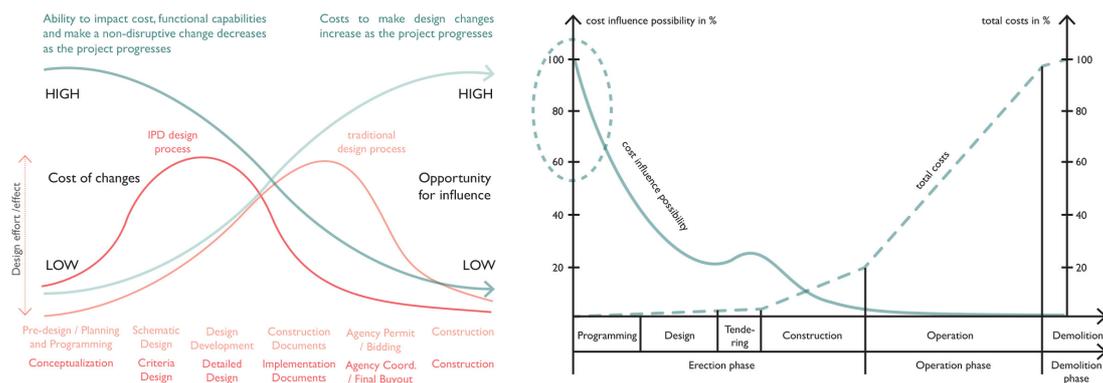
Figure 14 (left) MacLeamy Curve, illustrating the architectural programming phase as most cost-effective for changes to influence outcomes of projects (based on AIA, 2007, p.21; Sullivan, 2007, p.22; WBDG, 2016).

*Figure 15 (right) Cost influence throughout life cycle
(Faatz, 2009, p.82, adapted after Achammer, 2009, adapted colors).*

The contradiction and ambiguity of early stages is that effort is made to specify and frame the scope when projects still are rather unknown or uncertain and information is incomplete. It can thus be difficult to identify and foresee every aspect. Projects may furthermore be subject to change and unexpected events as new insights or additional values not considered in advance may emerge during the process (Bogers et al., 2008; Sullivan, 2007). The objective of early stages is however to outline goals, ideas, needs and requirements as good as possible to facilitate the process and ensure quality in outcome (Barrett and Stanley, 1999; Blyth and Worthington, 2001; Kamara et al., 2002). As illustrated by Figure 14 and 15, early stages have a major impact on cost development as well as great ability to influence design, project scope and outcomes (AIA, 2007; Faatz, 2009; Sullivan, 2007; WBDG 2016). The operational phase in the project process comprises the greatest economical expenses for buildings while early stages in comparison has the lowest cost levels. It highlights the importance of planning and design in early stages to ensure performance, value creation, quality and feasible

operational expenses (Faatz, 2009). Sufficient time and effort should consequently be allocated to early stages to minimize resource consumption, avoid costly changes later in the process as well as to meet expectations in results (Faatz, 2009; Ryd, 2008).

2.2.1   Architectural programming and architectural programs

Peña and Parshall (2012) describe the architectural programming process as five interchanging qualitative and quantitative steps: *'establish goals'* (what to achieve and why), *'collect and analyze facts'* (what is known or given), *'uncover and test concepts'* (how to achieve goals), *'determine needs'* (budget, space and quality) and *'state the problem'* (conditions with influence and general directions of the design). Step one to three are characterized by research, uncovering of information as well as analysis and sense making. The fourth step is comprised by evaluation or research to determine feasibility, which is followed by the fifth step where information, alternatives and decisions that have been made throughout the process are extracted and stated. The sequence is however not strict or consistent as architectural programming constitutes a dynamic process and steps may hence be carried out in different orders or in parallel. Ryd (2008) refers to the architectural programming process as *'a set of activities which include identification, collection, documentation, prioritization, structuring, quality assurance and management of both operational and construction related requirements for a particular facility and or/building'*. It essentially constitutes a communication, information and requirement management process where needs, desires, demands, conditions and possibilities are defined, translated, classified and specified (Ryd, 2008) in relation to aspects such as function, form, economy and time as well as quality and quantity (Malmqvist and Ryd 2006; Peña and Parshall, 2012; PTS Forum, 2017).

An architectural program is gradually developed from the architectural programming process with the purpose to interpret and reflect statement of needs as well as facilitate planning and design (Malmqvist and Ryd, 2006). Peña and Parshall (2012) refers to the architectural program as *'a statement of the problem'* which forms the last step in problem seeking and architectural programming as well as the first step in problem solving and design. It constitutes the interface, handoff and link between planning and design with gradual influence on the development of a schematic design proposal. According to Oxford Dictionary (2016), the word *'program'* origins from Latin's *'programma'*, which means *'written statement'*. It is defined as *'a plan of action'* and *'a brief usually written outline describing a presentation'* (Encyclopedia Britannica, 2016). In connection, a *'brief'* (UK, European and international terminology) is defined as *'to instruct or inform'*, *'a consideration or abstraction of large documents or series of documents'* and *'short, concise, institutional, barely adequate'* (Chambers Dictionary, 2016).

An architectural program is composed by one or a number of documents with the purpose to identify, describe and outline project backgrounds, requirements and resources in order to establish an understanding of operations and activities, analyze alternatives as well as compare potential solutions as a basis for the design (Ryd, 2008). It can be established through collaborative efforts between the client and designers, by the client itself or through appointment of a specialist consultant, e.g. project manager or architect (Faatz, 2009; Peña and Parshall, 2012; Ryd, 2008). The architectural program is developed through loops and iterations throughout the process with focus on the future and can hence be considered as a *'living'* document (Malmqvist and Ryd,

2006; Ryd, 2003). In the development demands and expectations are expressed, prioritized and communicated, which eventually are synthesized into solutions, proposals and strategies for execution and implementation. The architectural program comprises and handles aspects such as vision and goal definition, negotiation and compromise, decision-making, value creation and quality management as well as balancing of changes and risks (Designing Buildings Wiki, 2016; Hyams, 2001). It entails functional, architectural and economic aspects such as budget, area needs, activities, connections, design and concepts, technical systems and specifications, performance requirements, working environments and physical properties (Malmqvist and Ryd, 2006; Ryd, 2008; Svensk Byggtjänst, 2017).
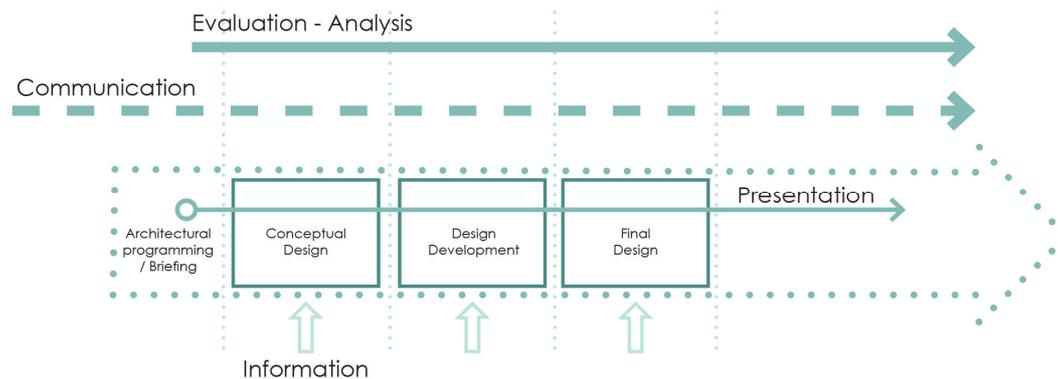

Figure 16 Overview of design process and design supportive tools
(based on Norouzi et al., 2015, p.111; Weytjens et al., 2009, p.291, adapted colors and some modification).

The architectural program constitutes an important communication tool in aligning stakeholder objectives as well as to form a basis for following development (Designing Buildings Wiki, 2016; Hyams, 2001), see Figure 16. It functions as a benchmark, *'road map'* and governing framework to confirm requirements, evaluate design solutions as well as for management and quality verification throughout the project process (Bogers et al., 2008; Hansen and Vanegas, 2003; Heintz and Overgaard, 2007). According to Hansen and Vanegas (2003), Heintz and Overgaard (2007) and Ryd (2008, 2003), the architectural program and programming process are critical to ensure success and increase quality in outcomes. Peña and Parshall (2012) furthermore underline the architectural program as *'one of the most important documents in the chain that is the total project delivery system'*. Communication hence becomes central in architectural programming as crucial decisions and problem statements are formulated in architectural programs which influences design solutions.

2.2.2   Communication in early stages and architectural programs

Communication origins from the Latin words *'communis'* and '*communicare*' with the meaning *'to share'* (Oxford Dictionary, 2016) and is described as *'[the] process of exchange of information between the sender and receiver to equalize information on both sides'* (Otter and Prins, 2002)*, 'sharing of meaning to reach a mutual understanding'* (Otter and Emmitt, 2008) as well as *'[a] cognitive and social process by which messages are transmitted and meaning is generated'* (Maier et al., 2008). Communication comprises a central part in early stages, design processes and development of architectural programs in order to frame projects by defining needs, demands and wishes (Juaim and Hassanain, 2011). Faatz (2009) describes architectural programming as a communication and decision-making process where information

exchange, sense making and mutual understanding is crucial. The most significant design failures are according to Lyytinen and Hirschheim (1988) connected to interaction, expectation and process, which essentially are based on communication. In connection, Malmqvist and Ryd (2006) and Ryd (2008) underline information gathering processes as highly dependent on effective communication and documentation techniques to improve project conditions, development and outcomes. Communication structures are furthermore stressed by Frens (2008) in relation to the transition from phase-based processes to activity-based approaches in order to facilitate continuous information gathering.

Peña and Parshall (2012) emphasize the importance of documentation to manage communication as well as enable dialogue, evaluation and consensus when many actors and stakeholders are involved. Clear and effective communication and formulation of architectural programs may facilitate understanding of possibilities, barriers, solutions and alternatives among groups with diverse backgrounds and knowledge levels. If communication and documentation is carried out insufficiently projects, information and intentions may be represented unrealistic, untruthful or incomplete. It may furthermore be interpreted and understood differently with risk of misunderstandings, which may limit potential design solutions (Ryd, 2008). According to Malmqvist and Ryd (2006) and Ryd (2008), methods, approaches and communication tools hence become influential to clarify abstract goals and issues, minimize ambiguity, create structure as well as support dissemination of information in early stages. Communication techniques such as diagrams, graphic analysis and simplified images may be of use to align actors, facilitate overview, comprehension and decision-making, ensure sense making and avoid misunderstandings by illustrating sub-elements, correlations, ideas, alternatives, scenarios and consequences without limiting design possibilities (Peña and Parshall, 2012; Ryd, 2008). Graphic communication can be used as a tool to complement written descriptions, focus and catalyze issues as well as support discussions and management of expectations connected to quality. It may furthermore be of use to investigate, compare, illustrate and sketch out parallel processes, complex aspects and comprehensive issues to facilitate innovation, strategies, concepts and operational changes (Malmqvist and Ryd, 2006).

2.3   Change and innovation management

Change can be defined as *'a transition from one state to another'*, which either is considered as an exception to stability or from a process-based view with flux and transformation (Clegg et al., 2011). According to Van de Ven and Poole (1995) there are four types of change: *'life cycle'* (maturation, growth and stages), *'dialectal'* (struggle based, interplay, tension, contradictions and social relations), *'evolutionary'* (adaptive to environment and sustainability) and *'theological'* (strategy, future and vision based). There are two theoretical approaches to change, which either is planned and rational or experimental and processual (Clegg et al., 2011). A rational approach to manage change is that of Taylor (1967), which is based on development of plans, implementation and monitoring to diminish future change. It applies the view that change is a necessary interruption with adaptation in response to the environment. It is furthermore based on analysis, rethinking and redesign of activities for improvements, efficiency and performance (Clegg et al., 2011). On the contrary, a processual approach applies the view of Pettigrew (1997, 1990, 1985) and Van de Ven et al. (1999) that change is both incremental and evolutionary in relation to pressure, directions, process,

structure and continuity. Change and innovation are not considered as stages or a linear sequence, but rather emphasized as temporal and uncertain with patterns and interplay of various contextual aspects (Clegg et al., 2011).

Innovation can according to Clegg et al. (2011) be described as a social process and defined as *'the creation of a new process, product or service'*. There are two views on social innovation, which either emphasize the human dimension or technology, systems and structure as enablers for social networking to share ideas and solutions (Clegg et al., 2011; Murray et al., 2010). There is not one-best-way, instead there are several approaches in response to balance the fusion, tension and relationship between freedom and responsibility, determination and emergence as well as rational plans and uncertainty, which also is referred to as autonomous or disciplined creativity (Clegg et al., 2011). The innovation process is connected to complexity theory by Pascale (1999) through the four principles *'equilibrium equals death'* (constantly develop to maintain stability), *'self-organization is important'* (patterns of collaboration and no hierarchical relationships), *'complex tasks need more complex problem-solving processes'* (complex systems, many processes, trial-and-error steps, initial chaotic patchwork of actions and outcomes transforms into ordered patterns) and *'complex organizations can only be disturbed, not directed'* (calculations and predictions are meaningless). According to Van de Ven et al. (1999), the process is based on the stages *'initiation'* (emergence and development of plans and innovation through concentration and attention of diverse stakeholders), *'development'* (multiple ideas, unclarity and exploration) and *'implementation'* (integration of old with new). Murray et al. (2010) furthermore describe innovation as a six-step process with *'prompts, inspirations and diagnoses'*, *'proposals and ideas generation'*, *'prototyping and pilots'*, *'sustaining'*, *'scaling and diffusion'* and *'systematic change'*.

Innovation involves many driving forces, roles and stakeholders as well as challenges organizational power relations and resistance (Clegg et al., 2011; Pfeffer, 1992). It may hence require other approaches of control and leadership, such as pluralistic, transactional, transformational or full-range leadership (Bass and Avolio, 2000, 2003; Van de Ven et al., 1999). Innovation is dependent on effective management of economic, political, social and cultural aspects as well as relates to institutional settings based on interaction, contexts and networks. It furthermore requires organic management through mediation, interlinkage and balancing of financial, technological, strategic and resource constraints with creativity to achieve goals (Clegg et al., 2011). March (1988) questions rationality, alignment and consistency in purpose, decisions and actions as well as underlines that goals are subject to change and develop in relation to context. Design and creativity hence needs to be balanced with business and implementation to enable exploration but at the same time maintain exploitative control, responsibility and accountability as well as ensure outcomes and urgency through deadlines, phase reviews and milestones (Brown and Duguid, 2001; Clegg et al., 2011; March, 2002). An issue regarding evaluation and assessment is however the focus on measurement through short-term financial indicators opposed to other aspects and benchmarks. Innovation and change entails risk, chaos, creation, discovery and improvisation as it cannot be entirely planned and controlled. It is complex, ambiguous, dynamic and unpredictable, which challenges and is in conflict with management approaches focusing on usability and order (Van der Ven et al., 1999; Weick, 1979).

2.3.1   Design management and design theory

Design can be described as *'[the] relationship of two paradigms: design as puzzle making and design as problem solving'*, *'as exploring the situation, discovering the solution and presenting the new and unique one through synthesized process'* or *'as attempting to create the solution'* (Norouzi et al., 2015 referring to Kalay, 2004). Design management encompasses and combines project management, design, strategy and supply chain to control, structure, organize and support creative processes, see Figure 17. It connects operational and strategic aspects in processes with the objective to develop and maintain efficient business and achievement of goals through design. Emphasis is on iterative, collaborative, human centered and cross disciplinary approaches such as design thinking as well as effective products and service, communication, environment and branding to create quality of life (DMI, 2017; Jones, 2008). The design process interlinks problem analysis, solution synthesis, evaluation and communication (Archer, 1968), which is considered as *'a negotiation between the problem and solution through the three activities of analysis, synthesis and evaluation'* (Lawson, 2006) or as *'[an] interaction of the participants managed within a dynamic and cyclic communication model'* (Norouzi et al., 2015 referring to Krenk, 2006). It is furthermore explained as *'the process of making decisions about the design alternatives with consideration of different aspects and components'* (Norouzi et al., 2015 referring to Krenk, 2006) and *'creation of synthesized solutions in the form of products, processes, or systems that satisfy perceived needs by mapping between [functional requirements and design parameters]'* (Suh, 1990).
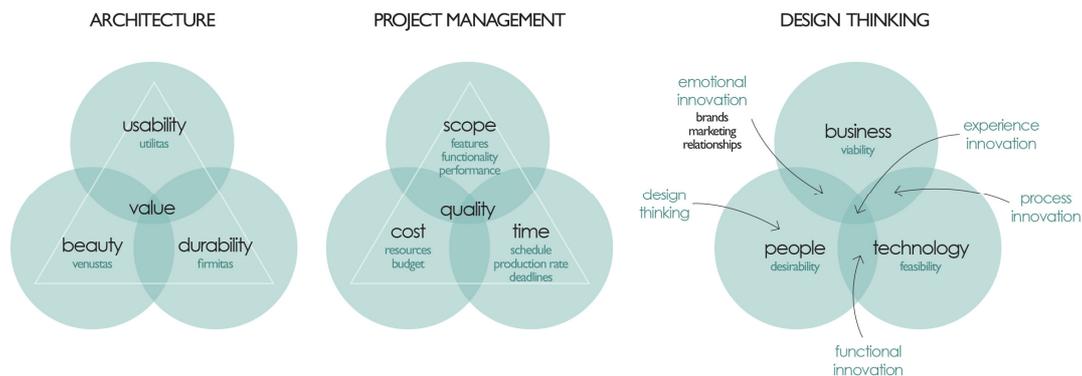
Figure 17   The triple constraints of Architecture, Project Management and Design Thinking (based on Vitruvius; Atkinson, 1999, p.338; IDEO, ideo.com/Brown, 2015, p.19).

Figure 18 The design process components and theories of analysis and synthesis (based on Lawson, 2006, p.38, 40).

Design theory and design research connects functional and physical aspects through design, which involves the relationship and concepts of problem and solution, also

referred to as analysis and synthesis or programming and design. There are however diverse opinions and theories related to analysis and synthesis (Kelly et al., 1992; Lawson, 2006), see Figure 18. One theory separates the concepts by applying a systematic and scientific approach, which is referred to as the A-S-E-model. It highlights analysis, synthesis and evaluation as a rational and sequential process based on transparency, logic, predefined criteria and explicit decision-making (Peña and Parshall, 2012; Rittel and Webber, 1973). Another approach origins from participatory design and is based on continuous interaction, negotiation, evaluation and decision-making. It views analysis and synthesis as interlinked where problems and solutions connect, adapt and develop simultaneously in relation to each other (Cherry, 1999). It is associated with the expression *'the program is the design!'* (Hershberger, 1999).

2.3.2 Collaboration and networks

Innovation and creativity becomes challenging when teams, groups and organizations grow as it requires intense communication and various languages, intuitions and identities need to be bridged (Brown and Duguid, 2001). Social configurations such as user communities, networks, alliances, partnering, multifunctional project teams or *'lead users'* in collaboration with professionals may hence be adopted as a *'tribalization of society'* to overcome tensions and boundaries (Castells, 2000; Clegg et al., 2011; Leonard and Sensiper, 1998; Trullen and Bartunek, 2007; Von Hippel, 1986). Collaboration relies on relationships through dialectical systems, which according to Das and Teng (2000) requires balance between tensions and accountability. It is often applied to complex project-based settings with many actors and specialized competences to link people and knowledge through interaction and sharing to establish a common base (Clegg et al., 2011). Participation, co-creation and methods such as workshops, design dialogue and Integrated Project Delivery [IPD] with interdisciplinary teams, parallel planning and early involvement has in recent time gained attention in planning and design processes. It facilitates gathering of information, knowledge exchange, sense making as well as management of quality and time, but simultaneously imposes increased demands and measures of communication (AIA, 2007).

According to Castells (2000), Fairthlough (2007) and Wenger (2002), innovation entails establishment of multifunctional communities of practice to integrate and manage disparate views and disciplinary knowledge where managers and key stakeholders balance each other through group think, networks and close partnership. Collaboration creates strong cohesion and emergence of roles, however may also be contra-productive to change due to conservatism and resistance. It is dependent on communication and sense making processes with interpretation and evaluation to establish mutual understanding among various groups. Identity is created from interaction and there is a need to balance innovations and goals, commitment and accountability as well as develop tolerance for ambiguity, uncertainty and paradox. Collaboration furthermore implies that actors and stakeholders relate more directly to each other and hence shifts focus from control, authority and power into multiple authorship (Bangle, 2001; Clegg et al., 2011). Clarke and Clegg (1998) and Fairthlough (2007), describe organizations as networks and knowledge-based teams with combined interdependency and independency, dispersed leadership, balance of power through *'heterarchy'*, *'responsible autonomy'* and mutual accountability. In connection, Trullen and Bartunek (2007) emphasize the necessity and importance of collaboration with

focus on situational and contextual uniqueness, experimentation for process, interventions and achievement of goals as well as solutions opposed to analysis.

2.3.3 Boundaries and leadership

Ernst and Chrobot-Mason (2011) define leadership across groups and achievement of goals in relation to boundaries, which is based on *'direction'* (a shared understanding of common goals and strategy), *'alignment'* (the joint coordination of resources and activities) and *'commitment'* (a commitment to collective success that is equal to or above the commitment to the unique success of any single group). Boundaries can be of different type and are categorized as *'vertical'* (across hierarchical levels, rank, seniority, authority and power), *'horizontal'* (across functions, units, peers and expertise) *'stakeholder'*, (customers and suppliers, organization and external partners, alliances, networks, value chains, shareholders, advocacy groups, governments and communities), *'demographic'* (diverse groups) and *'geographic'* (distance and regions, locations, cultures and markets), see Figure 19. In connection, *'six practices of boundary spanning leadership'* (buffering, reflecting, connecting, mobilizing, weaving and transforming) from Great Divide to Nexus Effect are introduced to increase intergroup collaboration, solve problems, create innovative solutions and transform organizations by managing boundaries, forging common ground and discovering new frontiers, see Figure 20.

vertical	horisontal	stakeholder	demographic	geographic
across levels and hierarchy	across functions and expertise	beyond the boundaries of the firm, with external partners	across diverse groups (e.g. gender, ethnicity, nationality)	across regions and locality

Figure 19   Five types of boundaries
*(based on Ernst and Chrobot-Mason, 2011, p.19).*
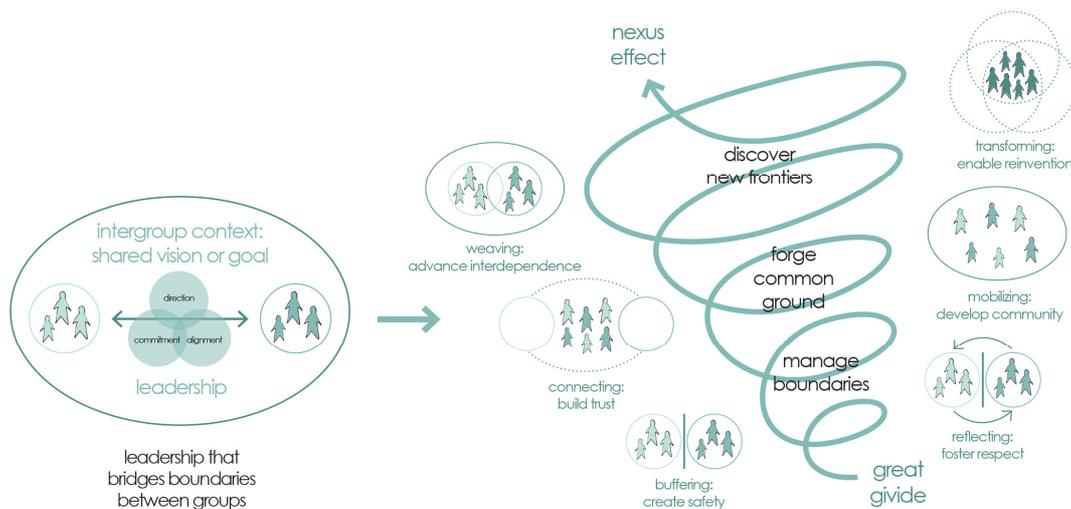
Figure 20   Six boundary spanning practices from Great Divide to Nexus Effect
(based on Ernst and Chrobot-Mason, 2011, p.5, 13, 90, 111, 135, 155, 179, 202, 220, 270-272).

Leadership structures of innovation processes may differ, however the need to unify heterogenous opportunities and establish consensus on intentions maintains important. According to Van de Ven et al. (1999), leadership roles and management in connection to innovation shifts between *'sponsors'*, *'mentors'*, *'critics'* and *'leaders'* with the function to check-and-balance. In connection, Ernst and Chrobot-Mason (2011) refer to leadership as *'interdependent'* (collective activity), *'independent'* (as needed from a variety of individuals) or *'dependent'* (positions of authority) and emphasize interdependent leadership cultures as having stronger boundary spanning capabilities. A hierarchical leadership structure can be suitable for simple and trivial tasks, however may become inappropriate when complexity and ambiguity increases. It may hence be discarded in favour of pluralistic power structures to incorporate various and diverse perspectives, handle uncertainty and facilitate decision-making (Clegg et al., 2011; Van de Ven et al., 1999).

2.3.4   Process management models

Project and process lifecycles and phases can take on different forms depending on management views and approaches. Processes are either considered as systematic, static and sequential or dynamic, iterative and agile, which influences planning, economy and development. Combinations or hybrid models may also be applied.

The *'waterfall'* process model established by Royce (1970), also referred to as formal, traditional or *'tayloristic'*, is plan-driven and simplistic, see Figure 21. It is based on phases and milestones that build on each other with decisions, reconciliations and extensive documentation. It features an incremental approach, where phases with specific purposes are completed before subsequent phases are initiated. The process sequence involves specifications, analysis, design, construction, testing, delivery, occupancy and maintenance (Alleman, 2002; Hay 2003; Hitchins 2003; Petersen, 2010; Royce, 1970; Rechtin and Maier, 2000; Wallace 2013; Wiktorin, 2003). Outcomes from each phase are delivered and documented to function as input for the next phase. In practice, phases are however overlapping and may involve smaller iterations. The model is suitable to apply in smaller projects with predictable results as well as determined demands and requirements. It is less suitable for large, complex, changeable and innovative projects if not complemented with additional steps and phases (Lindvall et al., 2002; Royce, 1970; Vinekar et al., 2006, Wiktorin, 2003).
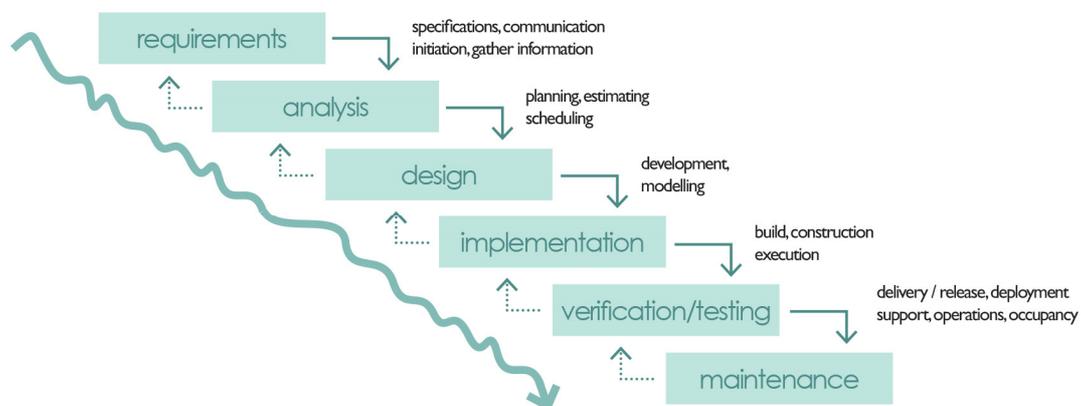

Figure 21 Waterfall process model
(based on Royce, 1970, p.329-330).

Agile management connects to modern project management theory and models as well as new organizational forms, which can be considered as a reaction to traditional, sequential and rationalistic approaches (Clarke and Clegg, 1998; Dybå and Dingsøyr, 2008; Fairthlough, 2007; Lindvall et al., 2002). Agile models are dynamic, iterative and incremental with partition into sub-systems and cycles, completion of small portions as well as gradual evolutionary development over time (Gustavsson, 2007; Lindvall et al., 2002), see Figure 22. Focus is on deliveries and competence, individuals, communication, openness, cooperation and collaboration in groups opposed to process, standard procedures, documentation and tools (Agile Alliance, 2017). According to, Björkholm and Brattberg (2008), agile management furthermore involves innovation and uncertainty through highly flexible and interactive processes, activities and non-hierarchical leadership in order to meet needs with minimal cost, waste and time. It is based on the nine principles *'priority and focus'*, *'transparency'*, *'iterative and incremental development'*, *'collaboration'*, *'encouragement and openness to change'* (non-fixed scope of work), *'simple tools'*, *'target management and decentralization'*, *'constant improvement'* and *'high quality'*. It encompasses various models such as SCRUM, XP (extreme programming) and UP (unified process). It can furthermore be considered to have connections and conceptual links to lean management approaches (Dybå and Dingsøyr, 2008) and the iterative Deming/Shewhart PDCA-cycle (Plan-Do-Check-Act). Agile process management models allow scope for change and are hence applied to projects with clear goals and objectives however uncertain, unclear, non-specified or changeable demands and requirements in order to create new products or services. It is furthermore applied to complex projects, for instant results or when results are difficult to grasp (Gustavsson, 2007). Agile management and agility may however be sensitive to and affected by large teams as uncertainty regarding roles may emerge. It is dependent on collaboration and social aspects, which requires increased communication and coordination (Björkholm and Brattberg, 2008; Dybå and Dingsøyr, 2008; Gustavsson, 2007; Lindvall et al., 2002).
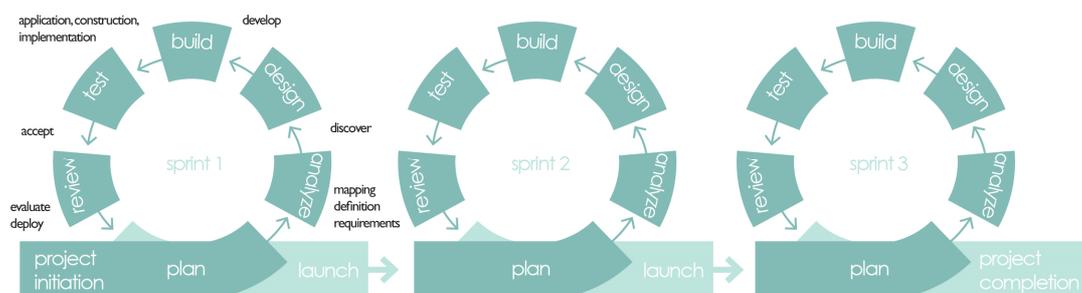
Figure 22 Agile process model with sprints
(based on CommonPlaces Inc., 2017; Greenline Systems, 2017).

The spiral process model constitutes a hybrid combination of the *'waterfall'* and iterative process management models. It is based on prototyping, testing, validation and phases with iterations initiated by specifications, requirements and documentation, however gradually complemented throughout the process (Boehm, 1986).

The concept of design thinking developed by Brown (2015) is based on theories by Simon (1969). The approach is improvement and solution centered and involves change, design and structure in a conjoined process of *'inspiration'*, *'ideation'* and *'implementation'* (Brown, 2015; Michlewski, 2008; Trullen and Bartunek, 2007), see

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Figure 23. It constitutes a reaction to the analytical framework and rational view on change, which is considered as limiting for processes, design and possible solutions. Design thinking is rather based on learning, understanding and value creation through collaboration and trial-and-error approaches. Focus is on tools, skills, testing and prototyping of action to minimize risk and impact of failure as well as explore new possibilities for design and innovation (Coughlan et al., 2007; Michlewski, 2008; Trullen and Bartunek, 2007). According to Bate and Robert (2007), design thinking features the principles *'inclusion of users in development'*, *'simultaneously address performance, engineering, aesthetics and experience'*, *'new diagnostic and intervention methods and useful approaches'* and *'apply energy to sustain change'*. The process model is initiated by a problem, mock-up, scenarios or sketches, which is followed by generation, development and testing through prototyping and pilots as well as further development, specification, effective communication and translation of ideas into actions or practice (Brown, 2015; Clegg et al., 2011).
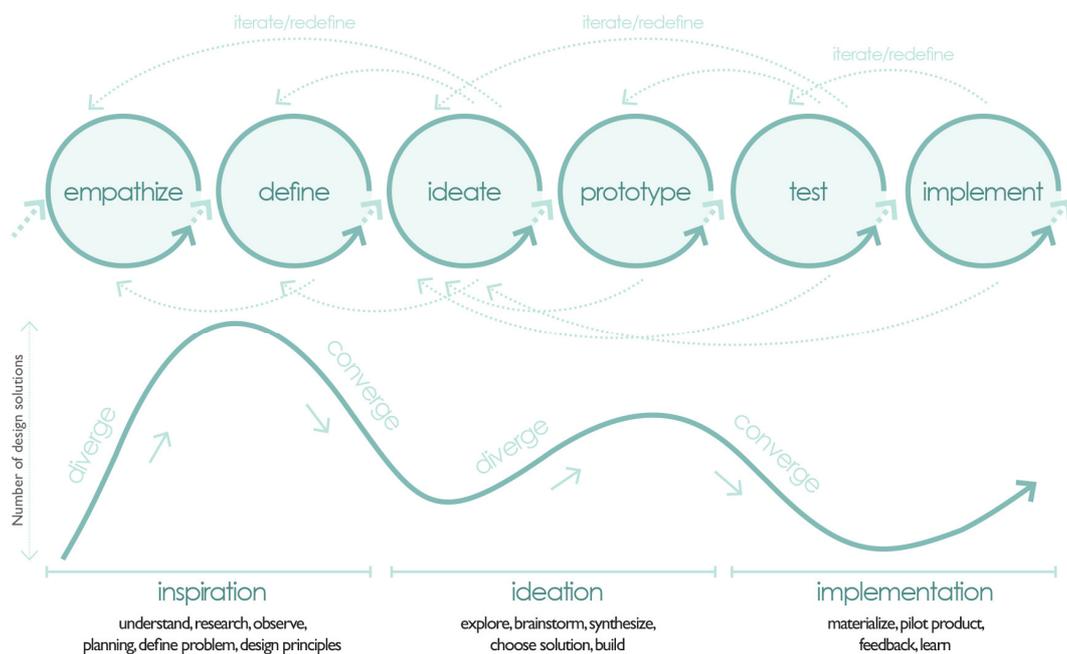

Figure 23 Design thinking process
(based on IDEO, ideo.com/Brown, 2015, p.65-67).

3 Method and research approach

In this chapter, the methodological approach and research process is presented. It is followed by descriptions of literature review, selection of cases, architectural program review and interview study design as well as method for the design proposal.

3.1 Methodological approach and research process

A qualitative method with empirical studies was selected for the thesis due to the explorative, descriptive and interpretive nature of the developed research questions. It was furthermore motivated in considering that *shared space and use* constitutes an emerging research topic within built environment, since a qualitative method has the ability to provide an empiric contribution (Bryman and Bell, 2015). In connection, an inductive research approach was adopted, see Figure 24, which is carried out through investigations, analysis and results as well as connected to a contemporary research overview and explaining theories (Bryman and Bell, 2015; Hörte, 2010). Limited previous research was found in relation to the purpose and thesis topic, which is in accordance with an inductive approach (Bryman and Bell, 2015). The approach was furthermore applied due to the practical relevance of planning and design in early stages and the connected architectural case. According to Lawson (2006), a design process can be characterized by a *'bottom-up approach'* based on intuitive judgement, iterations, evaluation and improvement as well as earlier solutions or ideas.
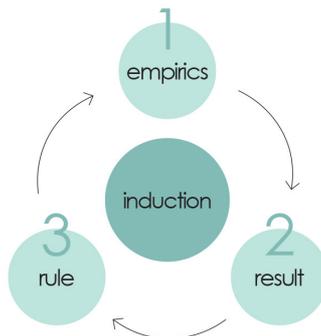
*Figure 24   Argumentation flow for inductive approach
(based on Hörte, 2010, p.12).*

The thesis interlinks project management and architecture to achieve synergies with the method and approach to connect literature, research and practice as well as conclude in a design proposal. The process was structured into six steps with the research strategy to gradually improve and develop findings in relation to each other, see Figure 25. Literature studies were applied as a method to compile previous research within the area. In connection, case studies and architectural programs were reviewed and complemented by interviews, which was followed by development of strategies for planning and design of *shared space and use*. The result of the empirical research was applied to the connected architectural case through the development of a design proposal to exemplify the findings and consequently provide an in-depth perspective and specific empirical enquiry on the topic. Empirical research findings were based on secondary data from literature, case studies and architectural program review, complemented with primary data from interviews. In line with purpose and aim, research questions and expected outcomes of the thesis, a combination of SWOT-analysis, qualitative content analysis and thematic stepwise analysis was selected and

applied as strategy for analysis of data. SWOT-analysis constitutes a strategic method which is applied and useful in order to develop strategies and recommendations as well as facilitate decision-making. The method is based on analysis and evaluation of important factors and relations as well as identification of internal and external factors with focus on achievement of objectives by informing steps to proceed (Humphrey, 2005). In connection, thematic analysis and qualitative content analysis is comprised by stepwise analysis where language, data and material is maintained however condensed and sorted into themes and sub-themes in order to establish categories, patterns and correlations (Bryman and Bell, 2015). According to Ryan and Bernard (2003), it furthermore focuses on reoccurring themes and repetitions, similarities and differences as well as metaphors and analogies in descriptions. Scientific research methodologies were studied to support outline and implementation of the research study as well as analysis of data. The analysis, discussion, connected literature and theory were continuously revised and developed throughout the process in accordance with the progress of the thesis.
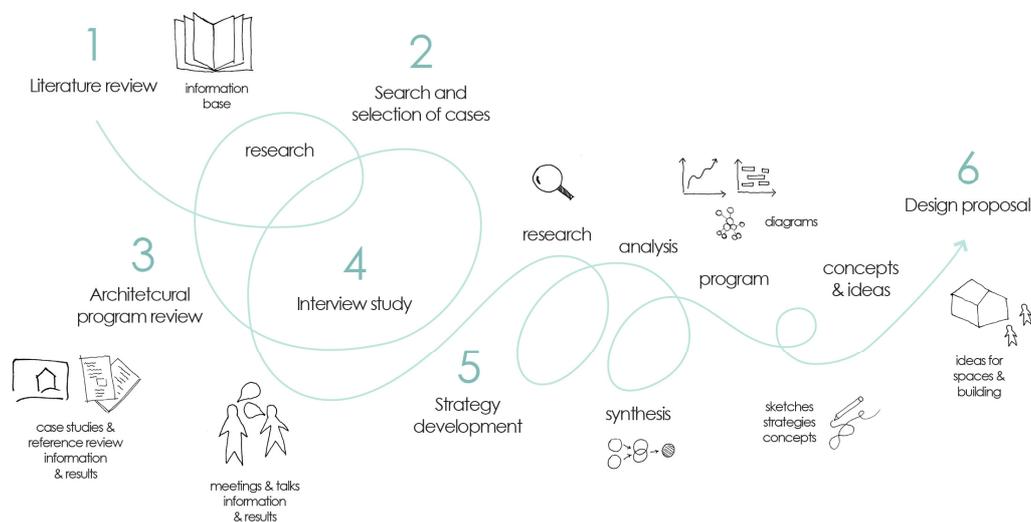
Figure 25   Thesis process.

3.2   Literature review

An exploratory semi-structured literature review was conducted prior to the empirical studies to provide a knowledge base and theoretical framework in the field of study. It was carried out to map existing front edge research, identify gaps and establish a research scope for the thesis. Furthermore, with the purpose to describe the area along with the concepts involved, provide a frame of reference and establish a foundation for the following empirical research (Bryman and Bell, 2015). The initial literature studies were complemented with additional literature in an ongoing process throughout the thesis alongside analysis of data in order to fill knowledge gaps as understanding of the topic increased.

The literature review was based on books, scientific articles, reports, publications and electronic sources related to the areas and main keywords *communication*, *design theory*, *early stages*, *pre-design*, *front-end management*, *architectural program* and *programming* (UK: *brief*, *briefing*, *brief management*) as well as *shared space and use* within built environment. Books, theses and reports were used to a large extent in considering that architectural research is limited within scientific publications and

rather published in other formats. Literature was selected based on assessment of relevance in relation to the research topic and scientific articles were mainly found through the databases Google Scholar, Scopus, Emerald Insight and Science Direct. The search was narrowed down to recent articles within a time range of mainly ten years, however was complemented with earlier research of recognized authors. Abstracts were reviewed and assessed in order to determine which articles to include and study in-depth. Alongside the review, further complements to literature were made with references not found in the search however referred to in selected literature and articles. Relevant data and information were systematically extracted from the literature review as well as analyzed and synthesized.

3.3   Selection of cases

The search for projects with *shared space and use* was conducted through general search on the Internet for project information, newspaper articles, magazines, reports and official announcements. Furthermore, the Swedish Association of Local Authorities and Regions [SALAR], various actors and municipalities in Sweden as well as project consultants connected to *shared space and use* were contacted. The search for cases to involve was conducted during a time frame of three weeks to map existing projects with *shared space and use* as well as obtain documentation from early stages.

The strategy for selection was to include a mix of cases as diverse as possible to obtain a rich empirical material and cross-section from practice. Moreover, to widely cover and represent *shared space and use* within built environment in order to describe and illustrate the concept along with planning and design in early stages and hence provide a contribution to the emerging research area. The selection was limited to the geographic location and context of Sweden along with a national distribution as well as to existing or planned and programmed projects with *shared space and use*. It was furthermore limited to completion of architectural programs mainly within a time range of ten years to include recent cases and reflect current methods and development. In connection, the approach was to include both established and new developments, private and municipal projects as well as a variety of operations, functions and activities in between cases. Ten cases were selected in consideration of aspects such as degree of complexity, availability, relevance to the research and the connected architectural case as well as illustrative purposes. The studied cases are described and presented below with typology analysis according to Brinkø et al. (2014, p.161), see Figure 12.

Mariehem, Umeå
Collaborative building for preschool and retirement home
Typology: *Sharing physical space in a building or a building itself in a closed community*

Ålidhem, Umeå
Collaborative building for preschool and retirement home
Typology: *Sharing physical space in a building or a building itself in a closed community*

Bildhuggaren, Huddinge
Preschool and retirement home
Typology: *Sharing physical space in a building or a building itself in a closed community*

Johanneberg Science Park (phase 1 and 2), Gothenburg
Collaborative environment for exchange of ideas and knowledge between academia, industry and community stakeholders
Typology: *Sharing several facilities in an open or semi-closed community*

Lindholmen Science Park, Gothenburg
International cooperation environment for research, innovation and education within transportation, ICT and Media
Typology: *Sharing several facilities in an open or semi-closed community*

Stadsdelshus med rum för kultur, Selma Lagerlöfs torg, Gothenburg
Leisure club and youth center, culture school, library, disability support and service, meeting place for seniors, staff facilities for field group and offices for district administration
Typology: *Sharing several facilities in an open or semi-closed community*

Garaget, Norra Sofielund, Malmö
Open meeting place, library, creative workshop, event scene, organic café
Typology: *Sharing several facilities in an open or semi-closed community*

Kvarteret Rönnen, Malmö
Offices and work places, student housing, café managed by disability support
Typology: *Sharing facilities between users in a network of buildings/organizations in an open, semi-closed or closed community*

Lindängeskolan, Malmö
School and community center for seniors and children as well as sports and other activities on evenings and weekends
Typology: *Sharing physical space in a building or a building itself in a closed community*

Strandskolan, Malmö
School (second to ninth grade) with meeting place
Typology: *Sharing physical space in a building or a building itself in a closed community*

3.4   Document study of architectural programs

An architectural program review was carried out as a qualitative document study to provide initial knowledge. It was conducted by applying an interpretive approach of analysis, which is referred to as qualitative content analysis. It is furthermore described as an empiric scientific method that is commonly applied to communication review, which involves analysis of content and underlying themes in studied material and often involves exemplification by extracting themes or illustrating aspects with quotes and pictures (Bryman and Bell, 2015). Among the ten selected cases there were limited response from enquiry of information corresponding to architectural programs from early stages. Material was provided from three cases, where two were architectural programs which were included in the study and one was a general documentation consisting of a municipal function program which hence was excluded. The studied architectural programs were provided by municipalities and consultants with connections to the selected cases. The availability and access to study architectural programs, along with architectural programs not existing or being created in other formats, can be considered as a limitation.

Architectural programs were studied with focus on investigation, interpretation and description in relation to the qualitative and explorative approach of the thesis. Collected data and findings were analyzed through a semi-structured review carried out through two rounds of analysis where no themes were decided in advance. An initial review was conducted to uncover general and first impressions, identify and map themes, characteristics, similarities and differences. In the second review, architectural programs were studied further in-depth to deconstruct and interpret content and methods more in detail. Main themes and characteristics were uncovered and structured

from the analysis, which was followed by organizing findings into categories. Architectural programs were reviewed based on the aspects: *'statement of needs (background, visions and goals)'*, *'function and use'*, *'spatial and qualitative values'* as well as *'communication and documentation methods'*. Findings were compiled to exemplify and illustrate aspects by highlighting parts and drafts of content and methods.

The initial approach was to study and review architectural programs of projects with *shared space and use* in terms of communication and documentation. However, during the process it proved to be difficult to find and receive material corresponding to architectural programs from early stages. Interviews were hence added as approach and method to investigate early stages connected to the development of architectural programs. The conducted architectural program review however provided a knowledge base for further empirical studies along with inspiration and strategies for planning and design, communication and representation as well as the connected architectural case.

3.5   Interview study

A qualitative and explorative interview study was conducted to complement the architectural program review in order to uncover information and underlying aspects as well as provide a more in-depth perspective and understanding. Interviews are commonly used for data collection in qualitative research to uncover opinions and experiences from interviewees, which are expressed and described through emphasis on qualitative words opposed to quantitative numbers (Bryman and Bell, 2015). Eight semi-structured interviews were carried out together with project managers and architects responsible and connected to the ten studied cases. The interview approach was selected as it allows interviewees to freely formulate answers and the interviewer to follow-up with questions based on answers to provide further unanticipated information (Bryman and Bell, 2015). A limitation and possible bias of interviews as method is however that interviewees can be held back by aspects such as fear and loyalty, which may influence or restrict answers, information and data collection.

The interview study was developed and implemented according to the *'Seven stages of interviewing"* by Kvale and Brinkmann (2014), which involves thematizing, planning, interviewing, transcribing, analyzing, verifying and reporting. Interview questions were prepared in relation to themes and characteristics uncovered in the previously conducted architectural program review. Twenty-one questions were formulated and arranged into five categories to structure the content; *'shared space and use (concept, description, advantages and disadvantages)'*, *'statement of needs (background, vision, drivers and goals)'*, *'planning of shared space and use in early stages'*, *'methods, communication and documentation'* as well as *'future improvements and development'*. Interview questions were tested on five individuals (student, architects and project managers) prior to the interview study. A pilot-interview was furthermore conducted in order to observe how the interview questions were interpreted as well as to allow evaluation and improvements. It was performed with an architect experienced in project management, *shared space and use* as well as early stages. The pilot-interview was included in the study as no changes were made to the interview questions. For more information regarding interview questions, please refer to the Appendix.

Interviews were booked and conducted between November and December 2016 and were carried out by meetings in person or by telephone due to national distribution.

Interview questions were sent in advance to facilitate communication, understanding and responses. All interviews were held in Swedish, with a duration of approximately one hour. Interviews in person were held in meeting rooms in the interviewee's respectively office in Gothenburg, Sweden. For one case, the project manager and responsible architect were interviewed together simultaneously. Pre-determined interview questions were asked during the interviews and answers were noted down and recorded to ensure quality and complete data collection with the approval from interviewees and in line with anonymity preferences. One interviewee did not permit recording; hence the interview was only noted down. The result of the interviews was compiled and subsequently interviewees had the possibility to review transcripts and leave inquiries for any revision. Data from interviews were according to qualitative content analysis and thematic analysis transcribed, summarized, condensed and analyzed through an iterative process (Bryman and Bell, 2015). Transcripts were reviewed repeatedly to establish an overview of the material. It was followed by identification, separation and division of data into themes and units in line with the interview questions and categories in order to create a structure. Assembled data was furthermore reduced based on assessment of relevance in relation to the thesis topic and research questions. Content was coded, sorted, interpreted and synthesized to provide a grouping of data into themes, categories, characteristics and keywords (Kvale and Brinkmann, 2014).

3.6   Method for the design proposal

A design proposal was created based on the previously conducted qualitative and inductive research involving literature review, case studies, architectural program review and interviews. The findings were applied on the connected architectural case to complement the research, exemplify the proposed strategies as well as provide further suggestions to develop planning and design of *shared space and use*. The architectural case in Frihamnen was selected based on an enquiry from the project group *Samnyttjande av samhällservicens inom- och utomhusmiljöer* with ongoing research in relation to the thesis topic. It was furthermore adopted as *shared space and use* comprises a current issue within *Göteborgs Stad* and *Vision Älvstaden*.

The approach used for the design proposal was an exploratory investigation applying the methods analysis, synthesis and design (Lawson, 2006). The knowledge base from the previous research was complemented with additional research, literature and inspirational reference studies through a semi-structured exploratory review in relation to the specific architectural case and context. Information and data was furthermore collected through e-mail and telephone correspondence, meetings, talks and interviews with target groups, stakeholders, actors and operations. The design proposal was developed based on available and established information from *Vision Älvstaden* on Frihamnen as from November 2016. Contact were made with various professionals within *Göteborgs Stad* and the connected project group to identify background, situation and issues for the architectural case. In connection, recommendations and information were collected from local actors and *Göteborgs Stad* on agreed guidelines and strategic programs for operations. Analyses were made of site, context, history, characterization, identity and target groups along with mapping of synergies and differences in activities, functions, values, needs and demands. Diagrams, illustrations and sketches were used to analyze and synthesize information, investigate scenarios, compare and evaluate alternatives as well as develop strategies and concepts for design.

4   Result and research findings

In this chapter, the result of the research is presented, structured in a chronological order according to the process as well as into themes and categories. For information about cases, please refer to chapter three.

4.1   Research on projects with shared space and use

The research carried out to map existing and planned projects in Sweden featuring *shared space and use* indicated it to be a rather new concept and not that common. Furthermore, *shared space and use* does not seem to be a clear or established concept, as no consensus regarding definition, description and terminology were found in practice nor in literature and research. The found existing and planned projects featured a variety of operations and activities. A reoccurring combination was however that of elderly care and preschools as well as projects mainly being located within proximity of larger cities. Only a limited number of projects were found within the area according to the applied research approach. Most of the projects were however established in recent years, recently initiated or in early planning stages, which could indicate a growth in relevance and popularity. In accordance, SALAR express *shared space and use* to be a type of development that is increasing in interest and demand. SALAR is considering to eventually develop knowledge within the area of *shared space and use*, but does not have an overview of projects in Sweden at the time.

4.2   Architectural program review

The research and review of architectural programs established that there is great variety in how planning and design of projects with *shared space and use* is carried out in early stages. In enquiring information and documentation corresponding to architectural programs the response and provided material varied greatly in between the studied cases. The variety of the responses reflects and indicates differences in practice concerning perception of terminology and process stages. During the process of enquiring architectural programs, it proved to be difficult to obtain information and material from early stages, with only a few of the contacted responsible consultants providing concrete documentation. The responses indicated three distinctive approaches. For some cases, a detailed architectural program had been prepared, for some it had not and for others it had been prepared in a different way, in general or in an ongoing process during following project stages and development.

The initial approach and intention of the thesis was to investigate and review architectural programs of projects with *shared space and use* along with methods of communication, representation and documentation in order to strengthen the connection between analysis and design. The architectural program was identified as a strategic document and important link in the project process regarding influence and governance. The approach was hence to map, analyze and compile how architectural programs for projects with *shared space and use* were carried out in practice. Moreover, to suggest strategies and improvements of the architectural program format concerning tools, methods and governance as well as how to express and clarify design in order to promote qualitative values. However, the approach to search for, enquire and study architectural programs was not possible to fully follow through since architectural programs were not established, not able to take part of or there only being a limited

material existing or made available. The obtained material was considered as a limited basis for analysis and it was hence regarded as insufficient to conduct the research solely based on the approach to study architectural programs. The decision was made to briefly analyze and review the obtained architectural programs in order for them to function as an asset by providing a valuable initial basis for understanding. The review will be presented below together with some examples.

The research approach was consequently adjusted accordingly with the strategy to focus the research on interview studies of the selected cases. Interviews were hence added as main source to complement the architectural program review, and the purpose and research questions of the thesis were reevaluated. The focus was altered into early stages prior to the establishment of architectural programs along with aspects of importance in planning and design of *shared space and use*.

4.2.1 Statement of needs (background, visions and goals)

In the studied architectural programs, intentions and visions were described briefly and connected to accommodating use or future goals, strategies and core values. Specific keywords used to describe visions were *'meetings'*, *'collaboration'*, *'ideas'* and *'a dynamic environment with a mix of actors'*. Phrases used to describe core values, visions or goals were e.g. *'positive social interaction'*, *'strengthen interaction and cooperation'*, *'increase presence'*, *'stimulate increased entrepreneurship and competitiveness'*, *'creating its own identity'*, *'meeting place'*, *'link between'*, *'utilize and develop a knowledge environment'*, *'provide opportunities for interesting encounters and meetings'* and *'create conditions for ideas to arise and be realized'*.

Goals and strategic objectives were described in terms of capacity of activities and use within buildings and surrounding areas, numbers of square meters for facilities, visions of space concerning collaboration and knowledge transfer as well as establishment of networks and attractiveness. Moreover, goals corresponded to aspects such as time and cost constraints, satisfied tenants, quality in execution, a working environment without accidents as well as ambitions of projects to be developing for facility management and property owners. Goals were partly expressed with priority. Specific keywords used to describe goals were e.g. *'low energy use'*, *'sustainability certification'*, *'space efficient facilities'*, *'smart solutions'*, *'tasteful and exciting architecture'* and *'affordable rent levels'*. In one architectural program, guiding keywords (sustainability, flexibility and creativity) were used together with connected pictures, see Figure 26. The keywords were expressed as goals along with descriptions how the building and interior environments corresponded to values and were presented together with examples of application, e.g. *'impact on surroundings and social flows'*, *'human centered building'*, *'zones with different types of use and multifunctionality'*, *'a functioning environment for employees'*, *'encourage a good corporate culture'*, *'facilitate movement between functions'* and *'guide and make zones visible to simplify everyday application'*.

Concepts and visions were described and expressed through main ideas, e.g. *'the users make the building'*, *'the world's most flexible workplace'* and *'a dynamic and creative environment with lots of impressions and ideas'*. Concepts were furthermore explained by complementing text paragraphs with value loaded words and descriptions, e.g. *'attractive and inspiring meeting place'*, *'meetings, collaboration and interaction'*, *'custom-made'*, *'co-working spaces'*, *'activity based workplaces'*, *'spaces for meetings,*

conference, exhibitions, events, laboratories and workshops', 'a continuously changing laboratory in the spectra from work approaches to future building and energy technology', 'dynamic between interplay and thrilling contrast', 'open', 'joyful', 'contribute with a new dimension' and *'expression of own identity'*.

Figure 26   Architectural program: Johanneberg Science Park etapp II
(Johanneberg Science Park, Akademiska Hus, Tengbom, 2014, p.4, 35, 42, published with permission).

4.2.2   Function and use

Function and use were described through text, capacity of people and square meters as well as in terms of specific types of conventional operations the building was intended to accommodate (e.g. preschool and elderly care). The layout and organization of spaces was described in terms of volumes, levels, entrances and use, along with specifying spaces and functions intended to be shared between actors and operations. Spaces were sometimes referred to as groupings, *'area efficient spatial configurations'* or as private areas respectively active *'entrance'* spaces. Either value loaded words were incorporated in the description of the spatial organization, or strict function based descriptions were used. The architectural programs referred to general documentation, such as municipal function programs or property development and facility management policies, for guidance and governance in connection to developing sketches, alternatives and proposals.

Flexibility and generality was a reoccurring terminology in the architectural programs, e.g. *'the right level of generality and flexibility in relation to cost'*, and partly connected to property development and facility management guidelines and policies. Flexibility was described with the meaning that the building easily could be changed to accommodate new needs, e.g. *'by easily movable walls'*. Generality was described with the meaning that the building was useful for different purposes. It was mostly expressed and emphasized in connection to the floorplan layout and organization, e.g. *'general floorplans', 'allow to be used for other purposes'* and *'synergies or coordination benefits'*. Flexibility and generality was described as especially important concerning the placement of the building entrances, stairwells, vertical binders and technical systems as well as the selection of loadbearing modules and floor heights. Moreover, it was expressed that the size of the building should be possible to change in need of expansion and the ability to separate rental units should be considered.

Intentions of work approaches were described in one architectural program by referring to activity based methods with flexibility and variable furnishings, e.g. *'accommodate a wide spectra of working methods and room sizes', 'modern flexible technique', 'starting point from work assignments, activities and goals', 'a variety of spaces', 'support of changing needs and demands', 'custom-made according to the tenants individual needs', 'one function becomes another', 'functions with many types of use', 'common break and meeting space can be used in many different ways and furnished for different occasions', 'atmosphere and functions that encourage creativity',*

'encourage new meetings and collaboration', *'designed to be flexible and support new ways of working'* and *'variable and stimulating working environment'*. Actors and users were mapped and analyzed according to two crossing axes with four parameters (concentration vs. communication and individual work vs. work in group). Different types of needs and working situations were described through scenarios and exemplification by making use of fictive characters. Furthermore, possible functions and use were mapped and analyzed in a corresponding way with the same parameters, which were complemented by examples and reference pictures, see Figure 27.
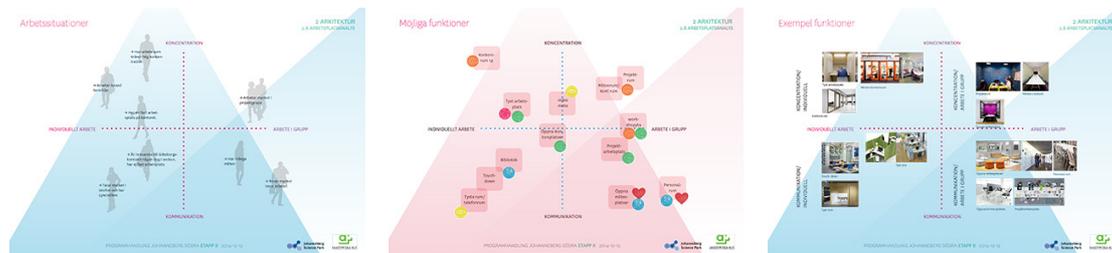
Figure 27 Architectural program: Johanneberg Science Park etapp II
(Johanneberg Science Park, Akademiska Hus, Tengbom, 2014, p.44-46, published with permission).

4.2.3   Spatial and qualitative values

In relation to concepts and statement of needs spatial and qualitative values were expressed as, e.g. *'cohesive volume'*, *'easily perceivable volume'*, *'cohesive with surrounding buildings'*, *'free standing volumes that densifies and creates a sequence throughout the building'*, *'create a peaceful front'*, *'generous atrium'*, *'movement in different spatial sequences with good overview'*, *'collective room'*, *'connecting space'*, *'continuous path'* and *'function-defined outer shell around rooms and activities'*. Moreover, social and symbolic aspects were referred to as, e.g. *'sustainable knowledge environments'*, *'strong social dimension reflected in the abilities of flexibility, mobility and natural meeting places'*, *'innovative ideas and new technology'*, *'show achievements and experiences in a pedagogical way to share with others'* and *'the large, collective atrium with space for meetings, provides a symbolic expression of the strive for cooperation'*.

In one architectural program, the character of spaces was described and illustrated by pictograms and categories, e.g. *'support'*, *'meeting'*, *'pulse'*, *'workshop'*, *'personal'* and *'focus'*, which were connected to senses and experiences, e.g. *'heart'*, *'soul'*, *'muscle'*, *'eye/ear'*, *'brain'* and *'lungs'*. The categories were described in connection with the floorplan layout and the intensity of communication flow, see Figure 28.
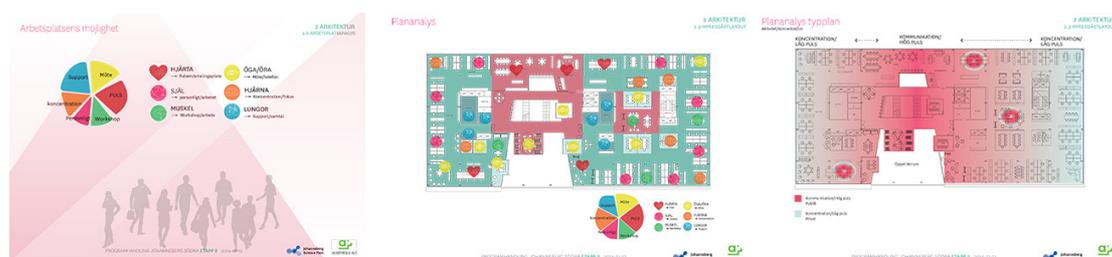
*Figure 28 Architectural program: Johanneberg Science Park etapp II*
(Johanneberg Science Park, Akademiska Hus, Tengbom, 2014, p.43, 47-48, published with permission).

Materials were either described briefly together with technical demands and specifications or elaborated on and connected with context, surrounding characteristics as well as architectural concepts and intentions, e.g. *'connects in design and choice of*

materials' and *'is given a unique color which mediates the transition'*. Materials were explained with value loaded words and descriptions, e.g. *'rustic wooden structure'*, *'the materials own character are presented openly in structures and building elements'*, *'expressive abilities of materials are made use of to establish decorative effects'*, *'the color as a link'*, *'the warmth and materiality is highlighted in the treatment of surfaces'* and *'warm color range to create a cozy environment'*.

4.2.4 Communication and documentation methods

In the reviewed architectural programs, graphic and visual representation were used to a limited extent and text was the dominant approach to communicate design and convey information, see Figure 29. When representation was used, it featured reference examples, material samples, schematic drawings of floor plans and overview plans, sketches of proposals, illustrative renderings, floorplan diagrams (e.g. spatial characters and flow), graphic diagrams, symbols, axes and matrices.
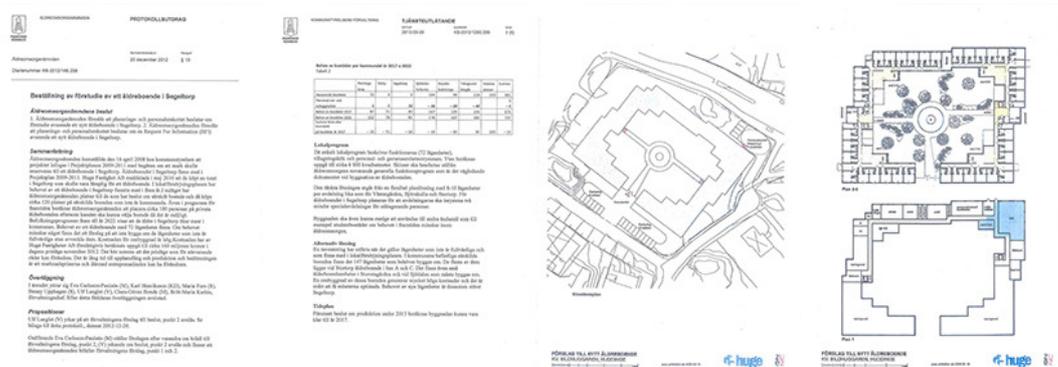
Figure 29 Architectural program: Kv. Bildhuggaren 1, Nybyggnad av äldreboende och förskola (Huddinge Kommun, Huge Fastigheter, 2012/2013/2014; zuez arkitekter, 2009, published with permission).

Analysis and sub-conclusion

The process of enquiring architectural programs indicated absence and difficulty to provide material and documentation, which gave the impression that architectural programs are created to a limited extent, in another way or not established. Either there are other formats than architectural programs used or there is no established structured method and format. The conducted research for architectural programs may indicate a gap and lack in the process, i.e. the connection between planning and design, which could imply that there is difficulty to define and follow up decisions and development throughout the project process.

The reviewed architectural programs were partly extensive and vivid in terms of describing text with value loaded choice of words, which may be perceived as ambiguous concerning meaning and interpretation. It gave rise to the question if pictures and illustrations could be used more extensively as a complement to text.

The initial research focus was to improve and develop the link between analysis and design, i.e. the architectural program format. However, the search and enquiry for architectural programs indicated that the link was not strongly existing. The focus was hence changed to investigate how planning and design of shared space and use is carried out in practice as well as how a structure can be developed and established, i.e. how planning and design strategies for early stages and architectural programs can be created for projects with shared space and use.

4.3   Interview study

The result of the interview study is organized according to the five categories of the interview questions and presents responses of interviewees.

Shared space and use

4.3.1   Concept, description and keywords

Shared space and use was associated with the context of sharing and co-using premises, however one interviewee emphasized the possibility to relate the concept with exterior or organizational aspects. Moreover, it was expressed that *shared space and use* can be within the same organization, tenant or actor or it can involve several different actors, i.e. different types and groups of users. *Shared space and use* was described as when various actors have access to and make use of the same premises as well as to enable different use of premises at different times (e.g. during morning and afternoon). In connection, from a user perspective one interviewee expressed it as when actors and operations utilizes and benefits from a space in several ways. The concept of *shared space and use* was furthermore explained to relate to degree of utilization, i.e. rational use of premises. It was described to involve land and facility use of specific buildings or among actors and operations as well as sharing or jointly utilizing areas or volumes to enable increased efficiency. See Figure 30, for expressed keywords.

One interviewee emphasized *shared space and use* to foremost concern actors and operations. The extent of shared space and co-usage of premises was described to depend on statement of needs, i.e. how to work and collaborate. *Shared space and use* was expressed to entail open dialogue and require establishment of well-functioning collaboration as well as create conditions without conflict through planning, design and construction. One interviewee described *shared space and use* as a kind of community that involves collaboration with learning across borders and solving problems together. Another interviewee associated it with shared responsibility and the importance of all users to take part for it to function and be successful. In connection, *shared space and use* was expressed to involve establishment of clear demarcations, i.e. understanding, definition and agreement of roles and responsibilities.
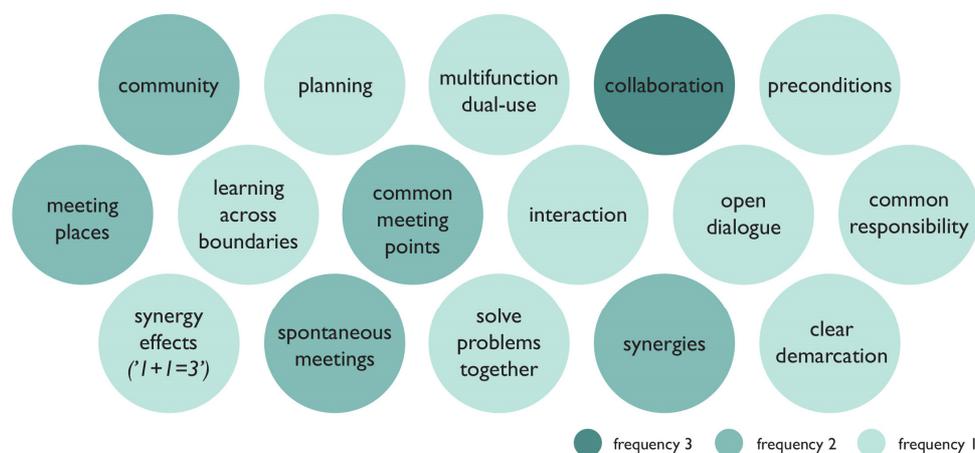

Figure 30   Illustration of keywords associated with shared space and use.

Shared space and use was by one interviewee associated with some kind of space for gatherings, assemblies or meetings. Another interviewee expressed commonly known

facilities and operations with a high degree of utilization, shared space and co-usage as well as great variety regarding activities and user groups to be e.g. churches, parish houses and municipal buildings such as libraries or sport centers. In connection, the interviewee associated the concept and its origin to be from the 1970's as well as relate to municipal ideas, ideologies and developments such as community centers, collectives, communes, cooperatives and the democratic open society. The opposite to *shared space and use* was expressed as specialization and mono-functionality, i.e. separate ownership, privacy and specific facilities, which was considered to be more commonly represented in society and built environment. Buildings were described to generally be planned and designed with an idea and intention of what kind of function they are supposed to hold and accommodate (i.e. building function, often by conventional concepts such as school, theatre, etc.). Furthermore, it was explained that depending on how specific the function of a building is determined, the more other opportunities and types of usage are excluded.

4.3.2   Advantages, additional values, qualities and disadvantages

Shared space and use was described to contribute with additional values by enabling premises to be used during a longer period of time, since the more space can be used the better it is. One interviewee expressed economic benefits as the most prominent advantage of *shared space and use*, since it implies sharing of expenses. Furthermore, benefits and additional values concern sharing of resources in terms of premises and functions, which were explained to be partly economical since it contributes to *'the whole becoming more than the pieces separately'*. *Shared space and use* may decrease expenses if it functions well, e.g. by not needing to have separate sets for each function, actor or operation. Additional values were explained to mostly concern tenants and users by only having expenses for space that is rented and not for collaborative shared spaces, which instead can be shared and co-financed similar to the concept of *'office hotels'*. One interviewee stressed the ability to afford additional functions by sharing and making a joint investment together with other actors and operations. Moreover, the advantage of reasonable rent was stressed, since *shared space and use* strives for ideal 24h renting of spaces, premises and buildings (referred to as the concept *'living building'*). In sharing space and use investments are used wisely and not made unnecessary due to thinking and building smart, which is rational for tenants in order to receive most out of investments. *Shared space and use* was explained to achieve more efficient use of investments and there should be the ability to charge more or higher rent (e.g. if there is use 18h a day compared to 2h). If rental levels and agreements are established in accordance, it was stressed as a great advantage from a business and property owner perspective. On the other hand, it was expressed to result in increased operating costs from a management perspective, which affects the property owner. However, one interviewee underlined that *shared space and use* does not imply any major additional cost, only for electricity and water, since the expenses of heating buildings is basically the same whether premises are used or not.

Other advantages were expressed to concern property management, quality and operational issues. Shared space and dual-use enables opportunity of good rent at the same time as good qualities as well as to build and incorporate better qualities. It was explained as possible to create larger spaces when different actors and operations share the same space and functions compared to what would otherwise be affordable, since spaces are used at different times by different users. One interviewee emphasized that

the ability to create buildings with better qualities provides other benefits such as decreased operating costs for property owners, which in turn enables possibility to keep lower rent levels for actors and operations or make greater savings and profit. Furthermore, *shared space and use* allows good qualities regarding environmental classification and reduced energy consumption.

Shared space and use was described to imply rational utilization of premises, however not solely be limited to rational aspects but also provide social, knowledge and competence benefits due to actors and operations being at the same location. One interviewee expressed benefits from superimposing functions by creating more *'positive friction'* among people, i.e. to meet, encounter and confront each other in greater extent. Additional values and qualities may arise from the community that is created from sharing space and use, along with the common, collaborative and intellectual exchanges it promotes. In sharing space and use many actors are involved, which was emphasized by interviewees as advantageous and beneficial regarding supervision as well as exchange and creation of new ideas and opinions. Moreover, it was expressed to give rise to new formations and configurations, resource advantages and additional values by establishing and encouraging meetings and discussions across boundaries and groups (e.g. spontaneous meetings, meet more frequently, provide the opportunity for common projects, create openness and transparency).

Sharing of space and use was described to possibly introduce various demands on design, size and dimensioning or require extra expenses, functions, resources and additional details, which may turn out to be costly and considered as disadvantageous. Furthermore, *shared space and use* may result in disadvantages or problems if no agreement is established in advance how to distribute costs and who should finance additional functions and details. It was explained that conflicts may arise during the project process concerning regulation of rent levels and practical issues, which one interviewee emphasized as important to solve to prevent occurrence of problems further on regarding use and facility management. Disadvantages may emerge if costs are not distributed equally or balanced between actors and operations. Moreover, disadvantages of shared and common parts may arise in case of changes and alterations, since it requires all actors to approve and agree in order to be realized.

Shared space and use allows interior or exterior rooms and environments to be used in different ways, which may give rise to conflicts of interest due to having different ideas concerning usage (e.g. need for great adaptation may exclude other actors or investments may create concern regarding other actors stay and use). Two interviewees stressed that increased wear and damages of premises or potential risk of theft, destruction and abuse may emerge from sharing space and use. Furthermore, it was explained that it may prove to be consuming and burdensome for organizations or that problems regarding secrecy and privacy may emerge depending on demands and activities of actors and operations.

Shared space and use involves establishment of several and various actors, stakeholders and user-groups, which was described to possibly result in difficulty, conflicts, confusion or uncertainty regarding order, procedures and responsibilities. Moreover, differences in need of privacy among people was expressed (e.g. some find simultaneous activity to be an asset, while others find it disturbing, distracting and with influence on concentration). Disadvantages or problems may emerge regarding

demarcation, boundaries and responsibilities, which can be difficult to deal with and may cause increased expenses if it is not functioning (e.g. if none or only a few actors, operations and users take responsibility). In connection, disadvantages may arise if actors, operations and users do not want to deal or have anything to do with each other. *Shared space and use* was by one interviewee explained to be dependent on leadership and management opinions, attitudes and approaches to promote and enable sharing as well as clarify collaboration forms, configurations, rules and conditions.

Difficulties and disadvantages were expressed in how to assemble the team during the project process, achieve active participation as well as maintain roles and responsibilities (i.e. active participation in own sub-processes, but less involvement in other sub-processes). One interviewee stressed it as important to obtain and maintain an understanding of roles and responsibilities among involved actors (i.e. why they are participating and what their part in the process is). Another interviewee explained that fear of issues concerning *shared space and use* exists, with the common reaction that people become disaffected or worried when things are not done as usual and changes or novelties emerge. It was recognized as a problem that many involved actors are not accustomed to work according to construction processes, but rather used to other types of processes. In connection, it was expressed as advantageous to reduce the size of work groups to not oblige participation in all events and meetings as well as avoid actors leaving comments in matters and decisions beyond their influence or mandate.

Statement of needs

4.3.3   Background, visions and goals

Backgrounds for *shared space and use* were by interviewees described as organizational changes, business ideas, need to expand buildings and premises as well as creation of organizations and concepts. Two cases with backgrounds of youth centers were developed to enable use during evenings and transform into a community center. The background and precondition of another case was a very small centrally located plot, which influenced and limited goal and vision to develop into *'trying to build something together'* to solve the establishment of a building. In connection, another case was developed from an internal organizational idea of creating something common together, which was well received and developed through a sketching process. The background of another case was from a driven and visionary person developing a documentation, which was translated into the creation of a physical building.

One case was initiated by too extensive intentions and statement of needs, which in order to be feasible and established had to be adapted into a possible size. Initial workshops and conversations concerning facility use were carried out with actors and operations. It was discovered that rooms and premises were programmed differently over the day along with possibility to co-locate several and various actors and operations. The work approach made it possible to find a smart and effective use of premises, which created a size of the building that was possible to realize. In addition, the project was explained as social and societal by bringing people together with greater chances for meetings as well as establishing a creative climate with a mix of people that live, work and manages the district. It was expressed that by constantly inviting the public there should emerge social exchange and benefits due to frequent movement and use of premises. Moreover, the interviewee explained that it should be possible to

measure social aspects within 5-10 years (e.g. reduction of exclusion in neighborhoods).

The intention and background of one case was for three actors and operations to interact and cooperate through the idea and establishment of meeting places and a common platform. It did not solely imply to be located in the same building separated from each other but rather create common projects, boost ideas, innovations and additional values. The building was created purely practical and the need to be smart with how program issues are sorted was emphasized. It was explained that for cooperation to be established it must be done all the time by creating opportunities for meetings. A social ground floor was created for meetings to occur during lunch-time, but was expressed to not be enough. Furthermore, an idea not to allow own separate kitchenettes were launched as a requirement in the building along with an agreement model to encourage meetings on the ground floor. The interviewee explained that it is about controlling people, however not put up *'forbidden'* signs but rather say *'welcome here'* and offer good quality with satisfactory aspects that appeals and attracts.

Three interviewees did not have specific knowledge of visions and goals, partly due to being involved later in the project process. One case had not been a specific project with visions or goals, instead it developed gradually over time without planning processes. It remains uncertain if there was a strategy behind the development, since there have been different facility managers over time. Visions and business concepts for *shared space and use* were expressed as to achieve collaborative gains and establish increased exchange between actors, operations and users (e.g. academia, industry and society). Furthermore, visions and goals were described as concepts to create a *'cluster'* and *'the building as a star'*, to provide suitable and adequate facilities as well as for buildings to connect to surrounding areas. Goals for sharing of space and use were expressed as to expand operations and facilities as well as to achieve and realize visions.

One case had functional and operational goals and visions in response to the property owner, mainly regarding aspects such as usability, generality, attractiveness, efficiency and rationality. Goals were explained to create flexibility and generality to enable different use of premises by various actors and operations. Moreover, parts of buildings were designed, sized and dimensioned to meet future facility needs. In another case, specific operations and facilities were governing in the project process and development (e.g. to meet the growing need of elderly care and solve issues concerning human resources and administration). It formed the base of the vision to create a retirement home that was as optimal as possible and could manage less staffing. It was managed through design, structure and spatial configuration of the building with a central part and three departments wings to establish overview and transparency.

4.3.4   Drivers

Drivers of *shared space and use* were described as to balance operational needs against property needs as well as create suitable and adequate premises (e.g. in terms of economy and energy). Moreover, the opportunity to use premises and buildings more extensively or expand use of some parts were expressed as drivers. It was hence emphasized as important to be familiar and connect with activities in surroundings. The driver of one case was the goal and vision to create a connecting communication link in terms of location, flow, movement and logistics, which one interviewee stressed as

important to be well-functioning holistically and over operational boundaries. In another case, there were practical and logistical drivers and advantages in sharing space and use to make it function, since it would not have worked to build separate facilities and premises for each operation. Another case was driven by interpreting the idea of a *'science park'* as well as how to create and promote maximum creative growth and driving force through sensible planning of content and logistics.

Economy was the driver of one case, since the objective was to establish realistic investment levels and rental costs. A reasonable rent level was described as dependent on actions in the project process and emphasized as important for operations to run as good as possible. In another case, the driver was to increase operational performance (*'quality of the product'* and *'obtain more per cost-unit'*) as well as current facilities not being suitable or adequate. Organizational drivers were by one interviewee expressed as mostly economic (e.g. in relation to facility management and tenants). Moreover, the importance of describing how to work and collaborate in relation to economical drivers was stressed in sharing space and use.

Drivers of *shared space and use* were expressed as to meet organizational goals by establishing collaboration and synergy between actors who come together and develop each other's activities. Another driver was described as to enable meetings in neutral spaces to encourage innovation. It was explained that goals and drivers can be to establish greater sharing, exchange and attraction. *Shared space and use* in the form of meeting places was the starting point of one case. In another case, the concept of a *'living building'* was the driver both in terms of design and working methods, which encouraged interaction, meetings and socializing between generations. The belief was expressed that actors and users can benefit from each other and that there are synergy effects from community, common areas, collaboration and doing things together.

4.3.5   Conflicting objectives

Conflicting objectives were described to possibly arise from conflicts of interest between various actors, operations and users (e.g. different needs and requirements regarding performance, operational procedures, working methods, security and personal contact). Furthermore, conflicting objectives may occur in planning processes depending on group composition along with differences in goals and values (e.g. if actors and operations have a different focus from consultants who tend to focus on functions, energy and maintenance; or if the architect invests attention and effort on issues of less interest or importance to the client). One interviewee expressed challenges and importance in managing, motivating and encouraging involved actors to have open minds, ease individual interests and listen to each other. It was described as important to create commitment, enthusiasm and understanding of each and everyone's role in the process along with importance of facility and operational managers. Planning of *shared space and use* requires to constantly provide and produce during early stages, which was explained to potentially be challenging if involved actors are not prepared and aware of what it demands.

It was described that conflicting objectives may emerge in discussions of design and spatial organization as well as in relation to flows, transportation, logistics and entrance functions. Moreover, different opinions concerning design, function and economy may arise during early stages. One interviewee expressed that conflicts may emerge from

how to meet needs and demands of actors, operations and facility management in the design of a suitable building (i.e. wanting to create more vs. restrict extent of premises). In connection, conflicting objectives can arise between property owners and tenants during early stages concerning rational design and construction opposed to uncertainty of functions and intended use. Furthermore, another interviewee explained that conflicting economic objectives may appear as property owners want high income from rent opposed actors and operations who want low rent. In one case, there were design and measurement preconditions of operational facilities, which influenced the design of spaces and gave rise to conflicts of interest. It was expressed that discussions emerged regarding common spaces and property management budgets (e.g. space, use and expenses among actors and operations). *Shared space and use* was described as a long process requiring flexibility and balancing of interests along with keeping some questions and issues open while continuously evolving and moving forward.

Two interviewees explained that there were no conflicts or very positive goals during early stages. One interviewee however stressed that conflicts may arise after completion (e.g. in relation to functions, use, security and alarms). It was explained that conflicting objectives can emerge from leadership and management opinions not being communicated to the staff. Moreover, the importance of well-functioning routines and procedures were emphasized to keep up the order.

4.3.6   Strategic objectives

In the design of one case the idea and strategic objective was to add another dimension to the building as well as contribute to innovative and spontaneous meetings and gatherings through a common meeting place on the ground floor. Meetings were considered as a symbol for the project with the strategy to not allow private or separate meeting places (e.g. coffee and break rooms), but rather encourage and govern actors and operations to meet in the same place. In another case, a common goal and strategic objective was established from desired needs and demands of districts and operations during night-time. Another case was expressed as having achieved a common goal and strategic objective without mentioning any specifics and one case never had an active common goal.

In one case, a common goal and strategic objective was created through collaborative processes and partnering between developers, contractors, consultants, actors and operations. Collaborative models and workshops were used continuously from early stages, together with activities and processes to create and work towards a common goal, strategic objectives and cooperation. The interviewee stressed architects as being increasingly involved in collaboration and cooperation models as well as workshops becoming more common as work and collaboration method to avoid alterations and additions. In another case, an external consultancy company specializing in uniting groups towards a common goal and strategic objectives was hired and engaged in early stages, which the interviewee described as a well worth and valuable investment. The external consultant functioned as a moderator to decompose questions and issues as well as establish agreement between involved actors. A document was drafted and prepared through collaboration with the external consultant, agreed on and signed by all involved actors and then brought along throughout the project process. The document was considered as a milestone and to have an important symbolic meaning and significance in the project.

The creation of a common goal and strategic objectives was for one case facilitated by having a very good client who had written a program in advance, which was developed in a collaborative process after the project competition. Goals and strategic objectives were expressed to concern ambition levels and economical availability, which preferably should be in balance with each other. Another case was developed through gradual preparation of documents (feasibility study, architectural program, concept design and developed design), which allowed the project and strategic objectives to mature during the process. The goal and strategic objectives did not change throughout the process, however content, distribution and technical ideas evolved. Process management and preparation of written formulations and documents were according to the interviewee the main contribution to a common goal and strategic objectives. It was created from actors and operations by translating operational goals and visions into the building. In connection, a successful previously constructed similar building was used as reference for work methods and approaches.

One interviewee recommended to have exactly or at most three aspects or points to describe goals and to make use of distinct and precise formulations. Another interviewee expressed it to be useful in establishing a common goal and strategic objectives to *'look at the issue from one step back'* and reconnect to the question *'why are we doing this?'* (i.e. what is trying to be achieved together). It was explained that a common goal and strategic objective often is established through motivations, assertions and arguments regarding opinions and proposals. Moreover, by reviewing previous formulations in completed pre-studies and programs, which was emphasized as beneficial and useful to have throughout the process (*'sometimes there is need to step back in the process and documentations to once again find the common path'*).

Planning of shared space and use in early stages

4.3.7   Descriptions of planning

In one case, conventional planning and design meetings were performed during early stages, where involved actors reviewed drawings and blueprints, discussed placements as well as how to incorporate and obtain functions and benefits. In another case, an early decision was made from a construction perspective to make use of partnering as cooperation-form and to involve an entrepreneur. In the initiation of another case there was a lot of uncertainty due to not knowing what the project would become. The starting point was from a discussion with the organization regarding function, use and visions for the building and how the architect could be of support to achieve these. Planning was carried out through early collaboration, cooperation and meetings between client, organization and consultants, where involved actors presented and accounted for their ambitions. The project developed gradually thereafter with focus on generality, flexibility and versatile use. Another case was initiated on a political level and planning during early stages started with analyzing preconditions. Shortcomings were found between operations and was followed by meetings to specify needs and demands. Architects were involved as professional advisors and support for the client, project management, operations and users by providing knowledge and facilitating understanding regarding architectural and structural implications. An architectural program was written from the feasibility study and initial preparatory work.

In one case, there was no tenant or counterpart during early stages, which proved to be rather difficult and complicated. The planning and internal journey was hence different

and a program was established independently. Economy was discussed rather early in the process and estimations were made (e.g. rental income, indicators, commercial analysis, market adjustments, mapping of surrounding activities, calculation of non-residential and gross floor area). Moreover, capacity was calculated early on and adapted to organizational and operational needs and demands (e.g. number of workplaces accommodated). The interviewee described that planning during early stages generally is carried out by applying the same methods such as guidelines, principles and checklists. A clearly defined process model with a pattern of demarcation and steps how to advance is basically used and followed to create a common goal, strategic objectives and sufficient possibilities for realization and change. In connection, a dialogue is generally established with tenants to facilitate the process and project development. From a client perspective, it was expressed to require a broad knowledge base within the main areas projects concern and emphasized as a strength if clients have own ideas regarding design.

Planning during early stages was in one case initiated by the urban planning department having an idea regarding design and placement. It was expressed as challenging during the process to reach an agreement how to incorporate statements of needs while simultaneously coordinating ideas with the urban planning department. The project was developed through a creative process by making use of building blocks and volumes to investigate and analyze alternatives and placements in relation to the site. The planning was described to basically involve analyze and testing of how to incorporate the program along with discussing parameters concerning roads, noise and view. In another case, planning consisted of numerous interviews with clients and actors, some workshops and development of concrete measurable sketches (e.g. study flows and spatial needs). The interviewee expressed that sometimes there is too much emphasis on sorting out everything before sketching is started. It was explained that there is a need to understand consequences through iterative sketching as well as important to start sketching rather quickly for program issues to be settled.

One case was initiated and developed from innovative needs and demands as well as supported by an organizational group trying to envision the future. There was strong focus on environmental certification and pedagogical methods, which influenced the design and configuration of premises during early stages. In another case, the interviewee was uncertain how planning was carried out during early stages, since it never was a project, however it most likely developed spontaneously.

4.3.8   Important aspects in planning

In planning of *shared space and use* it was described as important to be careful and throughout in composing the team as well as make sure that everyone involved understands their roles and responsibilities. One interviewee expressed it as important to involve and engage all actors from the start of planning as well as to avoid having preconceptions and let go of prestige. Furthermore, not to out rule, condemn or judge ideas and solutions in advance and have an open mind for aspects not being convincing at first. Another interviewee emphasized it as important to initiate projects with meetings in order to clarify and understand motives and aspects of importance, and based on that organize and manage planning. Three interviewees stressed the importance of listening to each other. Moreover, it was expressed as important to have workshops, establish a sense of openness as well as clarify and be aware of that changes

will occur during the process. In connection, one interviewee explained that it does not function to apply a predetermined template in planning of *shared space and use*, instead it is important to listen as well as meet needs and requirements.

It was expressed as very important to have a documentation and a clearly defined goal formulation in planning of *shared space and use*. It was explained as facilitating to return to when there are many actors involved in the process, however often difficult to establish. In connection, one interviewee emphasized the importance of making sure that everyone shares essential knowledge. It was explained to be carried out through meetings with project managers in order to coordinate, wherein architects participated in discussions regarding how to distribute, allocate as well as make the best and most out of investments. Another interviewee expressed that what is said and decided during the process becomes serious, clear and evident. It was hence stressed as important for actors and operations to understand and be aware that what is said and expressed during meetings has consequences in order to avoid and reduce retakes. In connection, another interviewee emphasized it as important to make actors involved during the process understand how it is intended to function and work.

One interviewee described planning of *shared space and use* to require gradual decisions for the process to move along as well as to establish a building despite uncertainty regarding statement of needs, design, functions and use. In connection, another interviewee emphasized the decision-making order and reconciliations (i.e. check-ups and gateways) as very important during the process to not *'work too far'* and hence risk errors and accumulated costs. It was expressed as important to describe and specify operations and activities in order to define functions and use of shared and common areas. Furthermore, to consider and keep in mind what spaces and parts that are intended to be shared or not. Another interviewee hence emphasized connections and correlations to become significant (i.e. what is accessible for whom, everyone or only some). Moreover, it was expressed as important to consider and solve issues regarding fire safety, access and security systems as well as create possibilities to delimit and close of parts of buildings that are not intended to be used at certain times.

Maintenance, management and responsibilities were expressed as other aspects of importance to discuss and agree on in early stages along with establishment of demarcations and boundaries to prevent problems from emerging later on in the process. One interviewee stressed it as important to already from the beginning consider what areas are shared, how areas are supposed to be rented and how to distribute rent. In the connected case, there was a lot of discussions among actors and operations regarding distribution of rent for shared premises, which was divided and distributed according to percentages of use. Another interviewee emphasized it as important to analyze and create conditions for viable actors and operations. It was hence expressed as important to establish knowledge of the market and create interest and attention that attracts tenants. In connection, two interviewees stressed the importance to consider and review surroundings to determine what should be integrated in the building.

One interviewee expressed it as important to consider and understand driving forces through making simple analyses how to create wellbeing and motivate people to move around. It was explained that driving forces bring people together to meet others, which creates a broader dialogue and is beneficial for actors and operations in the same building. Driving forces were described as often being rather simple and uncomplicated

(e.g. seminars and lectures, *'fika'*, refreshments and coffee, a common break room, a new coffee machine, common breakfasts or free lunch). In connection, the main entrance constitutes a strategic meeting point where everyone has reason to pass.

4.3.9 Positive and negative aspects in planning

Positive aspects in planning during early stages were by two interviewees described as the team and consultants working and collaborating well together as well as supporting and helping each other without prestige. It was explained that involved actors were open-minded, had god skills, competence and knowledge. In connection, another interviewee expressed total openness and full transparency as positive. Clarity was created during early stages, which facilitated distinct and solid decision-making to make things happen. It was hence explained as easy to deduce and relate visions and goals to specific spaces and performance requirements for the building and various operations as well as cost, economy and investment. Another interviewee described the relationship, cooperation and collaboration between the organization and developer as positive due to already being established prior to the project initiation. The anchoring of the project was hence successful and easily established, which made it possible to make quick decisions. Another interviewee emphasized the decision-making order, by sketching to a specific level, calculating costs and rent levels, making internal decisions and presenting the proposal, followed by decisions and notifications to proceed, as positive during early stages. Another interviewee explained having knowledge of and it being easy to determine design and configuration of departments as positive. Furthermore, another interviewee expressed clear and positive ambitions as facilitating, and another interviewee most aspects as being positive during early stages.

Negative aspects in planning were by one interviewee described as involvement of close-minded actors during and later in the process (e.g. *'holding on to what they were used or accustomed to'*, *'how things previously have been done'* or *'how things usually are'*). In connection, another interviewee expressed it as negative that some parts of the building were predetermined and were to be done with simple standard (i.e. not being allowed to make decisions and there being few choices). It was explained that there is a lot of *'this is how it has always been done'* and that simple standard does not necessarily imply that things can be done in only one way. Moreover, it was stressed that projects become much better if everyone has an open mind about how to make strategic decisions and that architects not should be excluded from discussions.

One interviewee expressed that planning difficulties emerged due to lack of knowledge among actors and operations, and hence stressed the need of increased understanding of the design and project process. In connection, another interviewee described it as negative that involved actors and working groups were prepared differently along with various extent of consequences being created for different parts. Moreover, one operational part of the building was not programmed, which influenced the process greatly with a lot of additions due to gradual development of the architectural program. In connection, another interviewee described that one case was paused during the process, due to shortage in calculations and the need of another construction before it could proceed, which caused additional and higher cost levels. However, it also allowed the project to mature over time and await tenants.

One interviewee described the inability during early stages to know and determine costs of various aspects to constitute a problem. It was explained that developers do not receive any specific costs to relate to, rather it is discussed and given directives about in retrospect. Moreover, opinions, decisions and directives from politicians may change. In connection, another interviewee expressed a lot of discussions regarding rent as negative and stressed it as beneficial to solve and agree on division of rent among actors and operations in the initiation of projects. Another interviewee described the shared environmental room not having functioned as intended and resulting in higher cost as negative. Negligence and mismanagement was expressed as difficult to prove, however when affected by costs there is realization that something is not functioning. It was hence emphasized as important for actors and operations to be aware of the increased cost misbehavior or abuse implies.

4.3.10 Characteristics in planning

Characteristic in planning of *shared space and use* was by one interviewee described as various groupings becoming apparent and evident, wherein opinions and ideas can be different. In connection, another interviewee described it as characteristic that several actors are involved and need to be satisfied and accommodated. Moreover, there is no clear organizational homogeneity in sharing of space and use and more effort is required to describe the common goal and strategic objectives. Another interviewee expressed collaboration as characteristic in planning of *shared space and use*, which was described to require agreement and shared common responsibility among actors. In connection, another interviewee described it as characteristic that every actor and operation in the building need to talk with each other more in-depth to determine how to share things. Furthermore, another interviewee expressed it as characteristic of sharing and cooperation to require and imply that involved actors understand the seriousness and meaning of the concept. *Shared space and use* was described to imply management of cost allocation and operational costs. It was emphasized that difficulty and uncertainty exists regarding ownership of shared and common spaces. It needs to be discussed and established early in the process along with how it is intended to function (e.g. due to work environment responsibilities).

One interviewee expressed it as distinguishing that *shared space and use* encompasses and involves more and other parameters to consider as well as may require other functions. Another interviewee described zoning of space as characteristic and important as well as stressed that premises should be designed to enable different kinds of use. Multi-use, generality and flexibility was however explained to often increase expenses and difficulty, which may result in need to make compromises. Moreover, *shared space and use* imposes demands on design, sizing and dimensioning, which can be expensive from an investment perspective. On the other hand, it was described to offer and allow development, many possibilities and activity-based work approaches.

It was expressed as characteristic that no completed text exists regarding what is to be planned and designed in sharing of space and use. One interviewee described that *shared space and use* instead requires to gradually find *'the right path'* through creation, exploration and testing along with intermediate steps for coordination and decision making. In connection, another interviewee expressed it as distinguishing that no architectural program was established in the project initiation. Actors and operations were newly developed but considered as important, hence there was uncertainty how

the project would develop. It was underlined that sharing of space and use needs to be processed and developed in a process, which requires gradual reasoning and input from actors concerning what is to be established. Another interviewee described the process of analyzing possibilities as unique and characteristic.

4.3.11 Compromise and priority

Compromises in projects with *shared space and use* were by one interviewee described to foremost concern design, economy and technical requirements, limitations and preconditions. It was explained that savings often occur during later stages, which may result in unfavorable compromises. The project economy was expressed to foremost control and govern projects, especially if tenants not are involved. Furthermore, it was explained that compromises are made gradually and that various types of meeting structures are followed to manage and address conflicting interests. Another interviewee expressed that compromises were carried out through consideration of tenants and actors in order to reach agreements. It was hence stressed as important to establish a dialogue and discuss changes for the process to move forward as well as due to several actors and operations being affected and in need of it to function.

One interviewee explained compromise and priority as a process to agree on intentions, where circles are drawn in order to communicate and establish *'what is wanted'* and *'how it is wanted'*, followed by review, coordination and then continued drawing. Compromising, feasibility study and architectural programing was described as a process in need of time that proceeds according to the pattern *'two steps forward and one step back'*. Moreover, *shared space and use* requires a *'give and take'* approach to gradually work towards a solution. In connection, another interviewee expressed that in sharing of space and use a *'common path'* has to be found and established regarding compromise and priority. It was emphasized as important to establish what can be afforded, created and acquired in relation to the project economy. Furthermore, it was explained that difficulty and uncertainty may emerge concerning responsibility of expenses. Another interviewee described it to be difficult to *'keep the common path'* as well as compromises and their results to become evident when actors are changed during the process, especially when actors with leadership positions leaves and operational representatives are involved.

Compromises were by one interviewee expressed to become apparent when facility areas are adjusted or changed (e.g. in need of expansion and what aspects hence are affected). It was described as advantageous to early on consider and incorporate technical systems in architectural ideas and drawings, since it may result in unfavorable compromises if not discussed during early stages. In connection, another interviewee explained a common expression to be *'this cannot be done'* (e.g. too expensive or technically unfeasible), which can be considered as a precondition to create something else or knowledge can be deepened to prove feasibility. Furthermore, emphasizing that economic aspects often not are fixed or final along with the method and solution to coordinate knowledge of different competences. Another interviewee expressed priority as very important as well as to consciously raise aspects of importance and comply with that during the project process. Moreover, the choice of products in relation to life cycle cost [LCC] was stressed as important (i.e. investments from a long-term perspective). Another interviewee emphasized that compromises constantly are made in projects with *shared space and use* and that clients make final decisions.

Compromise and priority was in one case handled through discussions and in another case in small project groups and discussion forums consisting of user representatives, organizational consultants and operational leaders. In connection, in another case it was handled through lengthy discussions, which after some opposition resulted in common decisions. Compromise and priority was in another case solved due to economic reasons, which was explained to determine what and how much can be created. In another case, safety and accessibility were of highest priority to eliminate functional and operational risks, along with colors in the design of premises being of priority. In another case, priority was focused on establishing storage possibilities and sufficient security. In another case, the ambition of the client was that the building and premises would function well, and the client was hence prepared to compromise with routines.

4.3.12 Functional differences

Functional differences were in one case handled by limiting *shared space and use* to encompass common functions and needs as well as major differences to become specific for actors and operations. It was expressed as important to analyze and identify similarities, which was carried out and established through discussions. In another case, functional differences were handled by separating specific spaces to be dedicated and designed according to needs and preferences of actors and operations as well as shared and common spaces to comprise similar or non-specific functions (e.g. shared changing rooms and technical systems as well as shared but operational-specific catering kitchen). There were discussions regarding minor issues concerning common areas (e.g. flooring material for the main entrance, where one actor wanted slip resistance and another durability). In another case, functional differences were handled through compromises and were explained to often concern service and secondary areas, i.e. spaces that no one wants expenses for but still needs (e.g. waste and environmental rooms, loading docks and inlet of goods). After completion and prior to occupancy issues surfaced regarding time, use and scheduling as well as lack of space and capacity in service and secondary spaces. It was expressed as a result of compromises and not highlighting specific practical issues during planning, which constitutes a lesson learned for future planning of *shared space and use*.

Differences in function were in one case handled through flexibility and generality. It was emphasized as important to identify demands on connections and correlations among functions, actors and operations as well as to determine and establish levels and extent of flexibility and generality in relation to costs. Moreover, to analyze and compare values early in the process as well as to establish functional specifications. It was explained as preferable to early on identify and find placements of *'odd and specific spaces'* (i.e. not shared, common or general) and how these connect to *'normal spaces'*. In another case, there was no knowledge of what the building or premises would contain or which actors and operations would be included. Structure, generality, flexibility and multi-use hence became important in order to enable a constant change of actors and operations as well as the building and premises to be changed over time. It was explained that the building and premises had to meet different needs, but at the same time actors and operations had to adapt to the building system. Operational-specific functions were located in separate spaces and premises. Furthermore, shared and common spaces were described to become special due to not relating to any specific actor, operation, user or individual owner (e.g. used for *'fika'*, coffee and refreshment, mingle and meetings). It was expressed that sizes of shared and common spaces as well

as changeability over time were established through assumptions. In connection, one interviewee considered functional differences to be uncomplicated (e.g. different requirements on acoustics, privacy, access and security systems) and explained it to easily become general solutions in sharing of space and use. It was also described as a risk to set high demands to stay clear from comments and opinions (e.g. excessive noise requirements), hence there is need for consultants to challenge each other.

In one case, functional differences were not handled, rather the project developed based on practical aspects with consideration of logistics and transports. In another case, differences in function were handled by involving the architect in the process along with incorporating wishes and requests in the best possible way through meetings, followed by assessment and evaluation of proposals and opinions. The project economy was stressed as governing along with the importance of establishing cost margins. Moreover, it was expressed as disadvantageous if economic limits not are complied with and that other aspects may consume cost margins as projects develop.

4.3.13 Additional values and synergy effects during planning

Additional values and synergy effects during early stages were by one interviewee expressed to concern economy and shared spaces. It was emphasized that proper use of shared and common spaces may contribute to create awareness and tolerance among actors and users as well as to interact, exchange, have common activities and benefit from each other. In connection, another interviewee described additional values and synergies to emerge from tenants, actors and operations meeting and interacting, having better contact and being encouraged to communicate, which would not have existed without *shared space and use*. Additional values and synergies were by another interviewee expressed to emerge both in relation to visions and practical aspects. Two interviewees explained that additional values and synergies can be improved design and quality as well as larger size of spaces than usual, since it becomes justified and can be argued for in sharing space and use. Another interviewee expressed synergy effects to emerge from trying to learn from each other and gather experiences from other projects as well as additional values to arise from the project being known on the market. In connection, another interviewee explained additional values and synergy effects to exist in the building concept of *shared space and use* along with the work carried out, since it generated an option to build another similar project.

4.3.14 Spatial and qualitative values

Spatial and qualitative values were in one case raised due to it being important for actors and operations. Qualitative values were formulated in bullet points during the feasibility study and it was stressed as important to write stringently in short text for them to be achieved and realized. Furthermore, it was explained as beneficial in order to create a starting point as well as be able to argue and make claims during the process. In another case, municipal design specifications (e.g. quality, environmental considerations, products and design) were governing for spatial and qualitative values along with aesthetics and the intention to create experiences being considered as important. Moreover, interactive meetings that were considered to occur in shared and common areas were expressed as qualitative aspects difficult to measure. In another case, the vision, goal and strategic objective was to create *'a science park in world class'* and hence there were also high ambitions for the architecture. It was considered as

important to showcase actors and operations along with openness, accessibility and meeting places in the building as well as shared and common spaces. In connection, three cases had big ambitions concerning branding as well as the building's impact on actors and operations. Meeting places were raised in five cases along with one case focusing on promoting innovation.

In one case, spatial and qualitative values were not raised and in another case not governing, instead it was important to avoid expenses and find functioning solutions in order to fulfill basic requirements. In another case, spatial and qualitative values were raised in relation to quality and environmental building certification along with security issues due to spaces being in use by actors and operations at all hours. The contact and connection to the building was hence emphasized as important and quality levels were early on determined in relation to various indicators. Moreover, relationships among actors and operations were in focus during the project. In another case, spatial and qualitative values raised during early stages foremost concerned functions, materials and technical solutions (e.g. choice of products based on LCC and energy). Environmental building certification was explained to make many aspects measurable and able to write down (e.g. social sustainability and energy calculations). Moreover, it was emphasized that spatial and qualitative values must be discussed and put on the agenda along with reference to guidelines, checklists, routines, procedures and facility management perspectives.

Communication and documentation methods

4.3.15 Communication

Communication methods used during early stages were meetings, meeting forums, workshops, conversations and discussions. One interviewee did not have knowledge of methods, communication and documentation due to being involved later in the process. Another interviewee described that communication was based on organizational visions and goals. Seven interviewees referred to meetings, which were described as planning and design meetings, program meetings with tenants, transdisciplinary meetings as well as meeting forums and workshops with key designers to discuss aspects such as expectations, opportunities, risks and ideas. Moreover, expressed as steering group meetings with internal reporting among project managers and project developers, complemented by e-mail and telephone communication as well as work sessions and meetings in between consultant meetings.

Two interviewees described meetings as a traditional method and common form of communication that functions well and can be beneficial, since project processes involve people and depend on interaction and cooperation. One interviewee emphasized it as superior to meet face-to-face during meetings in order to discuss and establish what to proceed with, since e-mail and chat cannot solve everything. In connection, another interviewee stressed it as important to listen and document meetings along with the expression *'consultants need to be like elephants, not crocodiles'* (i.e. to listen with big ears rather than speak with a big mouth). Another interviewee emphasized an advantage of meetings to be that agreements, decisions and execution can be made relatively quick. On the other hand, there is the risk that someone takes command and dominates, since meetings are dependent on people.

Other communication methods were by one interviewee expressed as to formulate and write as well as by three interviewees described as sketches and drawings along with technical specifications and meeting notes. Furthermore, two interviewees emphasized positive experiences from applying workshops as method and approach. Participation, workshops and meetings were by two interviewees explained to allow all involved actors to be heard and express opinions and ideas. However, one interviewee described it to be difficult to communicate results from workshops, since very much and comprehensive information rather quickly is created. It was explained as difficult to summarize and convey in the following process (i.e. what came out of it, was positive and negative).

One interviewee emphasized communication to be the key to success, however at the same time to be one of the most difficult aspects. It was explained to not be taught how to communicate ideas and opinions during basic education. Moreover, problems and difficulties may emerge regarding communication when there are many different actors involved in the process as well as when involved actors are replaced or when changes are made. Communication and documentation methods were hence emphasized as important. In the connected case, there was some difficulty due to absence of tenants to anchor decisions with. On the other hand, it was advantageous that no group was affected by changes made during the process.

4.3.16 Documentation

Documentation methods used during early stages were by six interviewees expressed as notes of meetings, conversations and discussions. Two interviewees described it as common and traditional design meetings notes. One interviewee explained that meeting notes were distributed by e-mail and another interviewee that color markers were used (e.g. red for new points and blue for points to be removed). Two interviewees expressed meeting notes to foremost include text but to some extent also illustrations and flow charts as well as drawings and sketches. In connection, one interviewee described other communication and documentation methods as descriptive text documents, cost calculations, investment analysis, bids and illustrations. Another interviewee expressed that visual images were used as documentation form and another interviewee that sketches, drawings, references and models were used.

In one case, it was explained that decisions made during meetings were documented in meeting notes and thereafter transferred into the establishment of an architectural program. In another case, existing facilities and premises were documented and an architectural program was developed, which was summarized and compiled into a feasibility study report. Focus was on specification of soft and hard values in order for visions, ambitions, goals and strategic objectives to be clearly defined. The feasibility study report formed a solid basis for decisions, which facilitated political processes and quick approval of the project. In another case, documentation was presented and followed by internal decisions, which were based on the developed material. Thereafter the documentation was sent to committees for decision-making and then passed on to the municipal government.

In one case, traditional strategic programs, statement of needs and room data sheets were not used. An architectural program was not written in early stages, but rather developed and established gradually during the process through conversations,

discussions and sketches. In another case, the initial text and documents defining the project were not completed and relatively thin, rather they were developed during the process. It was expressed as a problem not knowing what should be created as well as that *shared space and use* had to be created through testing and asking.

One interviewee explained that agreed design guidelines generally are established a few steps into the process. It is used and carefully communicated to contractors, clients, subcontractors, consultants and manufacturers in order for everyone to know what to relate to. It was explained as good to have for architects and throughout the process as well as to facilitate early decision-making by implying the need to take stand and define aspects, which often is very difficult. It was described as an important design methodology to establish a quorate internal process as well as to rather step back on some points, reevaluate and make new efforts in order to reach further and have time to study and refine aspects more in-depth.

4.3.17 Methods and tools

Methods and tools used for communication and documentation were by one interviewee described as whiteboards to draw and explain, various simplifications, illustrations, bubble diagrams and schematic images. It was explained to allow and facilitate illustration of several aspects, correlations, connections, dependencies and contexts as well as scenarios and decision-making structures. In connection, it was stressed as important during early stages to identify and determine operational needs to avoid risks. Another interviewee expressed that writing, drawings, illustrations, pictograms, models and 3D were used to clarify issues and make aspects legible and measurable. It was emphasized as important to show functions and possibilities to divide, i.e. how to use and share spaces. Moreover, to be throughout and continuously illustrate how it will become and what is experienced (e.g. based on simple illustrations). It was explained that experience and functions should be studied in parallel through images, floorplans or function studies to ensure correspondence.

One interviewee described that both text and illustrations were used as methods of communication and documentation. It was expressed as dependent on the situation what method works best, however illustrations were described to generally be useful and well-functioning in early stages by enabling possibility to show how aspects will become. Furthermore, perspectives were explained as good to illustrate exteriors and how the building relates to the site as well as drawings usually being better to illustrate interior environments in order to facilitate communication and understanding. Another interviewee described that text was used to a limited extent. The expression *'an image is worth a thousand words'* was emphasized along with positive experiences from making use of physical models, images and sketches, i.e. architectural tools, which serves as good communication methods to facilitate understanding among involved actors. In connection, another interviewee emphasized visual images to be a very good *'language'* as well as an innovative and important method, which constitutes a lesson learned from the process. It was explained that images are what is noticed and that most people cannot be bothered or do not manage to read, or find it difficult to make sense of texts. Moreover, there are problems concerning interpretation of texts, which may be different depending on the reader and subjective sense making.

One interviewee emphasized the importance of pedagogy in communication and documentation to understand what is decided, along with consultants explaining consequences to operational representatives to facilitate sense making. In the connected case, illustrative documents were used and established early in the process. It was emphasized as beneficial and important to be able to show and review ideas and decisions visually or in drawings as well as to draw and illustrate meeting notes and texts during the process. Furthermore, it was explained as facilitating to early on draw the footprint of the building as well as make use of color coding and markings for various aspects to improve understanding. The work approach was more pedagogic than usual and expressed as well-functioning in terms of communication between involved actors.

Four interviewees described communication during early stages to be carried out and facilitated by web-based tools such as project websites, databases and digital binders to share, submit and distribute sketches, drawings, files and meeting notes. Moreover, to assemble project information and material in one place and make it accessible for everyone involved. One interviewee explained that a digital binder enables possibility to follow and review the process and activity of involved actors, which creates positive benefits regarding management, transparency and accountability. Another interviewee described it as less well-functioning when involved actors, due to lack of time or resources, do not publish or complete material on time or as agreed.

One interviewee described that visual planning among consultants were used along with question-and answer-lists that were published on the project website and followed up in meeting notes. Another interviewee considered BIM-design to be a good and user-friendly tool to facilitate communication and use, show how aspects will become as well as enable use of a projector instead of printed copies. In the connected case, digital room data sheets were used and linked to the BIM-model along with identification of standard room types. It was explained to create opportunities to jointly document and link information as well as to facilitate organization and location of aspects and elements in buildings, which otherwise is difficult after completion. In connection, VR-googles were expressed as a possible tool to visualize experiences and simulate sound in order to facilitate understanding.

Future improvement and development

4.3.18 Challenges and problems

One interviewee expressed that *shared space and use* results in respect of all aspects and emphasized that challenges should be worked through. In connection, another interviewee described it to be difficult to grasp and visualize the extent of compromises as well as that actors and operations often want to accommodate and see to their own needs. There are hence challenges in how to express that it is not possible to establish everything that is desired due to the focus on sharing. Furthermore, problems and challenges may emerge since *shared space and use* seems simple and easy to imagine, however involves surprisingly more aspects and larger extent than initially expected.

In one case, challenges emerged from uncertainty regarding what should be designed and established, hence there was need to test and seek the way forward. It was explained as a problem not to know who to build for along with functions and use being uncertain in early stages. Moreover, there were challenges in how to define the project and at the

same time move along in the process. In another case, problems emerged from wishes, requests and changes being presented or brought up too late in the process. In another case, there was a strong organization that wanted to gather as much as possible into the project, which resulted in difficulty due to growth of the project and required political decisions.

One interviewee emphasized that problems can emerge when involved actors are changed, which may create difficulty to *'stick to the path'*. It was explained as challenging to make all involved actors understand how far the process has come as well as that processed and decided aspects will proceed. Furthermore, problems may emerge if new actors have different opinions or strive backwards in the process, since it is desirable to avoid retakes and disturbances. Another interviewee described that problems may emerge in organization and groups prior to settlement of constellations. In one case, there were initially differences in opinions between actors as well as different ideas regarding use of the site. It hence took some time before the project became as intended along with a break in the process.

One interviewee described that challenges and problems mainly emerge in relation to facility management and rental distribution. Another interviewee emphasized that *shared space and use* requires establishment of cost awareness among users as well as fair distribution of cost. In connection, another interviewee expressed the biggest challenge of *shared space and use* to concern economy regarding how to design and at the same time review costs. Moreover, it was stressed as common that projects become too expensive. It was explained that limited methods to calculate costs during design development currently exist, which constitutes a problem desirable to solve. Economic estimates were described to rather be based on experiences, instincts and assumptions, however there is difficulty to know relevance and ultimate impact.

4.3.19 Barriers

Two interviewees expressed conventions and conservatism as the biggest barriers for *shared space and use* (e.g. hold on to or be limited by old habits, not dare or be resistant and unwilling to change). Furthermore, two interviewees explained that in sharing of space and use it is not possible to think or have the mindset that things can be done as usual (*'as it were done last time'* or *'as it has always been done'*), which may constitute a barrier if believed by involved actors. Two interviewees emphasized that barriers may emerge from actors not wanting or being able to collaborate with attitudes to *'take care of oneself'*. In connection, one interviewee expressed that previous experiences can constitute barriers, since it may create resistance and affect assessments (e.g. from not functioning or working out). Another interviewee did not consider there to be any major barriers, rather minor issues in the planning process (e.g. concerning spaces and rent).

One interviewee described *shared space and use* as a human centered appealing concept rather easy to create visions and imaginaries around. The relatively large span between visions and actual implementation was however emphasized as a big barrier, since it may require some rethinking. Another interviewee expressed difficulty to exist in not knowing what is to be created and accomplished in advance or in the initiation of projects, i.e. uncertainty of the outcome. Another interviewee explained that economic aspects may constitute barriers and emphasized the need to find users and tenants for premises as well as to clarify the organization during evenings and nights.

In connection, another interviewee described that barriers or difficulties may emerge from an operational perspective and that *shared space and use* requires work through and establishment of very good strategic programs. Moreover, it was stressed as important to establish what is wanted and desired in sharing of space and use.

One interviewee described barriers in planning to be decision-making structures due to ambiguity regarding who has mandate to make decisions and claims on qualities that should be brought forth in the process. In connection, another interviewee explained that hierarchical decision-making structures sometimes are created and considered to be smart, however do not leave scope for change and makes decisions too distant. It was emphasized as a barrier that architects or other actors, with importance and creative knowledge to understand how mechanisms work and can be developed, in some projects are too far away from the power. Moreover, that actors who make and keep decisions to themselves only will create beautiful or functioning buildings with a low level of innovation. It was stressed that some people and professionals have a great need to acquire power in projects with large investments, which unfortunately overrides opportunities to develop issues concerning *shared space and use* (e.g. contractors wanting to make decisions with the client without involving architects).

4.3.20 Lessons learned

One interviewee described that *shared space and use* often develops organically with need for decisions to mature over time and that everyone usually is satisfied once buildings are completed and in use. It was hence emphasized as important to be tough and persistent as well as that barriers and preconceptions not should be created in advance. Two interviewees stressed the need to early on consider what has to be decided and what can wait to be programmed and designed. *Shared space and use* was described to require and involve gradual decisions along with having and establishing an understanding of the process. It was expressed as important to realize that decisions have to be made in the right order, not too early nor too late.

One interviewee emphasized the importance and need to educate involved actors in the construction process in order to establish knowledge and understanding of different stages and where in the process the greatest impact on influence and costs is possible. Furthermore, it was stressed as important to compose the team with decision-making actors or actors with stated responsibility for operations, since delegation, responsibility and decision-making becomes important for the process to move forward. Another interviewee emphasized the importance of being open and listen as well as to move the process forward and find ways to manage processes to *'make things happen'*. Moreover, there is need to establish a conscious process with sharing and awareness among involved actors. In connection, another interviewee expressed it as important to learn and share knowledge among involved actors by creating a mix with respect and understanding of everyone's expertise. There are different ways of understanding and looking at aspects and hence there is need to establish a common image. Furthermore, it was stressed as important to be prepared for change of actors and consultants during the process in order to ensure that intentions are safeguarded and brought forth.

One interviewee described that there often is lack of contact, communication and interaction below the senior level of leadership in the decision-making structure, which was expressed as desirable to improve among groups and across boundaries as well as

between senior leadership, operations and users. The need of increased focus on operations and users, team-building and discussions involving several actors was emphasized in order to achieve better understanding among actors and a more smooth and effective process. Another interviewee expressed that when more actors are involved it becomes more difficult to manage and make it work, which may result in greater challenges and problems. It was explained that few actors facilitate establishment of agreements and decisions as well as that extensive sharing of space and use or too many actors involved may give rise to issues and problems concerning lack of responsibility. There was experience of *shared space and use* being more successful and well-functioning in smaller scale.

One interviewee expressed that difficulty sometimes may emerge between visions and practical implementation. It was hence stressed as important to manage and hold on to the project as well as not only consider, highlight and communicate the vision but also practical aspects. Another interviewee emphasized the importance of establishing the right level of generality and flexibility in relation to economy. In connection, it was described as important to maintain security and correspond to regulations, which sometimes can be juxtaposed or incompatible (e.g. governing or difficult to solve fire safety). Building regulations were expressed as non-flexible and to possibly give rise to technical issues.

One interviewee emphasized that there is need to consider and confirm the economy in municipal investments of *shared space and use*. It was explained to often be overlooked, which in retrospect results in increased difficulties. Another interviewee stressed it as important to early on process urban planning and municipal departments in order to allow all actors to express opinions as well as create a common understanding and strategic objective regarding what should be established. The anchoring process was explained as important to conduct in order to avoid opinions from various municipal actors during the project process. Moreover, it was expressed as important to manage and succeed in joint planning of premises to develop and establish more multifunctional spaces.

4.3.21 Improvement and development

Possibilities for improvement and development were by one interviewee described to exist in relation to establishment and incorporation of intentions and aspects early in the process. It was stressed as important to communicate, accommodate needs and seize opportunities to incorporate functions in planning and design. Moreover, to constantly express and clarify what is wanted, what problems exist and when notice is needed. Another interviewee expressed development potential to exist in improved understanding among actors to facilitate and establish better cooperation, compromising and decision-making. It was described as desirable to avoid conflicts or not being able to move along in the process due to differences in opinions. In connection, another interviewee emphasized the importance and need to develop knowledge in relation to cooperation and process management with collaborative approaches and workshops. It was expressed that various professions are suitable as process managers and that there is need to develop basic and subsequent educations with increased focus on behavioral aspects, cooperation models and processes.

One interviewee stressed improvement and development potential in ensuring that actors and operations establish and finish regulatory and governing documents on time before projects are initiated. It cannot wait to be established later and was described to currently influence the process by delaying and slowing it down. Documents were explained to often not be finished by project initiations, but rather to be completed during the process and hence delaying subsequent processes. Furthermore, there is improvement and development potential in establishing increased clarity regarding what is expected of involved actors during meetings.

Opportunities for improvement and development were by one interviewee emphasized to concern economy regarding clarification and specification of rent distribution. Another interviewee expressed opportunity to exist in establishing greater proximity between decisions concerning quality and economy, since they are related and not two separate issues. *Shared space and use* was described to relate to quality aspects and how usable premises should be and was hence emphasized as a quality issue. It was explained that all issues and aspects need to be approached based on economy and quality, otherwise it is not possible to make necessary and radical decisions. In connection, another interviewee expressed it as important to consider practical aspects in *shared space and use*, since it needs to be well-functioning in everyday life. It was explained as beneficial to consider what has previously been well-functioning.

One interviewee expressed problems and improvement possibility to exist in finding opportunities to create and establish something together among municipal departments, i.e. the process of acquiring premises. It was explained that there is a greater incentive for municipalities in being the tenant. Another interviewee emphasized it as desirable to improve and establish increased cooperation with city planners. It was described as important to early on incorporate a mutual mindset through cooperation and dialogue to achieve a smoother and more efficient process.

One interviewee considered there to be plenty to do in order to continuously improve and develop planning of *shared space and use*. Another interviewee emphasized *shared space and use* to be a positive and beneficial concept and expressed the ambition to involve it in future projects. *Shared space and use* was however considered to be more common in smaller municipalities and cities as well as in new developments. Larger municipalities were explained to possibly be more focused on '*each doing or being on their own*'. Another interviewee expressed potential to create and establish more projects with *shared space and use*, especially in consideration of utilization rates during evenings, weekends and seasons. In connection, another interviewee emphasized that issues relating to *shared space and use* currently are under development and will evolve very much in the time to come as our society is undergoing a major transformation process. *Shared space and use* was described to involve a lot of creative potential to be created in much greater extent and considered as necessary, since the construction industry is responsible for a lot of negative impact on the environment. It was explained that if buildings can be designed by solving more program issues on fewer square meters it is a way to manage, save and economize resources.

5 Discussion

In this chapter, the result of the research is discussed, structured in accordance with the research questions along with general discussion and reflections.

Research question 1 - *How can the concept of shared space and use within built environment be understood and described?*

In performing the interview study there was agreement between interviewees that no proper definition or consensus on the concept of *shared space and use* exists. Instead it becomes what is subjectively associated with the expression, where responses showed both similarities and varieties. A wider study for descriptions and keywords would have to be performed to collect a greater extent of information. The pattern and reoccurrence uncovered however indicates what the concept entails. Based on responses, *shared space and use* can be summarized to involve actors and users, time dependency in connection to degree of utilization as well as functions and activities in terms of different use and benefit of space, generality and flexibility, multifunction and non-specific use. It can hence be categorized to encompass the aspects time, space and people. In connection, community, meetings and interaction were emphasized and referred to in descriptions, keywords, intentions, planning and design, which hence could be considered as characteristic for both concept and process. Reoccurring descriptive formulations were to share, co-use, create and establish together, develop and benefit from each other as well as to common and jointly utilize.

Shared space and use is commonly associated with focus on premises, however can also be considered from organizational perspectives. It can be described as to incorporate functions and benefits, solve more program issues on fewer square meters as well as to establish common areas and a *'living building'* with openness, connections and accessibility. It furthermore entails synergies and synergy effects with increased focus on drivers, activities, functions and use opposed to static rooms and spaces. In connection, it involves many different aspects and various actors, hence associations, meaning and understanding of the concept and what it entails can be different depending on perspectives. Responses clearly indicate *shared space and use* as dependent on work approaches, dialogue, cooperation and collaboration as well as roles, responsibilities and demarcations. Distinguishing characteristics are that groups and boundaries become evident as several actors are involved with no clear organizational homogeneity or obvious counterpart, which entails balancing of interests, design, function and economy through a *'give and take'* approach.

According to theory and research, *shared space and use* can take on different typologies and scenarios with dynamic aspects and variation, which can be *'same or different'* in relation to time, space and people (e.g. mixed, in parallel, at the same time, separated or after one another). *Shared space and use* is furthermore an emerging research area within built environment, hence there is limited established information and knowledge on the topic. It could explain the reason for diverse associations, explanations and lack of consensus on the concept. As there is no common definition or terminology, the concept becomes partially dependent on drivers and advantages, which are many, diverse and relate to all aspects of sustainability (economical, environmental and social). It is hence important to discuss drivers and establish a common understanding of the concept among actors as well as in research and practice. Drivers to share space and use can be economy, time and quality (e.g. design and size), social aspects,

exchange, communication, cooperation and collaborative gains (e.g. community, meetings, interaction and relationships) as well as management, organizational and operational aspects. It can furthermore be to promote ideas, innovation, creativity and knowledge, accommodate functions, use and needs, create neutral spaces as well as achieve benefits and resource savings. Based on descriptions, two distinct motives and approaches regarding drivers to share space and use can be distinguished. One is quality, concept and vision based with focus on change, transformation, ideas, future needs and demands as well as branding, attraction and market value. The other is cost, efficiency and rational based with focus on feasibility and practical aspects, functional and operational performance, expansion, limitations in preconditions or a large program to incorporate. Motives and approaches may of course also be mixed and combined.

It can be argued that *shared space and use* is not an entirely new concept as sharing has existed throughout history and there are parallels to similar ideas, ideologies and developments from the 1970's. On the contrary, the emergence of information technology in more recent time has inflicted a structural and organizational shift in society, which together with increased focus on efficiency and sustainability has influenced lifestyles, values and allowed for other opportunities. *Shared space and use* are thus not only based on ideological but also structural drivers, which has resulted in typologies, developments and concepts with new expression in society and built environment. Participatory cultures are furthermore developing strongly with intentions and approaches to share, collaborate, cooperate and create together.

Research question 2 - *How are projects with shared space and use planned and designed in early stages?*

Planning and design of *shared space and use* can be considered as a process of analyzing, identifying and comparing possibilities, synergies and similarities as well as to agree on intentions and statement of needs through compromises. It furthermore entails ambiguity in rational design opposed to change and uncertainty of functions, use and development. Descriptions and specifications along with early and iterative sketching hence becomes essential to settle program issues and understand consequences, which involves estimates, assumptions and analysis of placements, correlations, connections and possibilities for incorporation. Research findings clearly highlight *shared space and use* as dependent on people and developed based on collaborative, cooperative and interactive processes. Methods and models such as partnering, workshops, interviews, discussions, conversations and meetings along with documentation and meeting notes are applied. It facilitates establishment of agreements and quick decision-making, since many actors and various groups are involved with boundaries to overcome. In response, pedagogic approaches, communication, coordination, organization, delegation and leadership becomes important both from a planning and operative perspective. It becomes essential to establish common goals and strategic objectives, i.e. a *'common path'*, which entails approaches such as to motivate, argue, evaluate, review and assess options, proposals and previous formulations. It furthermore becomes necessary to define demarcations and responsibilities, describe how to work and collaborate as well as establish a process model with steps how to proceed in order to move forward. There may however emerge difficulties or problems regarding mandate and decision-making if there is no main actor, tenant or counterpart.

Planning and design of *shared space and use* is according to research findings carried out and established in different ways during early stages. Project management theories

and models connect to empirical findings with parallels to urban planning, design dialogue and partnering, however practice express uncertainty how to deal with the topic and that there is no predetermined template for *shared space and use*. Consistent with theories, both approaches relating to systematic, static and sequential as well as dynamic, integrated, iterative and agile process management models are represented. Based on research findings, three approaches to architectural programming can be distinguished. One approach is to make use of architectural programs, which either are developed in collaboration or independently when no tenants exist. Another approach is to partly use architectural programs and a third approach is to make use of other or combined methods. Connections can be made to theories and views on architectural programs as *'living'* documents and *'the program as the design'* or as *'problem seeking'* with focus on problem statement and specification. Research findings however indicate it as more common to partly establish or develop architectural programs over time, than in project initiations. It either highlights a need for architectural programs with reason and potential for development, or that other formats and approaches to communication and documentation are suitable for projects with *shared space and use*. In-depth studies are needed to determine specifics in approaches and alternative methods. The need for architectural programs is not confirmed in the study, however expressed by interviewees as facilitating to establish in advance and useful to have in the process as a framework and *'common path'*. An explanation to why architectural programs are undeveloped for projects with *shared space and use* could be that increased complexity is introduced to planning and design processes. It is furthermore reasonable in considering that *shared space and use* constitutes an emerging topic under development with limited experience in research and practice. Focus and attention could hence so far have been directed on other aspects than structural development and process management as there are various approaches and many aspects are complicated in relation to communication, collaboration and management.

Responses indicate two distinct approaches regarding process management models as well as design theories on problem analysis and solution synthesis in planning and design. One is a *'structured'* approach, which is based on a goal oriented and focused process. Emphasis is on analysis, predefined criteria, explicit decision-making, establishment of documentation and architectural programs as well as clear stages and gateways. There are theoretical connections to systematic, sequential and static process management models such as the *'waterfall'* and A-S-E model as well as views on design as *'problem solving'* where analysis and synthesis are separated. The other approach is *'experimental'* and features an explorative, investigatory and goal seeking process based on creation, iterations, trial-and-error and learning-by-doing. It proceeds according to the pattern *'two steps forward and one step back'* along with testing, seeking and asking. The *'experimental'* approach furthermore needs to develop in process, *'mature'* over time as well as to leave some issues open while still moving forward. A *'common path'* is established through gradual reasoning and input with intermediate steps for coordination, evaluation and decision-making. There is thin and incomplete initial defining text and documentation on design and traditional strategic programs, specifications and room data sheets are not used. Documents and architectural programs are instead prepared and developed gradually during the process. There are theoretical parallels with dynamic, incremental and iterative process management models and approaches such as agile management, SCRUM, design thinking and IPD as well as views on design as *'puzzle making'* where analysis and synthesis interact and develop in relation to each other.

The two approaches can be considered as responses to handle change and uncertainty by either acceptance or work through. One is characterized by rational and systematic management with control and organizing, comparable with systems thinking. The other by design and creative processes with freedom and openness. It is not possible to claim that one approach is better than the other as both have advantages and disadvantages. Combinations of approaches can also be distinguished from research findings. Suitability and choice of approach probably depends on type and character of projects. A risk with the *'experimental'* approach involving gradual and iterative development is however to get lost in the process if documentation, architectural programs or reconciliations not are established. There is consequently no possibility to follow up, review, evaluate and improve, which may influence the process as well as cause changes, additions and added costs. Issues may furthermore emerge as *shared space and use* involves many actors and diverse groups, which tend to change during the process. It contrasts with connected theories on agile and iterative process management models, which are based on small groups where team members do not change. On the other hand, a risk with the *'structured'* approach is to develop hierarchical structures and extensive documentation, which may complicate communication, limit innovation, change and creativity as well as restrict flexibility and agility. Projects may furthermore become too framed and controlled with too much emphasis and time allocated on analysis and decisions may become distant. It could hence be facilitating to combine approaches, since *shared space and use* to some extent requires clarity in management, organization, decision-making and communication as well as experimentation and iterations. Advantages from each approach could be utilized by balancing agility, flexibility and adaptability with stability, structure and control.

According to theories and research findings, two distinct approaches to design and configuration of *shared space and use* can be distinguished, which either applies adaptation or accommodation of needs. One approach is to establish solutions with generality, flexibility and versatile use. Another approach is to analyze and process functions, use and architectural program issues to establish a specific solution through design and spatial organization. Selection of approach depends on aspects such as strategies, intentions, statement of needs, demands, requirements and scenarios. It however becomes important to determine degrees and requirements on generality and flexibility as technical intensity and high demands may inflict increased cost, difficulty or compromises. Design and configuration could hence potentially be used as an approach to avoid costly technical solutions.

Planning and design of *shared space and use* entails balancing of economy and quality, which may become complicated in terms of sharing, distribution and allocation as several actors are involved. On the other hand, it allows better quality and service, since actors are able to co-finance and support economy. It furthermore enables possibility of improved quality through common long-term investments and planning, which otherwise would be costly if actors were separated. There are however also economic gains from investment in quality as it influences economy in the longer perspective. It provides reason to question how quality can be governed through communication, representation, specifications and requirement management.

Shared space and use along with networking, collaboration and participation replace individuality through community, interaction and co-creation with more together than separately. It can be considered as a reaction to Taylorism and standardization, which

rather has created and focused on contrasts, barriers, institutionalization and specialization. Project management and architecture are developing from industrial history, theory, models and approaches into an information, communication and network based society with increased focus on sustainability. In response, alternative methods and approaches to management and cooperation may be needed in order to overcome boundaries and establish strong, effective and functioning collaboration among actors. It furthermore implies that actors do not need to have knowledge, skills and competence in all aspects, but rather can focus on specialized parts. It is in line with developments towards specialization and professionalization, which brings up the same issues to consider in terms of collaboration, coordination and communication as more actors are involved in processes.

Research question 3 - *What can be suggested to develop and improve planning and design of shared space and use in early stages? (partly addressed in chapter six as planning and design strategies)*

Research findings indicate that project process actions and decision-making orders become influential in planning and design of *shared space and use*. In connection, there is evident need of process management as well as to educate actors in various stages in planning, design and construction processes. Increased awareness and understanding of processes, influence, consequences and importance of roles needs to be established to avoid late changes, wishes and requests, which may result in increased cost, difficulty and unfavorable compromises. Connections can be made to theories on early stages, cost of changes and opportunity for influence throughout project life cycles such as the MacLeamy Curve. Responses furthermore indicate an evident lack and necessity to develop and improve knowledge, collaboration and relationships among actors and operations. Project processes are complicated by many and diverse actors being involved as there is no clear organizational homogeneity and issues in actors being differently prepared, which relates to theories on boundaries and collaboration. It emphasizes need to establish demarcations, roles, responsibilities and improved understanding among actors to facilitate compromise, decision-making and cooperation as well as achieve a more smooth and efficient process. Goals, strategic objectives and formulations consequently become important as there is difficulty to establish and keep to a *'common path'*. In connection, as conservatism and resistance to change constitute barriers to *shared space and use*, there is need for preconditions of establishing something together through sharing as well as to focus on similarities and common aspects to overcome boundaries.

In planning and design of *shared space and use* there is difficulty and problems in not knowing what to create and how that should be handled. It can be connected to theories on change, innovation and uncertainty, however with need to relate to that, reduce risks and despite move forward. *Shared space and use* is furthermore comprehensive as it involves many aspects, which makes it complex and difficult to establish overview of the extent. There is need to define projects and incorporate aspects in early planning, however also consider practicalities, routines, facility management and operational perspectives. Understanding of core values and *'must haves'* of each stakeholder constitutes an essential starting point, which may differ in terms of own operations and sharing with others. It is hence important to clarify intentions, goals, strategic objectives, statement of needs, drivers and incentives for sharing among involved actors, i.e. *'why share?'*. In connection, there is need to clarify priorities and establish priority orders to facilitate compromise and negotiation throughout the process. Priority

may furthermore be of use in response to the issue and inability to estimate and determine cost in early stages as the actual economy rather is discussed and given directives about in retrospect. It could function as a method to govern economy, compromises, trust and quality in order to avoid conflict and disappointment as well as safeguard important qualities if economical savings are needed.

According to research findings, planning and design of *shared space and use* requires creativity and exploration. At the same time, dependency and need of leadership, management and organization is highlighted. There is evident need of structured architectural programs and necessity to establish control of processes through intermediate steps, which should be approached as a combination of product and process management. In accordance with theories, suggestions can be made to apply design thinking, agile and iterative process management models, architectural programming methods such as design dialogue, or other models able to handle several actors, multidimensional preconditions and ambitions. Architectural programs may furthermore be of use to make unclear or uncertain aspects more explicit, since the purpose is to manage design through communication. Research findings emphasize necessity to develop knowledge and skills in relation to cooperation, process management, communication, collaborative approaches and workshops. There are issues and difficulty in how to communicate and summarize results of workshops as extensive information is generated which needs to be organized and synthesized. In connection, empirical and theoretical findings indicate that *shared space and use* requires and is demanding in terms of communication and documentation, which becomes challenging when many actors are involved and change throughout the process. There is hence great value, importance and potential for development in sorting of information and guiding of processes.

Increased coordination, moderation and curatorship is according to research findings needed in planning and design of *shared space and use*. Depending on approach, operations and users are in need of increased knowledge and understanding of the construction process, their role and that they have an important part in early stages. It constitutes an important relationship to establish and develop as empirical findings indicate gaps and deficiencies with boundaries of language, sense making and knowledge to overcome. In response, there is potential for architects or project managers to be increasingly involved as facilitators in processes to investigate scenarios and sketch out alternatives to improve communication and representation. Contact is furthermore commonly established between architects, operations and users, which should be utilized and developed. Architects may hence take on an important role in coordination, collaboration and cooperation to align actors, avoid misunderstandings, support knowledge and ensure understanding. In connection, research findings underline communication methods as critical and dependent on the medium. Images, illustrations and graphic representation are emphasized as important and effective methods, which is in line with ongoing societal developments towards increased visual communication. It furthermore constitutes a power tool and instrument for proposals, which should be utilized to highlight and bring attention to certain issues or for important aspects to be noticed and reviewed. There is consequently great potential for improvement and development of visual communication and documentation in processes and architectural programs to facilitate value creation, sense making, governance and management.

6 Conclusions and recommendations

This chapter concludes with a compilation of research findings into proposed strategies for planning and design of shared space and use. For application and exemplification onto the connected architectural case and design proposal, please refer to the booklet.

According to theories and research findings, project process actions in early stages become influential as it affects costs and determines preconditions for operational use, performance and quality. Responses indicate various approaches to planning and design of *shared space and use*. Consistently for the ten studied cases is that the architectural programming process is carried out, however most have not established architectural programs in early stages. On the other hand, those who have made use of architectural programs emphasize it to facilitate collaboration and communication by functioning as a framework and *'common path'*. The study hence proceeds and concludes with suggestions and guidelines for improvement and development in the form of planning and design strategies for *shared space and use* in early stages, see Figure 31. It comprises a combined description of process and methods, configured as a process based chronological guide, handbook and checklist. Strategies are organized according to theories and models with advice for application as well as recommendations of important aspects and issues to involve, consider and handle. It could be considered as a structure or starting point to support development of architectural programs, but also when alternative methods and approaches are used. Some strategies can be considered as trivial and basic, but should not be diminished or overlooked in early stages. Flexibility applies to adjust and adapt according to situations, scenarios and project types as each individual project involves specific issues that requires special attention. Strategies may hence be followed more freely or arranged in a different order.

Research findings on economic aspects have been noted and included in strategies as management of economic issues is of importance. Economy however exceeds delimitations and is not in focus of the study scope, hence aspects have not been studied in-depth.

interlinked process
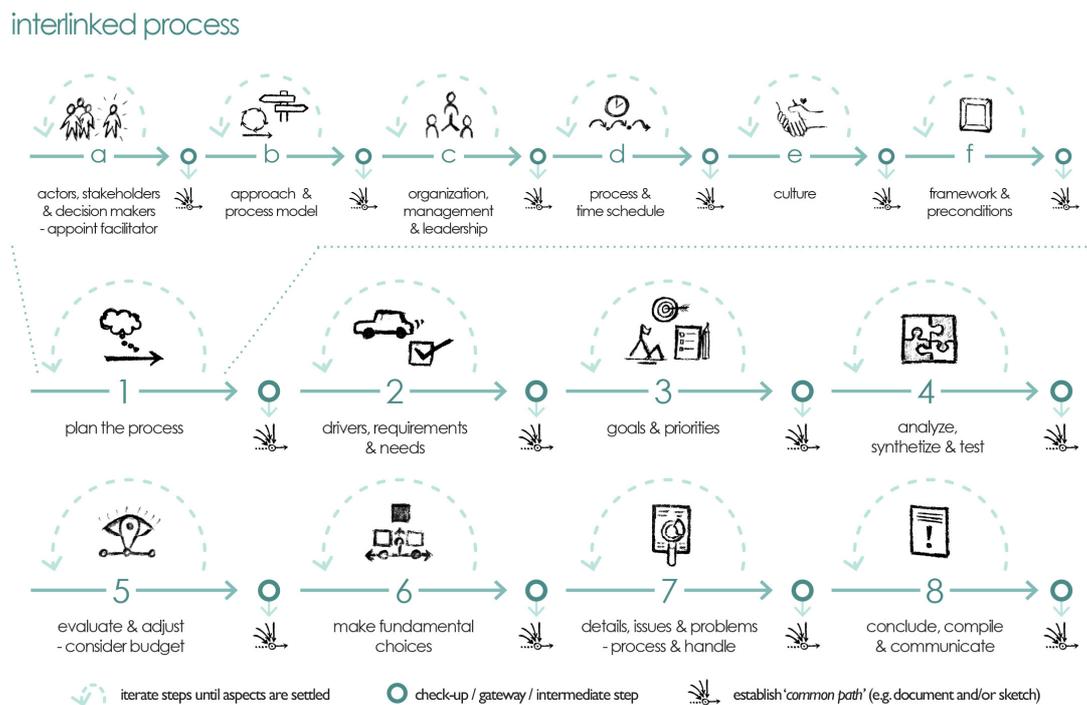
Figure 31 Proposed planning and design strategies for shared space and use in early stages.

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Step 1 – Plan the process

a) Identify, determine and coordinate actors, stakeholders and decision makers - Appoint facilitator

- **Identify actors and user groups - involve and engage key actors from the start**
- **Initiate projects with meetings and handle groupings**
- **Consider and analyze actors both separately and together (stakeholder analysis) -** be aware that perspectives can be different.
- **Determine if a *'main actor'* exists to function as a *'counterpart'* as well as who has mandate to make decisions** - find users and tenants.
- **Consider team compositions and group configurations -** inter- multi- and transdisciplinary. Describe and determine relationships.
- **Compose teams with decision-making actors with explicit mandate and responsibility**
- **Develop knowledge in relation to cooperation and collaborative approaches** to facilitate compromises and decision-making.
- **Establish understanding among actors through dialogue, collaboration and cooperation -** discuss and talk more in-depth, focus on teambuilding, establish dialogue with tenants, operations and users (e.g. apply models and theories connected to IPD, integrated project teams, design thinking and design dialogue).
- **Focus special attention on operations and users** to facilitate a smooth efficient process.
- **Include a first discussion, presentation and review of various stakeholder drivers** (*what's in it for us? why part of the project? why share space and use?*) e.g. anticipated benefits for each and every one, non-negotiable preconditions, budgetary limits.
- **Consider appointment of a facilitator** to function as moderator to coordinate involved actors and diverse groups (inter- multi- and transdisciplinary). Moreover, to reach agreements, decompose questions and issues as well as handle goals, strategic objectives, conflict, negotiation, information and communication. Consider architects or project managers as potential actors to support and facilitate knowledge and understanding.

b) Decide on approach and process model

- **Decide on what process management model to apply** - sequential, static and systematic or agile, dynamic and iterative, or a combination (find support in theories and models).
- **Establish a clearly defined process management model** with demarcations and steps how to proceed.
- **Develop knowledge in relation to process management** (find support in theories and models).
- **Consider developing an architectural program and agreed design guidelines in advance** (or develop documents gradually) to facilitate establishment of a *'common path'* as a solid basis to encourage early stands, definition, decisions and quick approval. Moreover, to avoid risks and additions, establish control throughout the process and facilitate communication among actors by clarifying what to relate to.
- **Establish a creative process** - sketch, draw and review opinions, alternatives and proposals (investigate, analyze, test, seek and ask). Start early and iterative to coordinate ideas, analyze and understand consequences, settle program issues as well as determine design and configuration.
- **Incorporate and establish pedagogic methods and approaches - *'draw and explain'*** to clarify and make aspects legible and measurable as well as to understand decisions and explain consequences. Show and review ideas and decisions visually, in models or 3D. Draw and illustrate text and meeting notes.
- **Make use of visual communication and graphic representation** as an important method to make issues more explicit, overcome boundaries, facilitate understanding and improve communication (e.g. flowcharts, drawings, sketches, (bubble)diagrams, simplifications,

pictograms, references, models, illustrations and schematic images). Moreover, as a power tool for proposals, certain issues and important aspects to be noticed and reviewed.

c) Structure and determine organization, management and leadership

- **Clarify organization and establish organizational structures** for planning, design and operational processes with contact, communication and interaction (if possible avoid dependent hierarchical structures, consider independent or interdependent flat network structures). Describe and determine relationships.
- **Determine leadership** for planning, design and operational perspectives as *shared space and use* is leadership dependent. Operations and facility management have an essential role and part in the process.
- **Establish roles, responsibilities and demarcations** for planning, design and operational processes (clarify what is expected of actors during meetings, ensure commitment, discuss and agree on e.g. management, facility management, maintenance, routines, procedures).
- **Clarify, determine and describe how to work, collaborate and cooperate** as it influences design and configurations.
- **Ensure awareness and understanding of organization, structures, leadership, roles, responsibilities and demarcations**

d) Develop process and time schedule

- **Plan reconciliations, check-ups, gateways and intermediate steps** for coordination, decision-making and anchoring of the process to avoid *'working too far'*, minimize risks and accumulated cost (e.g. sketch, calculate, propose, decide and proceed).
- **Plan the process to enable gradual development over time** - some decisions and solutions may need exploration and time to *'mature'* or need to be developed in process to *'gradually find the path'* through reasoning and input.
- **Keep some issues open while still evolving and moving forward - make gradual decisions -** consider early on what has to be decided and what can wait to be programmed and designed.
- **Establish a quorate internal process** to manage decisions and make sure that decisions are made in the right order.
- **Develop strategies for uncertainty and change** - clarify and be aware that changes will occur.
- **Educate actors about the process** to clarify and establish knowledge of stages, e.g. that there are consequences of what is said and that the greatest influence on impact and cost is during early stages to avoid changes and requests being brought up too late (connected to theories and models such as MacLeamy Curve and cost influence throughout life cycle).
- **Ensure awareness and understanding of process, design and decision-making order**

e) Establish culture

- **Establish active participation, transparency and openness with sharing and learning** to facilitate anchoring, quick decision-making, agreement, compromise and priority.
- **Make sure that all actors and groups prepare in advance and are ready on time -** establish and finish regulatory and governing documents before project initiation to avoid delay and slowdown of the process.
- **Establish openness with open minds** - motivate and encourage, manage attitudes, avoid preconceptions as well as to out rule, judge or condemn ideas and solutions in advance.
- **Ease prestige and individual interests - establish a** *'give and take'* **approach -** prevent seeing to own needs and taking care of oneself.
- **Manage and work against conventions and conservatism** (e.g. habits, fear, resistance, previous experiences, unwillingness) - establish understanding that it will not be as usual.
- **Be aware of the importance to listen**

- **Emphasize and focus on communication and documentation** - constantly express and clarify issues, problems and when notice is needed.
- **Establish strategies to solve conflicts** for planning, design and operational perspectives to avoid not being able to move forward in processes (e.g. *'take one step back and reconnect to intentions and drivers - why share?'*, apply methods and approaches from partnering, cooperation, network and collaboration theories).

f) Establish framework and preconditions
- **Establish common documentation** - agree on and sign to function as a *'common ground'* to bring along throughout the process. Moreover, to safeguard and bring forth intentions for information not to be lost as well as to prepare and save time when actors are changed or involved later in the process.
- **Try to make use of as distinct, stringent and precise formulations as possible** to clarify reasoning and facilitate argumentation (can however be difficult in early stages and also depends on if a dynamic or static approach is applied).
- **Define and establish frameworks** concerning e.g. time, financial, organizational and physical (detail plan and property related issues).
- **Discuss and establish agreements on project economy, management of costs and economic aspects** (e.g. cost, expenses, investments and financing as well as rental division, distribution and allocation; *how to co-finance? economy and budget for common spaces? what can be created, afforded and acquired? how to rent - according to percentage of use?*). Each stakeholder should define an ambition on decreasing costs for operations and premises.
- **Consider and determine responsibility of expenses early in initiation** both for construction as well as facility management and operational perspectives to prevent later savings, unfavorable compromises and increased difficulty in retrospect.
- **Make economical estimates based on rental limits for actors and operations to establish basic conditions for project and operational budgets** - establish and balance investment and income levels with rental costs.
- **Establish cost margins** for project economy and budgets.
- **Consider and develop strategies for extra or unexpected costs and expenses** (e.g. in relation to functions and resources).
- **Establish cost and consequence awareness of abuse among actors and operations**

Step 2 – Identify, analyze and determine drivers, requirements and needs among actors

- **Establish intentions, statement of needs, drivers and incentives for sharing among involved actors** - account for, analyze, clarify, understand, balance and agree on *'why share? what is wanted, needed or desired? and how?'* (e.g. objectives, goals, interests, visions and motives) to determine standpoints, synergies and potential flexibility as a basis for compromise and negotiation. Organize and manage planning based on outcomes and incorporate aspects early.
- **Consider and determine expectations, important aspects, values and ambition levels**
- **Establish awareness, understanding and consensus on the meaning and seriousness of the concept** *shared space and use* - clarify among all actors what is meant by the concept, how it is interpreted and understood to early on establish a mutual mindset.
- **Determine typology of shared use of facilities** as a first orientation to establish a starting point, e.g. according to Brinkø et al. (2014).
- **Identify, compare, analyze and define operational specific needs, values, demands, preconditions and requirements** (e.g. performance and operational procedures, working methods and personal contact).
- **Determine if there are any governing operational facility preconditions** - solve to minimize conflict and influence on design, or determine allowed degree of influence.
- **Consider privacy, integrity and secrecy issues and demands among actors**

- **Discuss and determine activities, functions and use as well as scheduling and spatial utilization over time** to establish what is possible to share, create jointly or in common, e.g. determine scenarios according to Gustafsson and Park (2015).
- **Establish descriptions and specifications of operations, functions and activities**
- **Establish and work through strategic programs - consider other functions that may be required** (if any, consider documenting existing facilities and premises).
- **Determine levels and extent of flexibility and generality in relation to cost** - avoid setting too high demands as it affects design, dimensioning and may cause increased expenses, investment, difficulty or compromises. However, also consider possibilities to enable different kind of use in relation to uncertainty, change, adaptability and development (e.g. versatile use, multi-use, multifunction, dual-use or activity based work).
- **Discuss spatial and qualitative values -** formulate in bullet points or short text to create a starting point and facilitate argumentation.

Step 3 – Formulate goals and make priorities

- **Establish common goals, strategic objectives and a clearly defined goal formulation** to have as *'common ground'*, facilitate common understanding and early on incorporate a mutual mindset. It will function as an important framework to return to during the process, which may prevent and handle conflicts as many actors are involved.
- **Consider making use of *'three aspects/points'* to describe goals**
- **Make priorities, establish a priority order and continuously raise important aspects throughout the process** to facilitate compromise and negotiation, avoid disappointment as well as maintain trust and important qualities if savings are needed. It can possibly function as a tool to handle uncertainty of economical estimates in early stages to avoid unfavorable compromises later on.
- **Make use of economy as a *'tool'* to test *'the willingness to pay'* in relation to requests and *'wish lists'*** to help determine desirability, drivers, *'must haves'*, core values and priority, which may differ in terms of own operations and sharing with others.

Step 4 – Analyze, synthetize and test solutions - consider several alternatives

- **Map and analyze context to connect and become familiar with activities and surroundings** (e.g. viable conditions, knowledge of market, what to integrate/connect to).
- **Investigate, analyze and determine similarities, synergies and co-location potentials** - focus on common and similar aspects rather than differences, however map and analyze both - seize opportunities to incorporate functions (e.g. collaborative gains, exchange, interaction, cooperation, meetings).
- **Identify, analyze and consider dependencies, connections and correlations**
- **Consider, discuss and incorporate technical systems early on**
- **Identify and find placements of *'odd/specific'* spaces and connections** (not shared, common or general).
- ***'Be smart in sorting program issues'*, adapt *'content'*** - how to incorporate program and achieve effective use of premises. Estimate and balance capacity, area and spatial needs. Adapt to demands and consider in relation to time and scheduling, e.g. scenarios according to Gustafsson and Park (2015).
- **Consider and balance *'meeting needs vs. adapting'*** - what is necessary for spaces, facilities and the building system to accommodate and facilitate? what can be handled through adaptation, organization and operational routines?
- **Define shared and common spaces** - consider parts intended to share or not, discuss needs and preferences of common areas (what and how?).
- **Limit *shared space and use* to common, similar or non-specific functions and needs** - major differences become specific or separate spaces, dedicated and designed for actors and operations.

- **Determine use of spaces and clarify functions** - handle demarcations, boundaries and rules to prevent conflicts (e.g. how spaces are intended to function, how to use and share).
- **Establish zoning and handle privacy vs. public degrees** - **consider possibilities to divide, delimit and close of parts at times**
- **Consider location, flow, movement, transportation and entrance functions** - important holistically and over operational boundaries.

Step 5 – Evaluate and adjust solutions - Consider budget

- **Consider and highlight the importance of quality** as it affects economy in the longer perspective (connected to theories and models such as MacLeamy Curve and cost influence throughout life cycle). Balance quality with economy to establish greater proximity and base decisions on that approach.

Step 6 – Make fundamental choices

- **Reach and confirm agreements**

Step 7 – Refine and consider details - Identify issues and problems - Process and handle

- **Review and highlight practical and logistical aspects, solutions and issues -** consider span between visions and implementation.
- **Balance operational and property/facility management needs** (*'wanting more vs. less'*)
- **Discuss and determine details in ownership and demarcations of shared and common spaces - establish** *'togethership'*
- **Consider safety and security issues** - establish and determine strategies for access, lock and security systems.
- **Consider damages and increased wear** as it emphasizes the need to make conscious and durable choices of materials and products. On the other hand, it provides reason and opportunity for renewal, conversion, change and alteration to maintain standard and quality every so often.
- **Develop a resilience plan for future changes and scenarios** to handle issues such as expansion or reduction in extent and need of space and facilities.

Step 8 – Conclude, compile and communicate for next stage in process

General conclusions and recommendations for future research

According to research findings, there is no consensus as well as various understandings and associations in relation to the concept *shared space and use*. It is not a clearly defined or established concept as it constitutes a broad area with many different aspects and drivers. It is consequently considered as important to define the concept as a basis for development within the area as well as to facilitate and improve collaboration and communication in planning and design processes. The thesis contributes with initial understanding, however further studies are needed to expand knowledge and establish wide agreement on the concept.

Based on responses, it can be concluded that there are various approaches to planning and design of *shared space and use*. It is not possible to claim one approach as more suitable than others, rather that more research and evaluation is needed. Support and explanations to phenomena which appear can be found in theories and models. There are not principal differences compared to other types of projects, however increased complexity and many actors introduces higher demands to work through process steps

more thoroughly. Practice express uncertainty with lack of knowledge and frameworks in relation to the topic and emphasize collaboration, communication, leadership and process management as important. There is consequently need to synthesize knowledge between theory and practice in order to define and explain the topic. It is furthermore motivated to analyze, compile and build upon experiences from practice to support development and improvement. *Shared space and use* can be considered to require some degree of experimentation, which consequently makes structure and tools more important. Further studies could hence focus on approaches, tools and methods to facilitate planning and design. One potential approach could be to develop and improve architectural programs as it constitutes a strategic communicative tool and documentation. However, it is also necessary to conduct further research to confirm the need of architectural programs.

It can be concluded that there is need to improve communication and process management in early stages to overcome boundaries as well as develop relationships, knowledge, understanding and awareness among actors. Increased coordination is furthermore needed to manage the complex variety of actors and aspects in order to create a *'common path'* for collaboration and cooperation. The thesis forms a basis for further research and development within the area. It contributes with knowledge and emphasizes potential methods and approaches in planning and design. Based on empirical findings, further studies could focus on use of visual communication and graphic representation in planning, design, architectural programs and early stages. Moreover, if images and illustrations can be used in greater extent as specifications to communicate, clarify, set requirements and govern.

The thesis highlights and brings forth a current and relevant topic to the societal discourse *'a changing society'*. It does not claim to be comprehensive or final, since the area of study is complex and in development. It however contributes to practice, the research field and the connected architectural case with further knowledge and better understanding of *shared space and use* as well as planning and design in early stages. It may not only prove to be useful for projects with *shared space and use*, high complexity or collaboration among many stakeholders, but also be beneficial to other and less advanced projects.

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Appendices

Intervjufrågor

Syftet med intervjustudien är att kartlägga hur planering av samnyttjandeprojekt utförs i tidiga skeden, vilka kommunikations- och dokumentationsmetoder som används samt vad som kan förbättras och utvecklas.

Övergripande om samnyttjande
- Hur skulle du beskriva samnyttjande, nämn några ledord du associerar med begreppet?
- Vilka fördelar, mervärden, kvaliteter respektive nackdelar ser du med samnyttjande?

Intentioner (bakgrund, visioner, drivkrafter och mål)
- Beskriv kortfattat bakgrund, vision och mål för projektet.
- Vad var drivkraften/drivkrafterna till samnyttjande i projektet?
- Uppstod målkonflikter i projektet – om ja, vilka?
- Hur kom man fram till en gemensam målbild i projektet?

Planering av samnyttjande i tidiga skeden
- Beskriv översiktligt hur samnyttjandeprojektet planerades under tidiga skeden.
- Vad är viktigt att ha i åtanke i planeringen av samnyttjandeprojekt i tidiga skeden? - Varför?
- Vad fungerade bra respektive mindre bra i planeringen under tidiga skeden?
- Ser du något som karaktäristiskt särskiljande i planeringen av samnyttjande jämfört med andra projekt? – om ja, vad och varför?
- Hur hanterades kompromisstagande och prioritering i projektet?
- Hur hanterades eventuella skillnader i verksamheters funktion i planeringens tidiga skeden?
- Uppstod några mervärden eller synergieffekter under planeringen? – om ja, vilka och hur?
- Lyftes kvalitativa värden* fram i planeringens tidiga skeden? – om ja, vilka, hur uttrycktes och säkerställdes dessa?
  (* svårmätbara eller omätbara värden så som samband, relationer, kvalitet, perception och upplevelse, estetik och sociala aspekter)

Metodik, kommunikation och dokumentation
- Hur skedde kommunikationen i tidiga skeden för att definiera projektet?
  - Vad fungerade bra respektive mindre bra? – Varför?
- Hur förankrades projektet genom dokumentation under tidiga skeden i planeringen?
  - Vad fungerade bra respektive mindre bra? – Varför?
- Vilka metoder och verktyg för kommunikation och dokumentation användes i planeringens tidiga skeden?
  - Vad fungerade bra respektive mindre bra? – Varför?

Framtida förbättring och utveckling
- Uppstod några utmaningar eller problem i projektet? – om ja, vad och varför?
- Vad ser du som de största hindren för planering av samnyttjandeprojekt i tidiga skeden?
- Vilka lärdomar från erfarenhet av planering av samnyttjandeprojekt har du att delge?
- Ser du något att förbättra eller utveckla vad gäller planering av samnyttjandeprojekt i tidiga skeden – om ja, vad, varför och hur?