Realising the potential of shared space in facilities management

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Realising the potential of shared space in facilities management

November 2016
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Preface

This dissertation is the result of a three-year PhD project, entitled “Sharing space in the Knowledge City”. The project was co-founded by the Technical University of Denmark, DTU Management Engineering, the municipality of Copenhagen, the municipality of Lyngby Taarbæk and the private company ICEconsult.

The project has been conducted at the Centre for Facilities Management at the Technical University of Denmark, and two supervisors have been connected to the project;

- Main supervisor; Susanne Balslev Nielsen, Associate Professor at the Technical University of Denmark, Department of Management Engineering
- Co-supervisor; Juriaan Van Meel, Senior Researcher at Centre for Facilities Management, and Co-founder and partner at ICOP

The dissertation investigates the intricate dynamics and processes of *shared space* from a facilities management perspective, focusing on defining what a shared space is and the processes involved in establishing and working in one.

Kongens Lyngby, November 2016

Rikke Brinkø
Ph.d. Fellow

Acknowledgements

This dissertation is the result of a three year PhD project, titled “sharing space in the knowledge city”. The project was co-funded by the Technical University of Denmark, The municipality of Copenhagen and ‘Københavns Ejendomme’, the municipality of Lyngby-Taarbæk and ‘Centre for Arealer og Ejendomme’ and the private company ICEconsult.

Throughout the PhD I have met and had help from a wide range of people that all have contributed to the development of my PhD in one way or another, and I am grateful to each and every one for their assistance during the entire research project.

First of all I would like to express my gratitude to my supervisor and co-supervisor; Associate Professor Susanne Balslev Nielsen and senior researcher Juriaan van Meel for their guidance, feedback and support through the many stages of the PhD, and for keeping me on my toes during this last phase of finishing this dissertation.

Many thanks go to all my previous and current colleagues at both the ‘Centre for Facilities Management – Realdania Research’ and ‘Climate Change and Sustainable Development’ for the many discussions, continuous support and inspiration during the project, and also the Lyngby-Taarbæk City of Knowledge Association with whom I have had a close collaboration with throughout the project. Thank you for your continued support, help and assistance throughout my project.

Furthermore, during my PhD I was visiting researcher at the research group TrinityHaus at Trinity College Dublin. I would like to thank Professor Mark Dyer and research fellow Thomas Grey for their hospitality and valuable guidance and feedback during my stay. The new research methods, approaches and topics I was introduced to during my stay have been a very valuable contribution to the development of my project, as well as the final results, presented in this dissertation.

A very special thanks also goes to the many practitioners who have helped me during my case studies and interviews. Especially Dick Gleeson and Dave Smith in connection with Mabos; Anne Juel Rasmussen, Charlotte Larsen, Christina Bech Hansen and Pernille Weiss Terkildsen in connection with the case Elisabeth Centre; Lise Hammershøj, Trine Tybjerg and Erik Schwartzbart in connection with Musicon; Signe Abildå, Flemming Knudsen, Helle Bøg Hansen, John Mortensen, Jan Poulsen and Charlotte Hvid in connection with Lyngby Idrætsby; Yolanda Steijns, Tom Jonker and Marijke de Jager in connection with IKC Zeeburgereiland and Charlotte Mark, Mette Pilgren, Sidsel Poulsen and Christian Andresen in connection with Microsoft, and many more. Not to mention master student Rikke Lindquist, who as part of her project on realisation of shared space connected to the PhD, collected valuable empirical material for the case of Elisabeth Centre through interviews, observations and workshops.

Finally, I would like to thank my family for their unconditional support throughout my PhD; for believing in me and keeping me motivated through tough deadlines and long hours at the office.

Kongens Lyngby, Rikke Brinkø
November 2016

Dansk resumé

Som et globalt samfund, har vi nu passeret vendepunktet og mere end halvdelen af jordens befolkning bor nu i byer, og flere og flere flytter til byerne hver dag. Selvom de store bysamfund der opstår som følge af denne befolkningstilvækst kommer med mange fordele, står de stadigt voksende byer i både Europa og rundt omkring i verden over for mange udfordringer. En væsentlig af disse er, at den øgede befolkning kan gøre det vanskeligt at sørge for tilstrækkelige kvadratmeter, da en øget befolkningstilvækst betyder en øget befolkning, der har brug for et utal af forskellige faciliteter, for at gøre livet i byerne muligt.

Byudvikling og udvikling af nye urbane profiler har traditionelt set været fokuseret på at bygge nyt, men med stigende befolkningstal vil plads til nybyggeri i byer uundgåeligt blive mindre og ikke mindst dyrere. Så med tydelige fysiske begrænsninger og stadigt udfordrende økonomiske omstændigheder er det 'bare' at bygge nyt ikke altid en mulighed – ønskeligt. Vi er derfor nødt til at begynde at nytænke 'byen', og det er her Shared Space har potentiale til at spille en rolle.

Shared space er en samlet betegnelse for lokaler, bygninger og faciliteter, der deles mellem enkeltpersoner eller grupper fra forskellig organisatorisk kontekst, og denne Ph.d. undersøger de komplekse processer der er involveret i shared space i en facilities management kontekst. Det overordnede mål er opdelt i en teoretisk og en praktisk del, med den teoretiske del fokuseret på at bidrage med ny viden om shared space, med det formål at bidrage til udviklingen af en ny metode til en mere effektiv og bæredygtig drift af bygninger og ejendomme. Den praktiske del er derimod fokuseret på at forbinde denne nye viden til praktisk anvendelse og udvikle værktøjer, som kan bruges til at arbejde med shared space i praksis.

Ph.d'en er forankret i litteratur fra en række forskellige områder strækkende sig fra facilities management til byplanlægning og byudvikling, og tager herfra en kvalitativ tilgang til studiet af de komplekse processer der indgår i at arbejde med, og i, shared space. Projektet benytter casestudier som metode til at besvare de opstillede forskningsspørgsmål, suppleret af empirisk data indsamlet gennem interviews, observationer, workshops og spørgeskema undersøgelser, og understøttet af case relevante dokumenter og litteratur.

Overordnet set bidrager denne afhandling og ph.d.-projektet bag det med flere resultater til både teori og praksis. Med udgangspunkt i de empiriske data og gennem grundig analyse af de mange forskellige cases undersøgt igennem Ph.d'en, er der udviklet en typologi over delt brug af faciliteter og lokaler samt en guide til shared space i kommuner. Typologien opdeler shared space i tre hovedkategorier alt efter graden af deling, og definerer en række karakteristika for shared space, med det formål at skabe et udgangspunkt hvorfra shared space kan diskuteres, udvikles og arbejdes med indenfor både den akademiske verden og praksis. Guiden derimod er en syntetiseret udgave af den samlede mænge teoretisk viden der er udviklet gennem studiet, kombineret med en række skridt der skal udføres i praksis, udformet i samarbejde med praktikere. Denne kombination betyder at guiden udgør en komplet vejledning til at arbejde med shared space i en kommunal bygningsportefølje, lige fra identificering af potentiale på porteføljе niveau, til at vurdere det endelige resultat efter ibrugtagning.

Gennem processen med at identificere disse centrale aspekter af shared space samt det overordnede studie af de komplekse processer der er involveret, blev tre temaer, territorialitet, involvering og praktikaliteter identificeret som værende afgørende når der arbejdes med shared space. Disse temaer blev efterfølgende undersøgt i både litteraturen og det indsamlede empiriske materiale, og er i kombination med typologien og guiden beskrevet tidligere, det endelige resultat af Ph.d'en.

Det samlede arbejde udført undervejs i ph.d'en er dokumenteret i fem videnskabelige artikler og opsummeret i denne afhandling. Forskningen bidrager til både teori og praksis, og bidrager til den indtil videre meget begrænset viden om emnet.

English summary

As a global society, we have passed the pivotal point and more than half of the earth's population now live in cities, with more and more people making the choice to live in cities each day. Though the large urban communities resulting from this population migration come with many advantages, the growing cities of Europe as well as the world face numerous challenges. An essential one is that the population redistribution can make it difficult to provide adequate space for the population, since people moving to cities means an increased population that needs a myriad of different facilities, and spaces to accommodate these functions to make city-life work. Urban development and development of new city profiles has traditionally been focused on building new, but with increasing populations, urban space for new buildings will inevitable become increasingly scarce and expensive. So, with physical constraints and still challenging economic circumstances, just building new is not always an option – or desirable. We must therefore start rethinking the city, and this is where shared space has the potential to play a role.

Shared space is a collective term for space and facilities that are shared between individuals or groups from different organisational contexts, and this PhD investigates the intricate processes concerning shared space in a facilities management context. The overall aim is divided in a theoretical and a practical part, with the theoretical focused on contributing with new knowledge of shared space, building towards a new method for efficient and sustainable facilities management operation of buildings and properties. The practical part is focused on connecting this new knowledge to practical applications and developing tools that can be used to work with shared spaces in a practice.

Grounded in literature from a variety of fields stretching from facilities management to urban planning and development, this PhD adopts a qualitative approach to the study of the intricate processes involved in working in, and with, shared space. The study employs case studies as the method of choice for answering the research question set forth, backed by empirical data collected through interviews, observations, workshops and surveys, and supported by literature and case relevant documents.

Overall this dissertation and the PhD project behind it offer several contributions to both academia and practice. With base in literature, the empirical data and through thorough analysis of the many different cases studied throughout the PhD, a typology of shared use of space and facilities and a guide to shared space in municipalities have been developed. The typology categorises shared spaces in three main categories according to degree of sharing, and lists a number of characteristics of shared spaces to provide a starting point for discussing, developing and working with shared space in both academia and practice. The guide on the other hand synthesises the theoretical knowledge resulting from the study in general, as well as the work having gone in to the development of the typology, and combines it with a number of practical steps to be taken co-created with practitioners. Through this combination it presents a complete guide to working with shared space in a municipal real-estate portfolio, from identifying potential on a portfolio level to evaluating the final result after the space has been taken into use.

Through the process of identifying these key aspects of shared space and the study of the intricate processes involved, three themes, *territoriality, involvement and practicalities*, were identified as essential when working with shared space, and these in combination with the typology and the guide described, are the final result of the study.

The work conducted throughout the PhD is published in five scientific papers and are summarised in this dissertation. The research contributes to both theory and practice, and adds to the so far very limited knowledge on the topic.

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1. Introduction

The topic of this dissertation is *shared space* in a facilities management context, with a focus on the sharing of physical space and facilities. This first section will introduce the overall research project by outlining the motivation and background for the PhD project, followed by a description of the research objectives, and lastly the structure of the dissertation.

1.1 Motivation and background

With global development continuing to move towards cities being the preferred place to live, the capacity of cities all over the world is being pushed to the limits. We have passed the pivotal point and more than half of the earth's population now live in cities, with more and more people making the choice to live in cities each day. More precisely is 53% of the world's population currently living in cities (The World Bank, 2012), and this is expected to rise to 64.1% in the global south and 85.9 % in the global north by 2050. Though the large urban communities resulting from this population migration come with many advantages, the growing cities of Europe as well as the world face numerous challenges, and an essential one is that the inhabitants of these cities need space that support their endeavours. This population redistribution can make it difficult to provide adequate space for the population, since people moving to cities means an increased population that needs a myriad of different facilities, and spaces to accommodate these functions in order to make city-life work.

Urban development and development of new city profiles has traditionally been focused on building new, but with increasing populations, urban space for new buildings will inevitable become increasingly scarce and expensive. So with physical constraints and still challenging economic circumstances, just building new is not always an option – or desirable. We must therefore start rethinking the city, and this is where shared space has the potential to play a role.

A good example can be found in the Netherlands, where a school in Arnhem (Brinkø, Nielsen, & Meel, 2014) have introduced a new concept, initiated by a dad who noticed an empty class room at the elementary school of his daughter. Being self-employed, he considered it an excellent alternative to his workplace at home, and working there would save him the hassle of going back and forth to bring and get his daughter. The school was sympathetic towards his ideas and provided desks, Wi-Fi and a coffee machine. The space is now occupied by a group of self-employed parents, tapping away on their laptops while their kids are having lessons. The parents can use the space for free in return for doing small jobs, such as watching the playground during breaks; the result is empty space being put to use - the parents have a workspace and the school gets extra hands.

The example is part of what seems to be a wider trend towards *sharing*, sparked by an increased focus on sustainability and optimised use of resources over the last decade or so. The mind-set of many are moving towards "access rather than ownership" (Botsman & Rogers 2010), and new business concepts are popping up at a rapid rate. Accommodation can be found via AirBnB, transport through Uber, services through Upwork, working space at coworking offices and the list goes on. Some of these business and concepts that started out not many years ago as small independent initiatives, such as AirBnB, has now reached a point where they are surpassing the established industry (Penn & Wibhey, 2015).

And this is one of the reasons why space sharing is interesting. We already share much more than we may realise, but when considering sharing most people often think about the typical aspects of sharing, such as sharing a car, a summer home, bicycles and the like. Therefore, we rarely consider the opportunity to share on a broader scale, although it may be a golden opportunity for many to not only utilise their resources better, but also in terms of what can be gained by entering into partnerships with others. There may be opportunities to share a myriad of different spaces and different aspects of both

private and public facilities in our cities. This paves the way for intensification of use, allowing different types of users and different uses over time. Such intensification might improve the liveliness of neighbourhoods, increase sustainability, and strengthen the ties between private individuals, companies and cities.

In this regard shared space is a space management related concept that can lead to positive effects for multiple stakeholders. A user will potentially be able to gain access to a much larger range of facilities than usual, either free of charge or for a fee for the access and use. From the perspective of a facilities manager, who has the task of ensuring a satisfactory use rate of a certain building or space, the shared space movement can be a positive development that can help intensify the use of buildings that are otherwise underutilised. Because it is clear that sharing is starting to move outside office space and office buildings, where non-territorial- and open space offices have been on the agenda for some time now, and into a broader spectrum of buildings and organisations as an alternative sustainable view on property-, real-estate and space management. The focus is on optimising use by allowing different types of use and users at different times of the day or different times of the week. From a societal development perspective there is a deliberate agenda of creating lively and attractive urban environments which can stimulate cultural and economic innovation, and the increase of people using the facilities and the mix of user groups is a strategy for many innovation hubs. The definition of shared space developed for the research project encompasses these characteristics, and it is: "**Multiple individuals/ groups/ organisations/ businesses, organisational independent of each other, making use of the same space, either simultaneously or serial"**

The critical factor is that both private and public organisations should take a critical look at their real-estate portfolio and question the need to necessarily have 'own' buildings, rather than sharing facilities with other organisations or people. From a municipality's perspective the question could for example be, do we really need to provide all schools and communities with their own sports facilities, playgrounds etc.? For a private company the question can be: Do we really need to build a large expensive lab facility just for ourselves, or can we team up with other companies, and thereby also get a more sustainable and optimised use of the facility, reduced costs and maybe increased synergies? In short; could we share our facilities with others, and what would be the benefits or disadvantages?

1.2 Research objectives

With a base in the issues outlined above, the objectives of this research project revolve around a number of different aspects of exploring the topic of shared space in a facilities management context. The overall aim is divided in a theoretical and a practical part, with the theoretical focused on contributing with new knowledge of shared space, building towards a new method for efficient and sustainable facilities management operation of buildings and properties. The practical part is focused on connecting this new knowledge to practical applications and developing tools that can be used to work with shared spaces in a practice.

The research project is based on a combination of theoretical studies in the form of literature reviews, as well as empirical studies in the form of case studies, interviews, workshops and surveys. The research question formulated to guide this endeavour is;

How can shared use of facilities and spaces be understood and what mechanisms and processes are involved?

- *What is shared space in a facilities management context*
- *What types of shared space are there?*
- *What are the benefits and disadvantages of shared space?*
- *How can a building be evaluated for potential for sharing?*
- *How can shared space be implemented in practice?*

These questions have been studied during the three year PhD project with the main objective of contributing with new knowledge of shared space, building towards a new method for efficient and sustainable facilities management operation of buildings and properties,

1.3 Structure of the dissertation

This dissertation is divided in two parts;

1. Part one introduces the research topic and motivation behind the study, and presents the theoretical and methodological framework for the project, as well as an overall summery of the work carried out for the PhD project.
2. Part two is constituted by the individual papers produced during the PhD

Part one will present the following sections: The first chapter presented is the **Introduction (chapter 1)** followed by **Research design (chapter 2)**, describing the overall research approach, research framework, the research methods employed during the study as well as considerations regarding validity, reliability and limitations of these method. **The theoretical background for the study (chapter 3)** describes the theoretical knowledge the research is built upon, focusing on the sharing economy, shared space and facilities management. **The empirical field (chapter 4)**, meaning the case studies, are presented next, introducing the many different cases that have been studied during the research project. **The findings (chapter 5)** present the main results produced during the PhD. **Discussion and conclusions (chapter 6 and 7)** presents a summery and discussion of the outcome of the PhD, using existing literature as base for comparison and evaluation. The section is finalised with an overall conclusion of the dissertation and the PhD project as well as thoughts on further research.

Part two is a selection of the papers produced during the PhD, and they can be found in the appendix. The appended papers are:

- Paper 1: Access over ownership: A typology of shared space (Brinkø, Nielsen, & Meel, 2015)
- Paper 2: Shared space in a municipal sports facility: The case of Lyngby Idraetsby (Brinkø & Nielsen, 2015)
- Paper 3: Shared space in practice and theory: A cross case analysis (Brinkø & Nielsen, 2016a)
- Paper 4: The characteristics to consider in municipal shared spaces (Brinkø & Nielsen, 2016b)
- Paper 5: Access over ownership: The case of meeting facilities in Lyngby Knowledge City (Nielsen & Brinkø, 2016)

2. Research design

Research design is "*the basic structure of a research project, the plan for carrying out an investigation focused on a research question that is central to the concerns of a particular epistemic community"* (Schwartz-Shea & Yanow, 2012). The choice of overall research design shapes the way a research project is conducted, and requires careful consideration. Moving from the overall philosophical standpoint towards the very specific choice of methods and data analysis techniques, and the importance of being aware of how the choices made shape the type of research conducted and the potential biases this entails. All of this is reflecting the researcher's fundamental view on science and the creation of knowledge.

In short, the research design shapes the way a project is carried out and describes the researchers' approach to conducting research. In accordance with this, the deliberate choice of philosophical standpoint, ontology and epistemology should fit with the research objevtives of a project and the research question they are associated with.

The following sections will outline the research design behind this dissertation, by describing the different parts that come together to make up the final design, beginning with the general research appraoch adopted, included in which are considerations regarding research philosophy, ontology, epistemology and axiology. This will be followed by a presentation of the methods chosen for the project and lastly considerations regarding validity of the data collected through these methods.

2.1 Research approach

The overall research approach for the study presented in this dissertation has been very inductive and structured as follows (Figure 1):

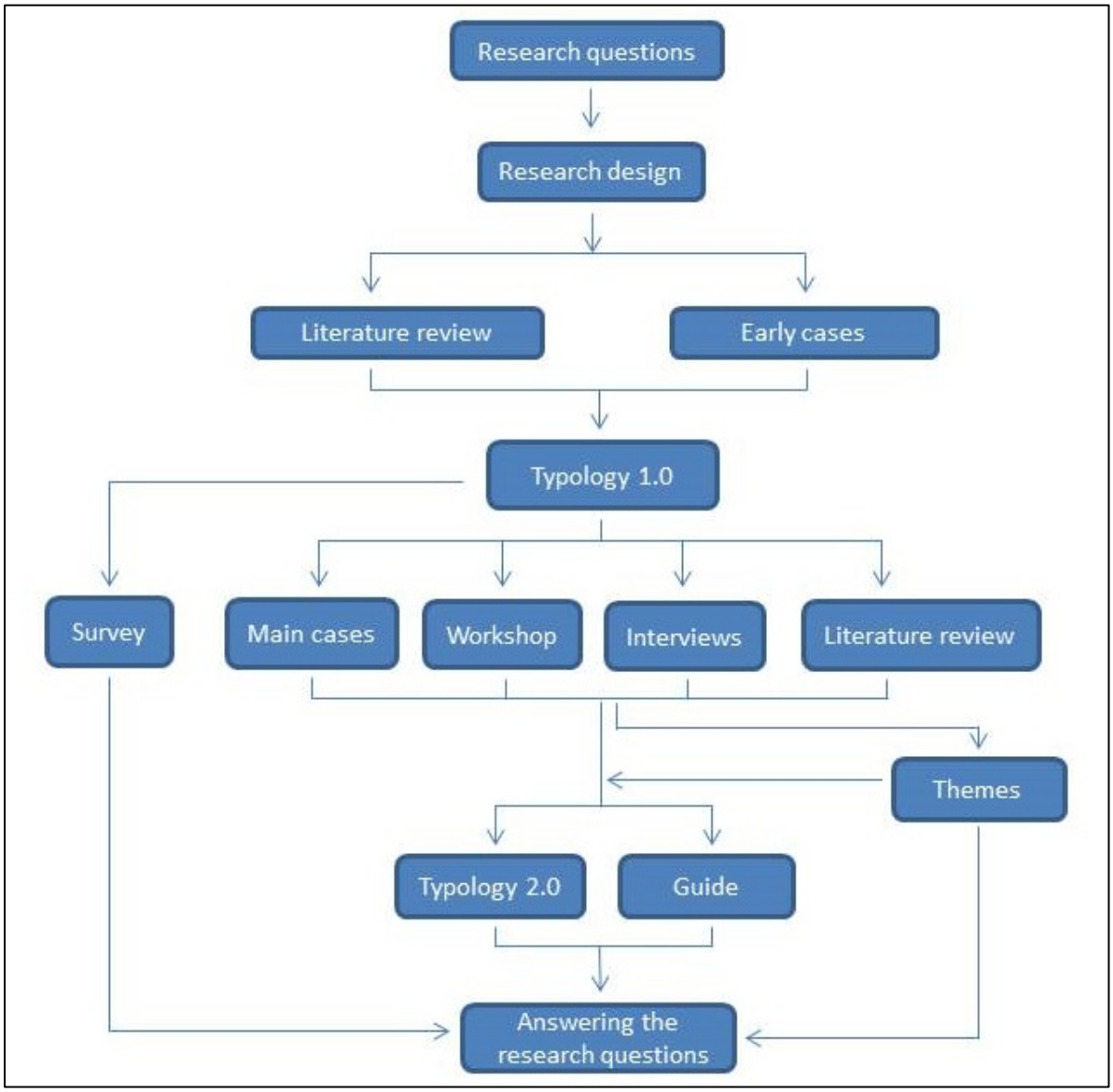


Figure 1: Research approach

This is of course an idealised process, and several of the steps have overlapped over the duration of the study while others has been carried out as a continues process throughout, such as keeping up to date with literature and practical cases. With this in mind, it still illustrates the development of the study over time and the main steps taken along the way.

In the following sections the different parts that make up the research design for this PhD will be described, starting with the overall research framework.

2.2 Research framework

Referring to 'the research Onion' presented by (Saunders, Lewis, & Thornhill, 2016), see Figure 2, there are a number of choices to make regarding both research philosophy, research design and research methods when conducting any research project. Where the approach describes the practical steps taken during the project, the research framework constitutes the more philosophical standpoint and view on knowledge and research, such as interpretivism vs positivism. The research onion in Fig-

ure 2, illustrates the overall choices to be made when choosing a research design, with overall philosophical approach in the outer ring and moving inwards towards the final choice of techniques and procedures in the inner circle.

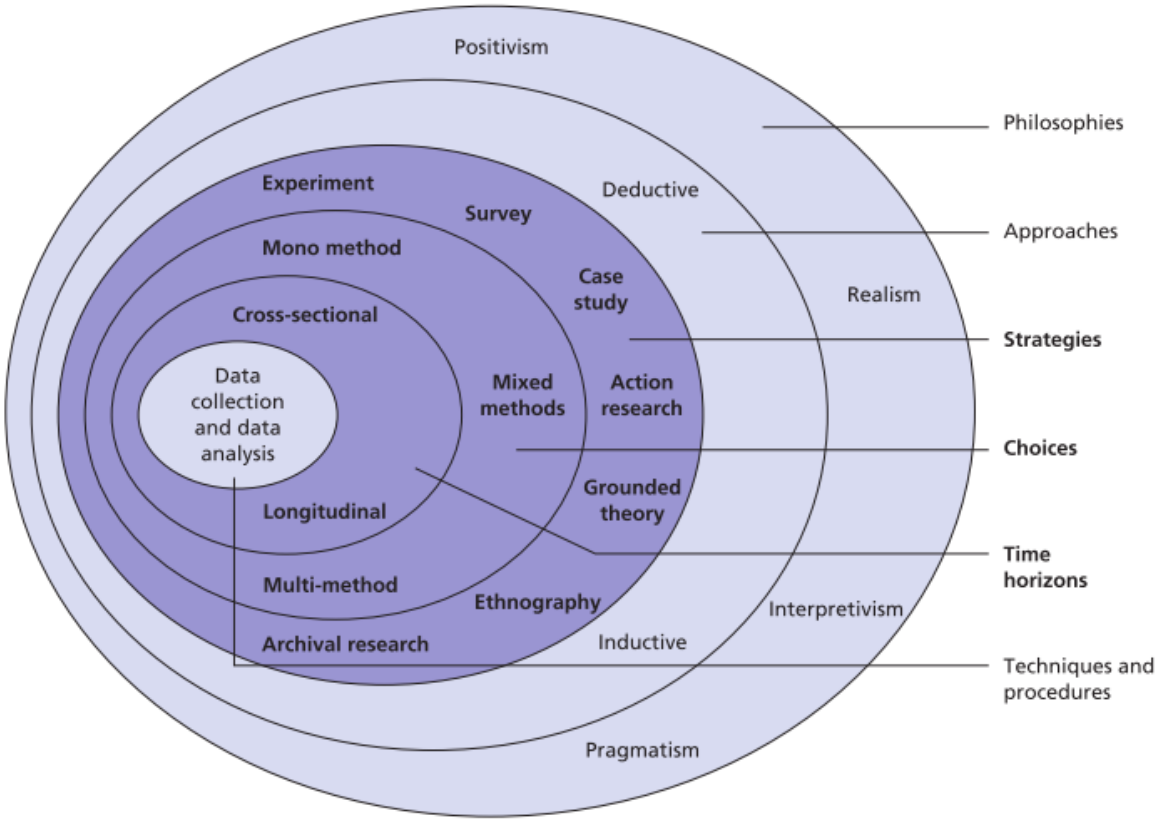


Figure 2: The research onion (Saunders et al., 2016)

The research onion have during the PhD been used as an overall guide in formulating and discussing the research framework, and will in the following along with additional information by (Saunders et al., 2016) connected to it, be used as an important reference and guideline in the presentation of the final research framework.

2.2.1 Research philosophy

There are a number of different traditions within the philosophies of science that reflects how one as a researcher views the relationship between knowledge and the process by which it is developed. The prevalent approach within the natural sciences is *positivism,* whereas the social sciences tends to lean more towards *interpretivism,* both of which will be described briefly in the following along with a third possibility, *pragmatism,* positioned in between the two. Going back to the research onion, these are pictured in the outermost layer of Figure 2.

Positivism is as mentioned dominant within the natural sciences; characterised by the stance that only phenomena that can be observed will lead to production of credible data. The research strategy for collecting these data is most likely formed by using existing theory to develop hypotheses that can later on be tested and confirmed or disproved.

On the other side of the philosophical spectrum *interpretivism* can be found, and it is this philosophy that the study presented in this dissertation lends itself to. Interpretivism is according to (Saunders et al., 2016) characterised by the stance, that the social world of for example management is too complex to be described by definite 'laws' in the same way as the natural sciences, and that the richness of this complexity is lost if reduced to a series of law-like generalisations. An interpretivist researcher will according to (Schwartz-Shea & Yanow, 2012) "*seek to understand what a thing 'is' by learning*

what it does, how particular people use it, in particular contexts. That is, interpretive research focuses on context-specific meanings, rather than seeking generalised meaning abstracted from particular contexts". (Saunders et al., 2016) describes the difference between the two philosophies, interpretivist and positivist, as the difference between conducting research among people rather than objects.

With this study aiming at understanding the mechanism involved in shared space, with a focus on the use and management of such a space, the users, *people*, play an important role in relation to the outcome. This makes it a type of study well suited to the characteristics of interpretivism, since the purpose of this type of research is to create new, richer understandings and interpretations of social worlds and contexts (Saunders et al., 2016).

With this being said, this study is not a pure interpretivist study, and borders on the philosophy of pragmatism, another philosophical approach, especially when it comes to the data collection methods being employed. For a pure interpretivist study the methods would according to (Saunders et al., 2016) be centred on qualitative studies with small samples and in-depth investigations. Pragmatist studies, on the other hand, lends itself to a much wider range of methods both qualitative and quantitative, with a focus on choosing the methods that are best suited to answering a given research question. An approach adopted for the study presented in this dissertation. This pragmatic choice of methods is a general characteristic of all aspects of the pragmatist researcher; choosing the approach and view that appears best suited to a given situation, whether it is associated with the positivist philosophy or the interpretivist. Since this dissertation mainly falls under the realm of interpretivism and only boarders on pragmatism, the deeper characteristics of pragmatism will not be further described.

From the choice of philosophical stand follows a number of assumptions related to ontology, epistemology, axiology and data collection methods, and these will be described in the following.

2.2.2 Ontology, Epistemology and Axiology

Ontology, epistemology and axiology are the branches within the philosophies of science that deals with the different aspects of the view on reality, knowledge and values in research.

Ontology is according to (Saunders et al., 2016) concerned with the nature of reality, and with a base in interpretivism as is the case with this PhD, the ontological assumptions of the researcher is that reality is socially constructed, subjective and may change over time. *Epistemology* concerns what constitutes acceptable knowledge in a field of study, and the view adopted for this PhD is due to the choice of an interpretivist study that such things as subjective meanings and social phenomena *is* knowledge as described by (Saunders et al., 2016). This entails that it is important to focus upon the details of a situation, a reality behind these details and subjective meanings motivating actions. (Saunders et al., 2016) describes *axiology* as the researcher's view of the role of values in research, and for a researcher within interpretivism and thereby the view for this PhD is that research is value bound. The researcher is part of what is being researched, cannot be separated and so will be subjective.

These assumptions and views on reality, knowledge and science in general influence how any research project is being conducted, and will therefore influence the type of result being produced. Since this is a mainly interpretivist study, the basic view is that the researcher is a part of what is being researched, which of course will introduce a number of biases that must be taken in to consideration in order to secure the validity of the study. On the other hand, the type of study also allows for a deeper understanding of the situation in question and the processes involved, making it possible to obtain insights that would otherwise not have been possible, which is exactly why this specific type of study has been chosen.

The research conducted for this PhD is mainly inductive, illustrated in layer two of the research onion in Figure 2, meaning that the process of research begins with the collection of data followed by an analysis from which a theory is developed, opposed to being deductive where the research begins

with a theory or a hypothesis from which a research strategy is developed to test this hypothesis. In some parts though, the project is also closely connected with the abductive approach, meaning continuous interaction and mutual development of theory and empirical field during the research, especially during latter parts of the PhD. The PhD consists mainly of cross-sectional case-studies, with some followed over long periods of time, in order to achieve both snapshots in time of a large variety of shared spaces, while also studying the more long-term development and issues arising over time in selected cases.

In addition to the philosophies of science as described above, another very important part of any research project, as also illustrated in the research onion by (Saunders et al., 2016) is the methods chosen to achieve the goals of the project and to analyse the data collected. The methods employed are closely linked with the type of research being conducted, and are an important part of the research design. The methods utilised for this study will be presented in the following.

2.3 Research methods

From the choice of research philosophy there follows a number of favoured methods, as briefly touched upon in the previous section. Since this is not a pure interpretivist study both qualitative and quantitative methods are employed, though with a significant emphasis on the qualitative. The specific methods used are presented in the following.

2.3.1 Literature review

An essential part of the study behind this dissertation has been to identify existing knowledge within the field; an endeavour that has been undertaken by use of systematic literature reviews. The method for conducting literature reviews during the study presented in this dissertation, is the "Eight steps for conducting a systematic literature review" presented by (Okoli, 2015), adapted to fit the specific needs, purpose and design of the study. The steps used are:

1. *Define the purpose of the literature review*: The purpose must be clearly defined in order to secure optimal consistency in the search and review process. In the initial phases of the study, the purpose has been to collect a broad section of literature connected to the field of shared space, in order to map existing knowledge within the area, and identify possible sources to form the theoretical starting point for a more in-depth exploration of the meaning and implications of shared space. In the later phases of the study the purpose shifted towards a focus on keeping the collected database of relevant literature updated with the newest published literature.

2. *Search for literature*: Since journal papers are an important part of scientific communication these were chosen as primary source for the systematic literature review. Four databases containing a broad and comprehensive spectre of journals and papers were chosen for the search (Scopus, Web of Science, DTU Findit and Google Scholar). All searches undertaken were done so by systematic use of two sets of pre-determined keywords; one set to specify the first initial round of searches for journals, and another to further narrow down the field for articles in a second round of searches. The main keywords used were *building, built environment, facilities/facility, property/real-estate, shared space* and *shared facilities*. In the later phases of the study, these same overall keywords were used for the regular searches to keep updated on the newest literature available, both scientific and popular.

3. *Practical screen and Quality appraisal*: An initial screen and quality appraisal was conducted based on paper abstracts, in order to identify the articles most relevant and to ensure sufficient quality. The screening process and criteria for selection was based on an assessment of relevance to the subject of the study.

4. *Data extraction:* After the literature search was completed, relevant information from each paper chosen was systematically extracted by the reviewer (me).

5. *Synthesis of literature review:* The last step in the process was analysis of the data extracted.

This method of conducting a systematic literature review was not only employed in the initial phases of the research project, but was also repeated in a less strict manner during the entire length of the project, in order to stay up to date on relevant literature and newly published material on the subject.

In addition to the main review on shared space, the method was also utilised in the later stages of the project on a different topic. In connection with the identification of the three themes territoriality, involvement and practicalities (described in chapter 3.5) in the empirical data, a separate literature review was carried out, following the steps outlined above. This was completed in order to develop a theoretical understanding of the themes to better support the conclusions made and guide the further studies.

2.3.2 Case studies

Case study research has been chosen as the main method for answering the research question set forth in this dissertation and due to the importance this choice will have for how the research project has been conducted; this will be described in detail in the following. First the overall methodology will be introduced, then the case selections strategy and then moving on the population and inferences.

Case studies is a method well suited to the detailed examination of specific events that may be generalizable to other events (George & Bennett, 2004), and is a strategy often used for examining a specific incident or phenomenon. Robert Yin defines the case study method as follows: *"As the first part of a twofold definition, a case study investigates a contemporary phenomenon (the 'case') in its real-world context, especially when the boundaries between phenomenon and context may not be clearly evident. The second part of the definition points to case study design and data collection features, such as how triangulation helps address the distinctive technical condition whereby a case study will have more variables of interest than data points"*(Yin, 2009). Relating to the motivation behind case studies (Flyvbjerg, 2006) states the following; "*For researchers, the closeness of the case study to real-life situations and its multiple wealth of details are important in two respects. First, it is important for the development of a nuanced view of reality, including the view that human behaviour cannot be meaningfully understood as simply the rule governed acts found at the lowest levels of the learning process and in much theory".*

(Yin, 2009) points to five traditional concerns that must be addressed if conducting a case study properly; these are;

- Conducting the research rigorously
- Avoiding confusion with teaching cases
- Knowing how to arrive at generalised conclusions if desired
- Carefully managing the level of effort
- Understanding the comparative advantage of case study research

The second point, 'avoiding confusion with teaching cases' is not considered relevant for this study, but in order to address the remainder of these points, careful consideration has gone in to deciding which cases have been selected as study objects for this research project. A pre-planned case-selection strategy was developed and employed, in order to secure selecting cases that would be suited for this particular study, as well as identifying the population and inferences that could be made on the basis of these choices

A more thorough description of this case selection strategy will be given in the following.

Case selection strategy

The case selection process has been divided in to two parts, the first focusing on creating and overall understanding of *what* shared space is and what overall characteristics define shared space, and the second part has been a narrower focus on the processes involved in establishing and managing shared spaces in practice. During both of these processes much thought has gone in to the design of the case selection strategy, the objective of which according to (Seawright & Gerring, 2008) is to have;

(1) a representative sample
(2) useful variation on the dimensions of theoretical interest

According to (Seawright & Gerring, 2008) the choice of cases is therefore driven by the way a given case is situated along these two dimensions ((1) and (2) above). The choice of cases for both these processes has been conducted according to a 'diverse case' selection strategy which purpose is "*the achievement of maximum variance along relevant dimensions*" (Seawright & Gerring, 2008), or "*to obtain information about the significance of various circumstances for case process and outcome*" (Flyvbjerg, 2006).

The 'diverse-case' selection strategy requires according to (Gerring, 2007) the selection of a set of cases – at minimum two – that are intended to represent the full range of values characterising X, Y or some particular X/Y relationship, with X being the potential cause and Y the effect. The diverse case selection technique can be used for both exploratory and confirmatory studies, and will be exploratory/hypothesis seeking when it is designed to focus on either a specific cause (X) or a specific effect (Y), and will be confirmatory/hypothesis testing when the study is designed to focus on a specific X/Y relationship.

For the study presented in this dissertation, the purpose is, among other things, to seek out potential causes that lead to shared space, meaning that it is an exploratory study with a focus on choosing cases where sharing is taking place in order to study the reasons behind. This means that Y will be instances/cases where sharing is taking place, and X the potential causes or reasons behind or leading to the sharing, also called a "positive-on-Y" framework (Gerring, 2007)

For the first part of the selection process, the focus of the selection has been to identify instances where sharing for one reason or another is being used in practice, and preferably in as many different forms, shapes, organisations etc. as possible, in order to map out a maximum variation of shared spaces. The variable of interest in this case - 'sharing' or 'shared spaces'- was defined as something that is either there or not, meaning a categorical variable, and the search resulted in a total of 22 cases/examples of shared space from all over the world. These 22 cases were collected through a combination of methods; word of mouth, newspaper searches, regular web searches and searches through academic literature.

For the second part of the selection, a number of cases were selected from the large pool of examples collected during the first part of the study. The variable of interest, sharing (Y), was still defined as a categorical variable, and was for this part of the process viewed as types according to the 'Typology of shared use of facilities', developed during the first part of the PhD (Brinkø et al., 2014) and presented in section 6.1 in this dissertation. This entails according to the description of 'diverse case' selection strategy by Gerring (2007), that a case should be chosen from each category – or in this study, from each type of shared space in the typology.

In addition to the decision of choosing a case from each type, there are also considerations to be made regarding which case to choose among the cases connected with each type - since each type is illustrated by a group of examples. Since it is expected that there is still diversity within the groups of examples belonging to each type, it is important to ensure that the chosen cases are typical for the

given type, so the case study does not focus on an atypical member of a subgroup (Gerring, 2007). This has been done by reviewing the examples within each type for commonalities, and hereafter choosing one that is typical for the type.

In addition to the criteria the design sets forth as described above, access to people and data have also played a role in choosing the cases within each type. The cases chosen for more in-depth studies are presented in section 4.1.

Case study population

The precondition of choosing cases that represent a maximum variation of shared spaces, also means that the population of the study is very wide and diverse; with the one thing in common that shared space is occurring. The population therefore, is not causally homogenous, which provides a very strict set of limitations regarding inferences. The reasons then, for structuring the study in this way and choosing cases that are so different, is that the purpose of the study is first and foremost to identify as many reasons for establishing a shared space as possible; answering the question – *why* people share. It is an exploratory study which, at least for this first part, is not focused on being able to make inferences to a wider population, but instead trying to identify and map as many different reasons for why sharing spaces and facilities takes place in general, over a wide, diverse population, in order to better understand the mechanisms involved later on. So what binds the cases together is that sharing is taking place, and what binds the targeted population together is that they – despite differences in organisation, management etc., - for one reason or another are interested in sharing space and/or facilities.

A motivation for not separating the study in to cases focused on, for example, either cases from the private sector or the public sector and thereby creating a more uniform population, is that it is believed that the mechanisms behind sharing space and facilities are more general than that. That for example municipalities – the public sector - may benefit equally from inspiration and knowledge from a case from the private sector and a case from the public sector and vice versa.

Inferences

The type of case study research is as mentioned based on a “diverse case” selection strategy, and in relation to representativeness this entails according to (Gerring, 2007); *“Diverse cases are likely to be representative in the minimal sense of representing the full variation of the population (though they might not mirror the distribution of that variation in the population”*.

For the first part of the study where the selection of cases is especially large and diverse, and not expected to be causally homogeneous, a given conclusion or inference cannot be expected to be ‘true’ for all cases in the population. This provides a set of very strict limitations concerning the inferences that can be made based on the case studies. With this in mind, the research however is a very explorative study with the aim of identifying and mapping main reasons for larger companies and municipalities to enter in to, or establish, a shared space. The purpose of this is not to make the inference that the reasons identified will be the only reasons or the ‘true’ reasons, but instead to explore and describe a new area within research, in order to form a first hypothesis or framework that can be tested in future research.

For the second part of the study, where the selected cases and the following population is smaller and better defined, the above reservations concerning inferences will not be as explicit. The purpose here is to conduct a first test of the hypothesis devised based on the first study, and by searching for themes across cases, though different in both type and population, inferences will be made on a stronger background, still keeping the definition of representativeness by (Gerring, 2007) in mind.

2.3.3 Interviews

A large number of interviews have been conducted as a part of the data collection process behind this study. The preferred method for conducting these has been semi-structured qualitative interviews as described by (Kvale, 2002), a method chosen based on its ability to provide insights into a specific subject or theme, and to ensure answers to predetermined key questions and aspects, while at the same time having the opportunity to obtain further non-anticipated information from the individual being interviewed.

Before all interviews, interview guides with essential questions were developed and send out to the respondents in advance in order to make preparation possible. When possible the interviews were recorded – if this was permitted by the respondent, and when not possible thorough notes were taken by the researcher and written up in the immediate time after the interview. During the interview the questions were used to guide the interview in the desired direction and securing information on predetermined key aspects of topic, while utilising the semi-structured approach to allow for un-anticipated information to be included in the interview.

The general focus of the interviews has been to gain insights in to different aspects of the project process seen from the perspective of different stakeholders, in order to understand which aspect of the project plays the biggest role from their point of view. The first interviews conducted were very open, and have all had the general focus of learning about as many aspects of shared space in a given case or situation as possible. In contrast to these, were the subsequent interviews much more focused on identifying key aspects of the process of working with shared space in practice, by looking for what could be considered 'critical incidents'. These interviews were completed with inspiration from the "Critical incident technique" originally developed by (Flanagan, 1954), which described briefly is a method that can be used for collecting direct observations that have critical significance to a case or process.

The focus on critical incidents was in this study done by asking questions focused on identifying situations or aspects of the case or process that the respondent had experienced as of significant importance. During the interviews the respondents were asked to elaborate on any such incident, and the examples of critical events gathered via the data collection process were then used in the analysis to understand how the process had worked – regarding both good and bad.

In addition to the considerations regarding how to use interviews as a method, considerations concerning potential threats to reliability is another important aspect. As with any method, when working with interviews there are several potential biases to consider. There is '*interviewer bias*' which occurs when a particular observation or response is influenced by some attribute of the interviewer (Saunders et al., 2016). There is '*interview effect'*, meaning that an interview is an artificial situation and this might influence the interview and the information respondents are prepared to provide, their attitudes and opinions – they might give you what they think you would like to hear, or what they would like you to have. There is a risk of *cultural incompatibility* when interviewer and respondent have very different backgrounds and might not understand what the other is saying, or interpret what is being said differently than intended. Lastly, there is also a risk of bias simply in the *choice of respondents* for the interviews. Interviewing certain people might only illuminate part of the case and not others, and it may be the people who are willing to participate in such interviews are more likely to have a certain attitude towards the topic or process.

It is according to (Saunders et al., 2016) impossible to eliminate the risk of these biases completely, but what can be done is to be aware of the threat to reliability they poses and seek to control that. The measures taken for the study presented here, involve careful consideration regarding the formulation of questions in the interviews. This is one important aspect, so as not to influence the respondent with personal attitudes or preconception about the topic or case. Obtaining as much knowledge about the

subject of the interview as possible beforehand to avoid misconceptions is another, as well as careful consideration concerning the choice of respondents, taking in factors such as time available and possible agendas, and both of these measures have also been employed during this study. In addition to these precautions, general triangulation of methods and sources is another measure taken, which will be described more generally in section 2.4.

2.3.4 Surveys

Questionnaires, or surveys, are as described by (Saunders et al., 2016) well suited for descriptive research, where the purpose is mapping attitudes, opinions and organisational practices. For this project surveys have been used to collect a larger number of responses on the subject, than would have been possible by use of interviews alone. The survey method has been used when more general attitudes towards the topic was desired and very specific questions could be formulated; focusing on more yes/no type questions than one would do with a semi-structured interview.

One main survey was developed during the research project, with the purpose of investigating the view of practitioners on shared space. Two large groups were available in connection with the PhD, one being the Danish Facilities Management Network and the other being Lyngby Knowledge City, a private association and unique partnership between private companies, research and educational institutions, local authority, housing associations and citizens to ensure the city of Lyngby's continued growth through collaboration across traditional boundaries. Both groups are expected to include a diverse selection of building owners, managers and users and thereby provide a variety of answers to the questions posed in the survey.

The survey was focused on mapping the attitude towards shared space in general with questions like, “what are you most likely to share with others?” and “what would you like to gain access to?” with the purpose of better understanding how shared space was viewed among practitioners, what was perceived as the barrier and what was perceived as motivational factors.

For each question there were a number of possible responses as well as space for additional comments. The survey was sent out to the two groups described in the previous, and details of these are described briefly in the following, with a complete list of questions to be found in the appendix.

Survey 1: Lyngby Knowledge City

The survey was sent out in September 2014 to the 152 recipients of the Knowledge City’s newsletter and 32 replies were received, giving a response rate of 21%. The survey consisted of a total of nine questions, six focusing on the subject of sharing and three on information regarding the respondents.

Survey 2: Danish Facility Management Network

The survey was sent out in September 2014 to the recipients of the Danish Facilities Management network’s newsletter and 21 replies were received. The survey consisted of the same questions as was send out to the Lyngby Knowledge City members, meaning a total of nine questions, six focusing on the subject of sharing and three on information regarding the respondents.

The results of the surveys were used to focus the research on the actual barriers and motivational factors perceived by the practitioners, who will be working with the shared spaces in practice, and are presented in section 4.2.

The total number of responses from these two surveys is 53, which is a relatively low representation. The results can therefore only be seen as indicative and not a complete mapping.

For both of these surveys, much work went into minimising the risks of biases influencing the results. One critical aspect was formulating questions that were as clear as possible. This was important both

in regards to formulating questions that could not me misunderstood, as well as questions that did not require pre-existing knowledge of the topic or specific technical terms to understand. Another important aspect was securing that the formulation of the questions was neutral, and did not unintentionally promote a certain answer or reflect the position of the researcher having formulated them.

In addition to these precautions to minimise biases in the survey results, there is another important aspect to be aware of. There is a risk of only receiving answers representing certain viewpoints, since there might be a certain type of people who will take the time to respond to such a survey. This is a potential bias that cannot be controlled by careful formulation of the questions, and is instead addressed by use of triangulation of methods which will be described separately in section 2.4.

2.3.5 Workshops

Two separate workshops were conducted as a part of the study. Workshops, similar to the focus groups described in (Saunders et al., 2016), can be used to acquire more in-depth knowledge about the participants views on a specific topic by "*encouraging interactions between participants as an effective means to articulate pre-held views"* (Saunders et al., 2016), making it a good choice to supplement the information collected through the interviews and other data collection methods employed for the study. Both workshops were structured around group work with multiple groups of 6-10 people.

The first workshop was conducted as a part of a members meeting at the Lyngby Knowledge City association, focusing on identifying barriers and motivators for entering in to a shared space collaboration. The second workshop was held with selected practitioners representing both municipalities and the private industry, focusing on turning the theoretical knowledge developed during the study in to a practical guide for establishing a shared space in a municipal building portfolio.

The two workshops will be described in more detail in the following.

Workshop 1: "What we share, we give to each other"

The workshop was as mentioned conducted as part of a meeting for the Lyngby Knowledge City members, with the latter part of the meeting reserved for the workshop. The workshop was structured by first introducing the participants to the concept of shared space and the results of the surveys described previously. This was followed by a group work session and finally a summary and discussion of the work produced at the end of the workshop.

39 participants attended, representing a broad spectrum of companies in the greater Lyngby area, and the focal point of the workshop was a poster containing four main questions, designed to stimulate discussion concerning different aspects of shared spaces. The questions being:

- **If only I could…?**
  Designed to facilitate the expression of visions and functions
- **If only I knew…?**
  Designed to facilitate the expression of need for specific information
- **If only I had…?**
  Designed to facilitate the identification of means to facilitate the process of sharing
- **Shared space I don't believe in it.**
  Designed to facilitate the expression of critical questions, concerns and scepticism

These questions were discussed in groups of 6-10 people, with participants encouraged to write as many answers as possible to each question on post-its, and place them accordingly on the poster. Following the group work, all posters were collected and the answers inserted in an excel spreadsheet, after which similar answers were combined and the spreadsheet condensed. From this a maximum of three main answers to each question were identified and collected in a single table, summa-

rising the main findings of the workshop for further study. These results are described in more detail in section 4.3.

Workshop 2: "Creating a guide for the establishment of shared space in a municipal real-estate portfolio"

The workshop was focused on shared space in a municipal real-estate portfolio, and how to facilitate the creation of shared space in practice in such a setting with the aim of creating a guide. The workshop was structured as follows:

Steps	Description
1	Introduction to shared space
2	Group work part one – focus on the portfolio level
3	Introduction to inspirational case
4	Group work part two – focus on establishing a specific shared space
5	Presentation and discussion

Table 1: Structure of workshop 2

The two project partners and municipalities, Lyngby-Taarbæk and Copenhagen, were represented by multiple participants due the study's focus on municipal real-estate, and in addition to these a number of professionals from the private sector with professional knowledge and work experience on shared spaces were invited to provide valuable input from practical applications. A total of 15 participants attended the workshop, 8 from the two municipalities and an additional 7 from the private sector; among which were architects, consultants and an owner of a successful shared space in Copenhagen. An additional 4 had signed up for the workshop but were unable to attend for different last minute reasons, but were still involved in the feedback loop during the period after the workshop.

The workshop itself was organised with a theoretical introduction to shared space, and a presentation of the theoretical findings produced during the PhD so far. This was followed by an introduction to the group work, and the participants were divided in to two groups for the first session, focusing on screening for shared space in a municipal real-estate portfolio.

After completion a representative from Lyngby-Taarbæk municipality presented a real-life ongoing case from the municipality for inspiration, and the second group work session was initiated, focusing on the steps necessary when creating a specific shared space at a chosen location. For both sessions an initial framework was introduced to ensure the discussion was kept on track, and a minimum level of detail was achieved. The framework used was constructed around a short content description to steer the discussion, connected with a question and a task of coming up with 7 steps to complete the work proposed, an example of which can be seen in Table 2.

Example from workshop 2, part "Screening on portfolio level"	
Content requirement	**Question**
General knowledge on the buildings in a given real-estate portfolio	What information should you have on your real-estate portfolio in order to identify potential for shared space? And which 7 steps are needed?

Table 2: Example of workshop framework

As described in (Brinkø & Nielsen, 2016b) the choice of seven steps was made to secure sufficient detail of the steps proposed while still keeping it simple and manageable within the timeframe given, and was worked with as a guideline and not a strict requirement. Intervention by the facilitator – the PhD student - only took place when groups approached for clarification of a question, or if it was clear that the discussions taking place were drifting off subject. The groups were asked to write their sugges-

tions on posters which after the group-work was completed, were presented by a representative from each group, followed by a general discussion of the results among all participants.

Following the end of the workshop, all data was collected and documented and send to all participants, preparing for the first round of processing the data collected in to the final guide.

The complete process of developing the guide is presented in (Brinkø & Nielsen, 2016b) and is summarised in section 6.2 of this dissertation.

2.3.6 Observations

Observations were used in connection with a number of the more in-depth case studies. It is a method that according to (Saunders et al., 2016) involves the systematic observation, recording, description, analysis and interpretation of people's behaviour in their natural 'habitat' or real-life situations.

The method has for this study been employed in a number of situations during the main case studies, in order to gather information on what topics were being discussed at for example planning meetings and reference-group meetings; in short; situations where for example interviews were not suited to collect the desired empirical data. Examples of such situations could be reference-group meetings with a large amount of participants, where the discussion is taking place in 'real-time' among the entire group, or at planning group meetings where the focus of the study is identifying what subjects are being discussed and in what manner.

Considering the biases connected with observations such as these, there are a number to be aware of. First of all the researcher's presence at the meeting might influence how freely the meeting participants feel they can speak about potential sensitive or critical subjects, and might therefore affect the observations. In addition, will the level of information/knowledge the researcher has in advance concerning the case and its contexts and aspects develop over the time of the study (Saunders et al., 2016). This means that actions or statements might be misunderstood due to lack of the knowledge to recognise signals etc. before later on in the study. This could create potential systematic bias, meaning that the researcher must be very cautious about over-interpreting things in the beginning.

According to (Saunders et al., 2016) it is impossible to eliminate the risk of biases in observations completely, but what can be done is to be aware of the threat to reliability it poses and seek to control it, and managing the biases for this method can according to (Saunders et al., 2016) be done in two main ways; (1) the process of asking yourself questions about your conclusions, and (2) by writing up all notes and conclusions and sending them to the informants for validation. For this research project it was not possible to always get the contact information for the informants, so the first method suggested has been employed in combination with general careful considerations to not over interpret events observed. In addition to the above, general triangulation of methods is another measure taken, which will be described in section 2.4.

2.3.7 Document analysis

In addition to the data collection methods described in the previous sections, a number of different types of documents have been used to contribute with additional information to the study, in an attempt to study as broad a spectrum as possible of the *why* aspect of sharing – why people/organisations choose to share, and secondly how this is then realised. This means that it is the reasons and processes in connection with these decisions that are of interest, and these processes are expected to leave fingerprints in material that document internal strategy and project discussions such as meeting summaries and drawings/briefs. The different types of documents used for this study are;

- Meeting summaries
- Building briefs

- Architectural drawings
- Newspapers and press material

In short, the observations/sources above are expected to document different aspects of the cases. Newspapers and press material provide a look into how the case would like to present their space to the 'outside world'. Meeting summaries can help illustrate what is discussed in connection with the cases internally – what is viewed as important factors. Interviews and observations from meetings etc., provides the opportunity to obtain additional information not recorded in official documents as well as and un-edited look in to what is being discussed, how and why, to support the information obtained from the 'official' documents. Last, building briefs and architectural drawings provide a visual illustration of how the plans for the spaces have changed over time and how/where the sharing is taking place.

When considering the risks of biases in connection with documents such as these, there are a number of aspects to be aware of. Meeting summaries are as the name entails summaries, and the quality can depend on the person writing them. There is also a risk of some information not being recorded in the summaries due to various different reasons or information being formulated in a specific way, and they might therefore not necessarily present a 'true' picture of the case. Drawings and briefs are not expected to include/lead to significant bias, as long as the researcher uses them for what they are – a visual presentation of space, and do not use them to draw further conclusions about processes, discussions or motivations. And last, newspapers and press material reflect how the company/organisation wishes to be viewed by the public, and can therefore not be used as evidence for anything else but this. They cannot be used to answer deeper questions about motivation etc. without additional information from other sources to back it up, and do not necessarily reflect the actual circumstances of a situation.

Despite of these limitations, or potential biases, the documents can still provide valuable insights in to many different aspects of the cases, as long as they are being treated as what they are – not necessarily the truth, and the potential biases connected to them are acknowledged and taken in to account in the analysis.

2.3.8 Data analysis

As a method for structuring the analysis of data and securing a rigorous analysis process, all empirical data and information collected during the PhD have been stored and analysed by use of the IT program Nvivo10, mainly by use of open and axial coding as described in Grounded Theory (Boolsen, 2010; Corbin & Strauss, 1990; Glaser & Strauss, 1967). Coding is a fundamental analytic process used by a researcher, in which both qualitative and quantitative data is categorised to facilitate analysis, and the purpose with doing this type of coding is according to (Saunders et al., 2016) "*to develop theoretical explanations of social interactions and processes In a wide range of contexts*".

Open coding is defined by (Corbin & Strauss, 1990) as "*the interpretive process by which data are broken down analytically. Its purpose is to give the analyst new insights by breaking through standard ways of thinking about or interpreting phenomena reflected in the data*", and axial coding on the other hand, is where" *categories are related to their subcategories, and the relationships tested against data*" (Corbin & Strauss, 1990).

Coding helps secure a rigorous analysis process that can be displayed and controlled, and the approach of open and axial coding has been used throughout this research project. First open coding has been used for an initial analysis and mapping of incidents, after which axial coding has been used to identify possible connections between the different incidents. This has been done in order to identify critical aspects in the process of establishing and working with shared spaces, how they are connected, and to develop an understanding of how they have influenced the final result and how they can be managed.

2.4 Researcher bias and triangulation

In addition to the biases connected with the different methods as described above, there is also an additional source of potential bias in any project, researcher bias; meaning people's, researcher's, predisposition to favour, recall and analyse data in a way that is consistent with one owns pre-existing beliefs or hypothesis and being less likely to identify and consider alternative options. (Johnson, 1997) describes researcher bias in the following manner; "*… the problem of researcher bias is frequently an issue because qualitative research is open ended and less structured than quantitative research. This is because qualitative research tends to be exploratory. […] Researcher bias tends to result from selective observation and selective recording of information, and also allowing one's personal views and perspectives to affect how data are interpreted and how the research is conducted."* My background is that of a civil engineer, trained at looking for physical or structural fixes and not the nature of human interaction or psychology. Secondly, I am working within the field of facilities management, again with a certain set of predetermined beliefs and theories connected to it. This means there is a risk of certain aspects of a situation, process or answer being overlooked or on the other side of the spectrum; being given too much attention. Finally there is the bias connected with the fact that my motivation for conducting the study in the first place is that I am excited about the topic and my initial thoughts on shared space are that is a good initiative with a lot of potential.

These biases do not necessarily present a insuperable challenge if they are acknowledged and dealt with accordingly, but they must at all times be clear and taken into consideration when analysing the data and drawing conclusions. Because due to the nature of qualitative research, and the researcher dependant methods connected to it, it is not possible to simply eliminate the bias connected with the different methods (Saunders et al., 2016).

In order to address these risks, or biases, the method of 'reflexivity' as defined by *"*(Johnson, 1997) has been adopted: "*The key strategy used to understand researcher bias is called reflexivity, which means that the researcher actively engages in critical self-reflection about his or her potential biases and predispositions"* (Johnson, 1997). For this study this has meant forcing myself to keep an open mind and not draw premature conclusions based on past experiences. This has been especially true in relation to the bias of me being enthusiastic about the concept of shared space, where it has been important to be very conscious of potential drawbacks and challenges of shared space in order to describe a realistic and balanced picture, and not one biased to the benefits.

In addition to this approach, another method has been employed to counter the risk of biases both in relation to the researcher bias as described above, but also in connection with the different methods described in the previous, and this is triangulation of both methods and data sources.

Triangulation is a much used method for coping with biases in qualitative research as well as a method for validating observations, and can be defined as; "*Use of two or more independent sources of data or data collection methods to corroborate research findings within a study*" (Saunders et al., 2016). This definition touches upon triangulation of both data collection methods and data sources.

Method triangulation can be described as "*The use of multiple research methods to study a phenomenon*" (Johnson, 1997). The purpose of using this approach is to combine different research methods that have different and non-overlapping weaknesses and strengths, thereby minimising the risk of biases from the individual methods influencing the final conclusion, making for a stronger argument, or as described by (Eisenhardt, 1989) "…*triangulation made possible by multiple data collection methods provides stronger substantiation of constructs and hypotheses*". According to (Johnson, 1997) 'methods' should be understood broadly, and refers to both different methods of research such as ethnography, survey, experiments and the like, but also different methods for data collection such as interviews, observations etc..

For the study presented in this dissertation, triangulation of methods has been employed by using case studies as the overall approach, but utilising questionnaires, interviews, observations, document analysis and literature review as data collection methods, and the use of all of these different methods are described in section 2.3.

In addition to triangulation of data collection methods, triangulation of data sources is another approach to minimising bias in a research project, and it is defined as "*The use of multiple data sources to help understand a phenomenon*" by (Johnson, 1997). It is stressed that multiple data sources does mean the use of different data collection methods, but instead the use of multiple sources using a single methods, such as for example conducting multiple interviews, and also that collecting the data at different times, different places etc. is of significant importance for triangulation.

For this study triangulation of data sources has been applied in all case studies, where it has been a priority to interview representatives from different participants in the case such as the architect, owner/project manager and user side of the project, in order to make sure that the different views are incorporated in the study. This is an important aspect in creating an understanding of the 'full picture', since the views and feelings regarding a specific project can vary greatly from user to owner, and even from user to user, with each party contributing an important part to the overall understanding.

In combination these two methods of triangulation contribute as mentioned to minimising the risk of biases influencing the conclusions of the PhD and lending credibility to the final results.

The sections in this chapter (2) presents the different methodological aspects of the study, from the data collections methods employed to the philosophical stance taken; aspects that combined make up the research design for the PhD project. Moving on from this, the next chapter will present the theoretical background that has been used to inform the study from start to finish.

3. Theoretical background

The main topic of this dissertation is the intricate dynamics of shared space, and a number of related subjects play a significant role in the understanding of such spaces, such as an understanding of the mind-set behind sharing, the impact shared space has in the area in which they are located, and last but not least how they can be implemented in practice. In order to form a clear base for the further studies, a relatively broach theoretical background is needed, and the following sections will therefore present introductions to a number of theoretical aspects connected to shared space as it is understood for the study presented here. The first topic presented will be 'sharing cities' followed by relevant aspects from facilities management, the theoretical field this PhD contributes to, then 'the sharing economy' before introducing the topic of shared space itself.

3.1 Sharing cities

How spaces are planned, carried out and used can have a large impact on the area in which it is located, something that is very much true in relation to shared space. This is illustrated for example by one of the first definitions of shared physical space by (Rafferty, 2012), which clearly speaks of *citizenship* and "*mixed neighbourhoods, shared services, safe civic spaces and parks accessible to all*" (Rafferty, 2012). Another example is from the book "sharing cities" by (McLaren & Agyeman, 2015) in which they state that "*the world's cities, where the majority of people now live, could become more socially just, more environmentally sustainable and more innovative through the twenty-first-century reinvention and revival of one of our most basic traits: sharing*" (McLaren & Agyeman, 2015), and that "*Cities have always been about sharing space, human interaction and encounter, and the exchange of goods and services*…" (McLaren & Agyeman, 2015).

Shared space has the purpose of housing many different functions in the one space, and therefore has the potential to attract many different users over a given period of time, contributing to more life in the area in which it is located. This mix of functions can also contribute to minimising 'dead time periods', by matching functions taking place during different times of day in the same space. An interesting example of this phenomenon can be found in the paper "*breathing life in to underutilised buildings*" by (Rudra, 2016). Since many restaurants don't open until 17 and most office workers mainly work until 16-17, matching up restaurants with independent workers provides an interesting example of attracting more and different users to a facility or area that would otherwise be attractive for only a certain group of people at very specific times.

This means that shared spaces has the potential of influencing the neighbourhood in which it is located by simply attracting more people; a very important part of successful cities according to world renowned architect, Jan Gehl, who write that "*the presence of other people in itself signals which places are worthwhile*" (Gehl, 2010). Not that the number of people in itself is the key, but according to Gehl more the fact that the area feels populated and used, and he states that this is a self-reinforcing process. This is also an aspect of cities dealt with by Jane Jacobs in the iconic book "The death and life of great American cities". In this book she writes that on successful city streets people must appear at different times, and one of the conditions stated in relation to successful urban districts is that they "*must serve more than one primary function; preferably more than two. These must ensure the presence of people who go outdoors on different schedules and are in the places for different purposes, but who are able to use many facilities in common*" (Jacobs, 1961)

Optimised use of the existing buildings and facilities in cities and the potential to attract more and different users at different times of day also means that shared space has a potential to play a role in relation to another discussion taking place concerning the development of cities; compact sustainable cities. The term compact cities refers to a concept within urban planning focusing on relatively high density and mixed land use, efficient public transport and a general layout that promotes walking and

cycling over car-use for more sustainable cities; in short a "*high-density, mixed-use city*" (Williams, 2004). In compact cities, there is not 'room' for space to stand empty and underutilised but it should instead be optimised; one of the key ideas behind shares space.

What can be seen from the above is that shared space has the potential, in theory, to play a role in relation to urban development and cities in a number of different ways, illustrating the broadest perspective on shared spaces.

The next section will take a step closer and look at how such spaces may be managed, by looking towards the field of facilities management and what can be learned from here in relation to the management of the actual physical space shared space represent.

3.2 Space sharing and facilities management

Facilities management is according to the Danish and European Standard DS/EN 15221-1 defined as: "*Integration of processes within an organisation to maintain and develop the agreed services which support and improve the effectiveness of its primary activities"* (Dansk Standard, 2008), and in the new ISO standards under development as an "*Organisational function which integrates people, place and process within the built environment with the purpose of improving the quality of life of people and the productivity of the core business*" (ISO, 2015)

The function 'facilities management' by which is meant the operational environment needed to support and enhance an organisations core business processes and activities has developed continuously over the last 150 years or so, but it was not until late in the 1950s that it became associated with the meaning we put in it today (Atkin & Brooks, 2015).

The field as it is defined now covers everything from financial management, strategic real-estate management, cleaning, janitorial services, repairs and maintenance to human resources, change management, health, safety, security, environment etc. It is also stressed by (Barrett & Baldry, 2003) that the scope of facilities management is not just limited to the physical characteristics of a building but that the behaviour and effectiveness of personnel is also of great importance.

When looking at shared space and facilities in a facilities management context there are several fields from which inspiration and knowledge can be drawn, and two of these are;

- Space management
- Property/real estate management

The field of **space management** is very closely linked to the topic of shared spaces, with *space* being the physical object of the sharing, and facilities management works with two different *types* of space, core space and support space. Core space being space that is of key importance to the main business of for example a company or municipality, and support space being space that as the name entails, support the main business. Examples of core space could be a laboratory of a pharmaceutical company and support space would be for example their printer rooms, bathrooms etc. Space management, the management of both these types of spaces, is an important function within facilities management, with the purpose "*to ensure the efficient and cost-effective use of space"* (Atkin & Brooks, 2015).

The responsibilities connected with the management are versatile, ranging from the allocation and effective utilisation of the space an organisation or business occupies, that being a single floor, multiple floors within a single building or multiple floors in multiple buildings, to understanding how the organisation best can be supported by its space – what space is occupied and by whom, how much and when etc. In short, it is a discipline all about how to manage and optimise the use of space to support the core business in the best possible way under many different circumstances and for many different

purposes. It has ramifications for how efficient the work of for example a company can be conducted, and has great impact on the physical environment of the employees.

(Atkin & Brooks, 2015) list a number of recommended practices for ensuring efficient space management and these are;

- Maximising space on the footprint of a new facility
- Matching new uses to a refurbished facility
- Increasing the ratio of usable to gross floor area
- Incorporating design features to support different activities at different times
- Providing space, furniture and fittings that can be adapted for different activities
- Creating spaces that mixes open-plan, meeting and quiet spaces
- Providing wireless data access to enable maximum use of common space

Many of these recommendations are very similar to the motivations and potential benefits of working with shared space, clearly illustrating the topics relevance for each other. Looking for further literature within the different aspects of space management to inspire the work with shared space, there are volumes of literature available; especially in the context of an office or workplace. Guidelines on designing shared space for offices in the form of open-office spaces and the new office (Becker, 1990; Becker & Steele, 1995; Duffy & Powell, 1997) have been around for some time now, and the newer 'activity based workplaces' are being adopted in many companies as well. This literature though, mainly addresses intra-organisational sharing, and not sharing with outside participants, or outside the office space, which is the form of sharing chosen to study for this dissertation.

Much can be learned then from this existing literature in relation to shared spaces, with one example being information about space utilisation ratio. An essential aspect of shared space is optimising the use of existing space, and with countless studies showing that spaces ranging from offices, to schools etc. are standing empty much of the time; there should be plenty of potential for improvement.

But there is a limit to how much a given space can be optimised in relation to use-time, since the popularity and desire to be in that space will fall drastically if it becomes too crowded or too unreliable to "get in", a phenomenon studied by for example (Fawcett, 2009) specifically in relation to shared workspaces. (Fawcett, 2009) also present a mathematical method of calculating the optimal capacity as well as optimal loading by use of three principles relating to surplus capacity cost, displacement cost and uncertainty of demand etc. A tool that can be of great benefit in connection with shared space in a workplace environment and may also be applicable to other types of shared space, along with other research on space utilisation ratio by for example (Atkin & Brooks, 2015; Jensen, 2008; May, 2014).

Moving to the subject of property/real-estate management, it is a field that in short deals with the management of buildings on a strategic level; it encompasses the operation, control and oversight of real-estate in the broadest term of the word. The tasks cover the long-term management of the entire portfolio, meaning anything from planning, design, construction and acquisition of buildings as well as general management and administration of property on behalf of a company, and should be aligned with the overall situation of strategies of the company.

Within this overall topic there are two different sub-disciplines; corporate real-estate management (CREM) and public real-estate management (PREM). Corporate real-estate management (CREM) has according to (Atkin & Brooks, 2015) the objective of making a return on investments from real estate without changing the organisations core business. It should be handled in a way so that it helps to secure and strengthen the competiveness of the organisation, with the gains that resources can be better utilised, costs can be reduced and potential synergies realised to add value to the core business (Atkin & Brooks, 2015).

Public real-estate management (PREM) on the other hand is different from CREM in a number of ways. As described by (van der Schaaf, 2002) "*Public real estate portfolios have very specific characteristics and there is clear evidence of political influence on the quality and location of the buildings included in them. This, in turn, has a strong effect on how such properties are managed*." It is a discipline of growing significance for local government across the world (Phelps, 2011), and in many countries municipalities own and manage large real-estate portfolios in order to provide the necessary services for the population and community. Among these are public buildings, infrastructure, schools, hospitals, social housing etc., and also buildings necessary for carrying out the administrative functions connected with municipal obligations (Klumbyte & Apanaviciene, 2015; Nielsen & Galamba, 2010). This large amount of real-estate means that public property management comes with a large potential when looking at the possible impact of shared space as a method for space optimisation, since much space is available, the amount of functions necessary to house are numerous and the budgets are often limited.

In relation to shared space much can be learned from facilities management, especially in relation to the strategic planning involved in deciding to enter in to a shared space collaboration. Much theory is already written with the field on managing space and buildings also in relation to space sharing as illustrated in the previous. So, while facilities management can provide a number of insights in to the practical management challenges related to the management of physical space, and on some levels also in relation to shared space, there is still a big gab from managing single user spaces or even spaces with intra-organisational sharing to 'shared space' as it is understood for the study presented in this dissertation. For example in relation to the increase in complexity that follows from involving multiple administrations with different goals and different financial setups in the use and management of one space, not to mention the change in mind-set required. In order to gain a better understanding of the mind-set behind shared space and the mentality it represents, a short introduction to the sharing economy will be given in the following.

3.3 Sharing economy

The sharing economy might not be the main topic of this dissertation, but the mind-set originating in the sharing economy is closely connected with the sharing of space, and is an important piece of the puzzle in understanding the mechanism and motivations behind shared space. With this in mind though, sharing different aspects of one's life is not a new thing, and over time there have been countless instances of people sharing space, facilities and the like in order to achieve a wide variety of end-goals.

Examples can be found all the way back in the 1800's, when the world saw the rise of local consumer co-operatives and co-operative societies, the purpose of which was to buy goods wholesale, distribute them to members and share any potential surplus or profit achieved (Birchall, 1997; Gyldendal, 2014a; Mansfield, 2012). But sharing is not confined to the business community. In the early 1900's sharing moved in to housing with the development of the first cooperative dwellings in Denmark; a type of co-operative characterised by the individual members purchasing a share certificate and thereby owning a part of the total assets and acquiring the right to use the cooperative facilities connected to the housing (Gyldendal, 2016)

Moving further up in time, the 1960's and 70's saw the rise of communes as dwellings in the modern sense in Denmark, in context of the youth rebellion. This type of sharing centred on the sharing of houses and all facilities connected with day-to-day living, and also extended the perception of what a good living environment entails and helped influence the general housing in the form of residential areas with shared collective facilities (Gyldendal, 2014b).

So sharing has been seen in many different shapes and forms over time, but in recent years though, the concept of sharing has taken another leap with the help of the internet and social media platforms,

and terms like ‘the sharing economy’, ‘collaborative consumption’ etc. has become increasingly popular.

The term 'share economy' is used to describe a new form of sharing developing in societies today; the sharing of anything from a lawnmower or a car to a house or whatever else one can think of. It originally grew out of the open-source community, referring to peer-to-peer based sharing of access to goods and services, or as defined by (Hamari, Sjöklint, & Ukkonen, 2016) “*The peer- to-peer-based activity of obtaining, giving, or sharing the access to goods and services, coordinated through community-based online services*”. It is a movement that has been described in many different ways by a still growing number of researchers and authors;

- By (Voight, 2013) as a trend that is reshaping our service-based society
- By (Rosenberg, 2013) as “access rather than ownership” and with a mentality of live light, waste less, to protect the environment.
- By (Silver, 2013) as “a way of sweating underutilised assets, by building communities around them and turning consumers into providers” and
- By (Owyang, Tran, & Silva, 2013) as “...an economic model where ownership and access are shared between corporations, start-ups, and people. This results in market efficiencies that bear new products, services, and business growth. Sometimes called the sharing economy or collaborative consumption, the movement toward peer-to-peer sharing is well-documented...”

No matter the wording, The Share Economy, Collaborative Economy or Collaborative consumption, all describing the same overall phenomenon has taken the internet with storm, and have become the object of also more popular publications such as for example the 2010 book “What’s mine is yours – the rise of collaborative consumption” by (Botsman & Rogers, 2010). Websites facilitating different kinds of sharing in online communities as well as local physical communities have become increasingly numerous, and the sharing economy is becoming a part of the public consciousness. Some examples can be found in Table 3.

Website	Focus
www.thesharehood.org	Local community for sharing of unused ‘stuff’
www.collaborativeconsumption.com	Online knowledge library
www.nesta.org.uk	Charity working to “shape a better, fairer and more prosperous future” through sharing
www.greenvillages.com.au	Sustainable green cities through sharing
www.shareable.net	The promotion, development and support for all things ‘sharing’

Table 3: Examples of websites promoting sharing

Despite shared space in the way it is used in this PhD would not be considered true sharing economy, it is definitely an idea or business model that has developed with inspiration from the mind-set and vision of the sharing economy, making a general understanding of the thoughts and mechanism of the sharing economy an important aspect in understanding shared space. With this foundation laid the next section will go on to present an introduction to shared space as a topic and more specifically how it is understood for this dissertation.

3.4 Shared space

Shared space is a topic that is receiving increasing attention within both popular and scientific literature, but it is also a term to which many different meanings are attached depending from which field it is addressed.

Within the field of traffic planning and road design, shared space has since the late 70’s (Sørensen, 2010) referred to a specific method of designing streets and pedestrian areas for increased safety, by

removal of the traditional boundaries of a clearly defined sidewalk, warning signs etc.; thereby creating a common area where the users according to the theory are more inclined to be careful, observant and considerate of each other (Clarke, 2006; Hammond & Musselwhite, 2012; Imrie, 2012; Thomas, n.d.). It is often defined along the lines of "*A street or place designed to improve pedestrian movement and comfort by reducing the dominance of motor vehicles and enabling all users to share the space rather than follow the clearly defined rules implied by more conventional designs*" (TrinityHaus, 2012, p 1)

Shared space is also used within the digital world, and refers here to certain types of online forums defined as "*Shared spaces are a new communication medium. They are three- dimensional spaces where people are represented by characters or avatars*" (Benford, Brown, Reynard, & Greenhalgh, 1996), whom in the same publication also state that even "*a phone call is a shared virtual environment with self-authored content and no graphical support*".

On a more overall level, and building on work by (Gaffikin & Morrissey, 2011) who proposes a definition of shared space as *"space that facilitates not just contact, but also engagement"* (Gaffikin & Morrissey, 2011, p 102), (Rafferty, 2012) takes the notion of shared space a step further, and presents one of the first overviews of different shared spaces with the Typology of Shared Space, see Figure 3.

Type of shared space	Focus
Inclusive design space	Shared surface; multimodal equality
On-line space	Collaborative virtual environments
Dialogic space	Safe spaces for dialogic; community meetings
Physical space	Neighbourhoods; services; parks; civic spaces

Figure 3: A Typology of Shared Space (Rafferty, 2012)

The last type in Rafferty's typology, 'physical space' is one of the first in including the notion of shared space as a physical space related to the built environment. In the paper 'shared physical space' refers to "*the co-existence in place—shared spatiality— that embodies a relationship between shared local identity, citizenship and ownership. It invokes notions of mixed neighbourhoods, shared services, safe civic spaces and parks accessible to all*." (Rafferty, 2012)

Looking beyond this first typology, not much scientific literature is addressing the sharing of physical space and the built environment, but some is starting to come forth. (Khamkanya & Sloan, 2009) for example writes on flexible working and Non-territorial Working Environment, (Lee, Kim, & Yoon, 2010) writes on the sharing of physical space between residents in an apartment building, (Sarjeant-Jenkins & Walker, 2015) writes on shared use of libraries as a way of servicing remote communities, (Ferguson & Ferguson, 2016) writes on shared space in relation to social relations between neighbours and (Barbosa, Araújo, Mateus, & Bragança, 2016) writes on how flexible interior can help enable an increase in possible users of a given building compartment, thereby reducing the impact of land use. (Barbosa et al., 2016) also goes on to stress the importance of taking the impact on land use in to account when designing and planning buildings due to the rapid increase in the population living in urban environments; a factor that have also been stressed in relation to shared space.

Looking outside the academic world, an increasing amount of reports on shared spaces is also emerging. A Canadian organisation working for the promotion of social change initiatives across the country and fostering social innovation through shared spaces, are working with four definitions of different types of shared space in relation to workspace; "***Co-location****: space shared among a number of separate organisations.* ***Community hubs****: space that brings together service providers to help the surrounding area by offering a range of supports such as language instruction, job training, and after school programs.* ***Co-working****: sharing of space among freelancers and independent workers.* ***Incubators****: provide strategic, administrative and/or financial support to small projects and organisations*" (The Centre for Social Innovation, 2008, 2009, 2011; Tides Canada, 2016). Jillrealviews reports on a

New York City start-up, Spacious partnering with restaurants that are often empty during the day and are working on turning them in to coworking spaces for freelancers and consultants looking for a different work environment (Rudra, 2016), and the New York Times have a large number of articles on the topic spanning more than two decades (Hamilton, 1988; Moss, 1996; Rosen, 2006; Alboher, 2008; Hodara, 2011; Creswell, 2014) just to mention some.

Even though these papers all deal with shared space in relation to the built environment, the specific meaning connected with the word 'sharing' still vary, and there are many different spaces and places that claim to be shared spaces. Standard office hotels where you have an office in a building alongside many others, but there is not necessarily any interaction going on – and the sharing consists mainly of having to share an entrance and maybe a bathroom, can still technically be called a shared space. This type of sharing though, does not require inter-organisational communication or interaction on a management level, since the responsibilities, needs etc. are not mixed. The level of difficulty in succeeding with such a space and the processes involved in the daily management are therefore different than shared spaces with a higher degree of involvement. Intra-organisational sharing within a company in the form of for example large open offices can also technically be called a shared space since the employees actually do share the physical space in which they work, but again, this type of sharing does not require interaction and administration between different organisations.

For the research project presented in this dissertation, the focus is therefore on the instances of sharing that takes place between different individuals, groups or associations belonging to different organisations, meaning in short that the study is focused mainly on instances of inter-organisational sharing, and secondly also on instances of sharing involving parties that would traditionally be inclined to have/build their own space. The definition used for the PhD is therefore; **Multiple individuals/groups/organisations/businesses, organisational independent of each other, making use of the same space, either simultaneously or serial**.

With this definition in place other aspects of shared spaces can be explored, such as for example advantages and disadvantages of working with and in shared spaces. Because in addition to the advantages of shared space, some of which are mentioned in the introduction to this dissertation, there are of course also a number of drawbacks, and if shared space is to be understood in full, it is important to look not only at the potential benefits but also have an understanding of the difficulties and drawbacks that follows. Going through the scientific literature on shared space available, reveals a number of these (Uzairiah et al. 2013; Moss et al. 2009; Rafferty 2012; Fawcett 2009 to mention a few), and Table 4 by (Brinkø et al., 2015) provides a overview of some of these.

Potential benefits	Potential disadvantages
Sustainability (Fewer buildings, optimised use)	More complicated logistics
Synergy (between different users)	Risk of lack of demand
Cost reduction (increasing economics of scale)	Management difficulties due to unclear ownership
Better connection to surrounding community (CSR)	Less control over availability
Creating a more vibrant atmosphere (avoiding 'dead space')	Physiological objections due to feelings of territoriality or privacy
Professional management (in case of third party ownership)	

Table 4: Potential benefits and disadvantages (Brinkø et al., 2015)

It should be mentioned though, that this is not an exhaustive list but merely an excerpt of examples.

3.5 Territoriality, involvement and practicalities

The theoretical background presented in the previous sections has been used to form a solid base for the empirical studies, whereas the theory presented in this section is of a very different character.

Where the first part of the study was conducted with an inductive approach, an abductive approach was adopted for the last part of the study. Following a test of the typology presented in section 6.1, three themes were as mentioned identified from the empirical material as being of key importance for working with and in shared space in practice, and these are; 'territoriality', 'involvement' and 'practicalities'. None of these are new in the academic world, but they have not been described in relation to shared space, and much can be learned from other professions on the nature of these themes and what can be applied to the context of this study.

To better understand these themes a separate literature review was conducted, resulting in an additional literature review and additional theoretical information being added to the study and later tested on additional cases. The additional theoretical contribution to the study from this is what is being presented here. Much of the theory in this section can also be found in the publication (Brinkø & Nielsen, 2016a)

Territoriality

The nature of working in and with a shared space is to *share*; meaning giving up what would otherwise normally be yours and relinquishing control of the space and its functions, whether it is a desk, an office or a production facility, and with this comes feelings of territoriality. Throughout history and literature, human territoriality is a well described phenomenon, and much can be learned from for example the fields of geography, architecture and anthropology, in relation to how this territoriality can be tackled when working with shared spaces.

There are of course many variations in the definition of territoriality also within the same field, but the following by (Hall, 1966) and (Sack, 1983) are much used within the field of geography. Territoriality is:

- "*the behaviour by which an organism characteristically lays claim to an area and defends it against members of his own species*" (Hall, 1966)
- "*the attempt by an individual or group (x) to influence, affect, or control objects, people, and relationships (v) by delimiting and asserting control over a geographic area*" (Sack, 1983)

These definitions, especially the definition by Sack, are due to the nature of the field of course closely connected with landmasses and geographical borders, and not specifically to smaller well-defined areas as an office building, but when looking at newer literature, also from the field of geography, we see territoriality being closer linked with social relations and the *meaning* we as humans put into spaces, illustrated by for example (Holt-jensen, 2001); "*Place becomes much more than physical place; the buildings and the landscape we see. Places are also social constructions created in our heads, founded on our social relations in places […]Territoriality create places with distinct meanings, such as living room, home, school, potato field*".

Also from geography we learn that the longer time you spend at a given location, the more you are likely to feel territorial about a place, for example illustrated by Robert Sack in his 1997 publication; Homo Geographicus, where he presents a figure showing the relationship between time spend at a given location and the likelihood of feeling territorial about a place (Sack, 1997).

The special relationship we as humans construct with our surroundings is also described within the fields of architecture and anthropology, where (Kent, 1993) and (Gissen, 2010) write the following on humans and territoriality in relation to the spaces we inhabit;

- "*Human beings are territorial animals. We define spaces, mark them for specific used, create visible and invisible boundaries, establish cultural conventions of behaviour towards those boundaries, and will defend the territory against unwanted intrusion*" (Kent, 1993)
- "*Territory emphasises the simultaneous production of architectural objects and the realms surrounding them*" (Gissen, 2010)

That human are territorial animals seems relatively clear from the above, and that it is not just something adults have picked up in a competitive society is clearly illustrated by the work of for example (Nordwall & Olofsson, 2012), with the observation; "*It is evident how specific the children use the common areas for playing. It becomes their territory and you can frequently hear children say: this is our yard – you cannot play here*".

This highlights the importance of considering territoriality when working with people and spaces in as close unison as is the case with shared spaces; it is the nature of people to be territorial and sharing space and facilities goes against this. Furthermore, this territoriality only increases with the amount of time spent in a given space, so in order for a shared space to be a success, a strategy for dealing with territoriality is a necessity.

Involvement

Following the theme of territoriality, the circumstances concerning giving up personal space and control is also of significant importance. There seems to be a clear difference between sharing with people you know and people you don't know, and also between being forced to share and making the decision to share out of one's own free will. Involving those who must change their habits when establishing a shared space, appears to mitigate the many potential difficulties that can arise when transitioning from one way of working to a new, and this plays an important role in the success or failure of any shared space.

The topic of user involvement is a well-established field in literature, and much has been written on the subject within for example facilities management and change management from which experience can be drawn in relation to working with users when developing and managing shared spaces.

From facilities management Per Anker Jensen writes "*User participation is of particular importance when a building project is part of an organisational change process*" (Jensen, 2006) and he further more gives *"acceptance and appreciation of the new facilities among managers and staff"* as one of the most important reasons for involving users in the briefing process (Jensen, 2011b).

Staying on the topic of employee acceptance of organisational change (Iverson, 1996) writes the following from the field of management; "*the challenge to human resource (HR) practitioners is to create a work environment in which employees accept rather than resist change*", and he then goes on to list a number of strategies for achieving this, among which "*the participation of individuals is integral to the change process*" (Iverson, 1996) can be found. Peter Barrett and David Baldry also writes on the topic of user involvement in connection with organisational development, and states that "*participation encourages users to make decisions about their own environment. Employees realise that their views are important and this encourages feelings of personal responsibility, hence they become more motivated…*" (Barrett & Baldry, 2003).

But it is not just management related fields such as facilities management and change management that are working with user involvement in order to increase user satisfaction. From the field of system design (Baroudi, Olson, & Ives, 1986) presents a model that illustrates how user involvement not only increase the user satisfaction but also the use of a given system, and though this is written in connection with systems and not space or buildings, it is not difficult to argue that 'system' could be interchanged with 'shared space' and the model thereby be used to illustrate the importance of involving the users in order to maximise the chance of succeeding with a shared space.

A multitude of methods are available for involving users in many different types of projects, and the important thing to consider before choosing one, is what type of user involvement is needed, or desired, for the project at hand. What level to involve the users on? What type of input would be benefi-

cial? Such questions can guide the process, after which one or more types of user involvement best suited to the specific situation can be chosen.

Practicalities

Whereas the two previous themes are well-described theoretical fields of study, the theme of practicalities is not so much a field of study within literature as it is a collection of practical tasks that are necessary to consider in the transition towards shared space, because the practical considerations involved in establishing a shared space are many. In contrast to conventional use, a shared space will most often involve multiple users from multiples organisations, each with their own administration, financial setup and so on; a setup that does not make planning and realising the processes involved in any construction-, renovation-, relocation project any easier; not to mention the operation of it.

One of the key aspects here is the logistics in relation to ensuring that a building and the people in it functions as optimal as possible. During the planning and construction phase this can be in connection with managing inventory and users in a possible transition phase, offering alternatives during renovations and basically making sure that the final space lives up the expectations of the multiple users involved and that the functions and facilities necessary are in place.

Following the occupancy of the space or building the practicalities will instead be focused on the daily management of the working shared space. This means

- Providing booking systems if necessary
- Managing time of use - planning availability and use patterns
- Maintenance and cleaning
- Handling administration
- Managing the access and security
- Managing differences in functions and needs
- Legislation

Another important aspect is evaluating the resulting space. Making sure the purpose of the project and the desired outcome have been achieved as intended and that the final shared space live up to expectations formulated for the project. This means for example if the users use the space as intended, and ensuring that this use is maintained or perhaps improved.

Regarding this topic of practicalities and all the different aspects of it listed above, existing literature within facilities management provides large quantities of knowledge. None of the processes described above are unique to shared spaces, the complexity level is just higher due to the multiple users and organisations involved. The basic processes and tasks are similar to any standard project, though of enhanced importance and complexity, and to assist in the management of these processes (Jensen, 2011a) for example provides an overview of theories and techniques within facilities management, as does (Alexander, 1996) and many others (Atkin & Brooks, 2015; Multiple, 2012; Shah, 2007 etc.), and this literature provides valuable insights into how to cope with the considerations mentioned here.

The theoretical background presented in the previous sections has been used to create a solid base for the development of the empirical studies during the PhD, as well as to further inform the empirical data collected. This empirical data has been collected mainly through case studies, and these cases will be presented in the following.

4. Empirical studies

This chapter will present the empirical part of the dissertation, by first introducing the cases that have been a key component throughout, followed by a brief presentation of the results from the two additional empirical studies, the survey and workshops conducted during the project.

4.1 Case studies

For this dissertation, a total number of 24 cases, or examples of shared space configurations, have been collected from across mainland Europe, Australia, USA, England and Northern Ireland, and studied to varying degrees throughout the project. The cases have been identified through a multitude of methods ranging from searches in scientific journals, newspapers, regular searches by use of google and through word of mouth, in order to secure both scientific well-described examples, newer "popular" ones as well as non-described cases that have not has the sufficient publicity to be identified through the media. The complete list is illustrated in Table 5.

Cases			
Nr	**Name**	**Focus**	**Country**
1	Republikken	Co-working	Denmark
2	Plywood sheds	Artist studio space	USA
3	School sharing	Public/private collaboration around workspace for parents	Netherlands
4	The HUB	Providing space for start-ups	Denmark
5	Lyngby Idrætsby	Municipal non-profit facility for sports associations and the local community	Denmark
6	Rambøll	Private company	Denmark
7	Frivilligcenter Hillerød	Support and represent local voluntary social associations	Denmark
8	Risskov Library	Public facility	Denmark
9	FOF Lyngby	Adult Education	Denmark
10	Fjaltring-Trans	Bank/elementary school	Denmark
11	Churches	Shared use of churches between different faiths	England
12	Shared use hubs	Co-working	Australia
13	Space for entrepreneurs	Space divided between start-ups with overlapping needs	USA
14	Airport passenger buildings	Co-location	World wide
15	Use of school premises	Shared use of school premises with the community	England
16	Center for Areal og Ejendomme	Portfolio management	Denmark
17	Denver Shared Spaces	Provide assistance for all establishing shared spaces	USA
18	Musicon	Entertainment/ creative industry	Denmark
19	Manchester Media City	A hub for the creative and digital sectors	England
20	Shared school campus	Sharing of school facilities between faiths	North Ireland
21	Mabos	Community engagement, art and entertainment	Ireland
22	Elisabeth Centre	Care centre for the elderly	Denmark
23	Microsoft	Private company	Denmark
24	Zeeburgereiland	Childcare and school facility	Netherlands

Table 5: Cases studied during the PhD

The purpose of this strategy has been to create an as varied inventory of examples as possible, according to the 'diverse case' selection strategy as described by Gerring (2007). A number of examples and cases have been studied to a varying degree during the process of creating first the Typology of Shared Use of Space and Facilities (see section 6.1), and later in the following analysis and tests conducted with the typology as a starting point (see chapter 5).

The total number is 24 among which 18 only have been studied through literature. The remaining six have been the focus of more thorough studies and collection of primary data and will be described in the following section. The initial presentations of the cases will be purely descriptive, after which three themes identified through the empirical data will be presented, followed by a combined analyses and discussion of the cases to end the chapter.

Out of the many examples studied, six have been the focus of more detailed investigation. These are:

Name	Short description	Country	Studied in
Musicon	Public owned abandoned buildings	Roskilde, Denmark	2013
Lyngby Idrætsby	Public buildings for sports	Lyngby, Denmark	2013-2016
Mabos	Private rented empty public building	Dublin, Ireland	2013
Microsoft	Private company	Lyngby, Denmark	2015-2016
Elisabeth Centre	Public senior centre	Holbæk, Denmark	2015-2016
Zeeburgereiland	Public/private integrated child centre	Amsterdam, Netherlands	2015-2016

Table 6: Overview of main cases

The cases are listed in the order in which they have been studied during the project and not according to project or construction realisation. Out of the six cases listed two have been the core of the project and have received the most attention, and these are Musicon and Lyngby Idrætsby. These two have been the focus of the most in-depth studies, and have been a part of the PhD since the beginning, with Musicon being one of the very first cases studied and Lyngby Idrætsby the second. They will therefore also be presented first in the following. The remaining four cases have been added during the research project in order to test, refine and develop the results from the first two cases as well as provide additional insights in to the processes and characteristics of shared spaces.

In the following sections these six cases will be presented with first a description of the case itself followed by a table with key information regarding construction process, time of study etc.

4.1.1 Musicon, Roskilde

Musicon is an urban development project that started in 2008/2009 in the Danish city Roskilde. The area is owned by the Municipality of Roskilde, and covers an area equivalent to approximately 40 soccer fields. The area was originally farmland and was later used for excavating gravel up until 1940 when a large concrete production factory was established on the site. In 2003 the Municipality of Roskilde bought the site, after the factory shut down, leaving behind 250.000 m2 to be developed, and in 2004 idea generation began on what to do with the area, resulting in the creation of Musicon in 2008.

The ambition of this new urban development, Musicon, was that it should be a national incubator for artists, designers, musicians, creative companies and others in need of an unconventional setting, and in order to achieve this, the development is done in close collaboration with people from the cultural- and business community, as well as property developers with a special interest in helping to inform the development of a dynamic and diverse city.

Picture 1: Musicon art gallery, café and workshop

Picture 2: Musicon warehouse, works- and event space

Picture 3: Musicon temporary outdoor space

Picture 4: Musicon outdoor work- and event space

The many large factory buildings and warehouses from the abandoned concrete factory are still present, and now make up the base for the development of shared space in many different configurations; the approach of choice in fulfilling the goal of creating an unconventional setting for the creative industries. The organisational structure is a very flat one, with representatives from the municipality present at the area in the form of a secretariat in charge of the day-to-day management of the area with a very high degree of user involvement in most decisions. Larger decisions regarding overall strategy still have to go through the Roskilde City Council though.

Many different facilities at Musicon are shared and the types of sharing taking place across the site are diverse. There is sharing organised by the Secretariat, which is mainly concentrated around the practical functions such as the secretariat itself, canteen/lunchroom and outside lounge areas. Besides these there is sharing organised by the users themselves, in the form of shared office space, shared facilities as for example bathrooms when necessary and shared buildings for workspace, exhi-

bitions, events etc. Most of the sharing is taking place simultaneously such as the cantina, lounge areas etc., but sharing can also occur serial with for example gallery space used by the artists being used for other events hosted by the secretariat when not in use by the artists.

The sharing is as mentioned mainly directed towards the entertainment- and creative industries, and is available for private individuals, organisations and businesses. The site is as mentioned owned by Roskilde Municipality, but the daily management of all aspects of the area lies with the Musicon secretariat, which in practice functions as an on-site administrations office. In order to rent space or facilities at Musicon you have to be approved by the secretariat, after which a lease is formed. In short; the users rent the buildings/ rooms/ facilities from Musicon, though with a possibility to buy in the long run if it fits with the strategy for Musicon and is approved by the Municipality

Case study characteristics for Musicon	
Construction/project period	2008 – ongoing
Studied during	2013-2014
Area	250.000 m^2
Focus	The entertainment industry
Ownership	Municipal
What is shared	Support space such as reception, cantina, bathrooms and event- and outdoor space etc.
	Core space such as offices and workspace, art studios and galleries etc.
People interviewed	Both on-site members of the secretariat, a representative from the users and the director of the department “By, Kultur og Miljø”.
Additional	Observations were conducted on site and large number of documents from the press, the municipality and internally in the organisation was collected

Table 7: Musicon case study characteristics

Case update

As of November 2016, Musicon is now the ‘home’ for almost 50 different actors, among which are 29 private companies, a dance theatre, a workshop for artists, a skate hall, youth housing and rehearsal rooms for a variety of users. About 1,100 people use the facilities at Musicon on a daily basis, not counting the approximately 200 young people who have moved into the youth housing and visitors to the Rock Museum established in the area.

4.1.2 Lyngby Idraetsby, Lyngby, Denmark

Lyngby Idrætsby, Lyngby in Denmark is a non-profit sports facility owned by the municipality of Lyngby-Taarbæk, which is expected to be completed some time during 2016. The complex was originally completed in 1948 and modified in 1976 with the addition of a swimming pool, and has since then not been altered or updated in any significant way.

In 2012 the process of modernising and expanding the facility commenced, increasing the size of the complex from approximately 13700 m2, not counting the outdoor areas, to 23080 m2 (DGI projekt- og udviklingsværksted, 2012). The new complex will be adding a number of facilities to the existing site among which are new common rooms for the sports associations, an area reserved for the business community, a physical education day-care centre as well as space for the Lyngby-Taarbæk Youth School, in order to achieve the municipality's vision of the space to be characterised by activity in as many hours of the day as possible, for as many different users as possible.

Picture 5: Lyngby Idrætsby location

Picture 6: Lyngby Idrætsby main entrance

Picture 7: Lyngby Idrætsby facilities

Picture 8: Lyngby Idrætsby reference-group meeting

The facilities for recreational sports, both old and new, are meant to be shared where possible, and all new facilities are planned with multi-purpose use in mind with much attention being put on flexible interior design and furnishing to accomplish this goal. Another major difference between the old and the new complex is that in the new no sport association as a general rule will have their own private club room. Instead an association zone will be established around newly constructed common rooms which will be shared between all associations, and will also be made available for the general public when not in use by the associations.

This type of use means that the sharing taking place is mainly serial, with the available spaces being used by different people and organisations at different times of the day or week. There are many parties involved in the sharing, organised with the municipality as owner and facilitator and a wide variety of private individuals and non-profit organisations as users. In addition the new space for business life and day care/ school facilities will bring a new set of users to the complex, adding to the vision of creating a space for as many different types of users as possible. These additional users will have their own main space, but with the possibility of utilising the facilities of the shared complex.

Case study characteristics – Lyngby Idrætsby	
Construction/project period	2012-2016
Studied during	2012-2016
Area	13700 m^2/23080 m^2
Focus	Sports facilities
Ownership	Municipal
What is shared	Core facilities such as clubrooms and workspace
	Support facilities such as bathrooms, cantina, storage etc
People interviewed	Several interviews with users, a representative from the project organisation from the municipality as well as the architectural firm and facilitator behind the project.
Additional	Observations were conducted on a number of occasions at reference-group meetings and project planning meetings. A large number of documents from the press, public documents from the municipality and private documents from internally in the organisation were used to inform the study

Table 8: Lyngby Idrætsby case study characteristics

This case was used to identify three main themes essential to shared space (presented in 3.5), and the majority of the information in the previous can therefore also be found in (Brinkø & Nielsen, 2015)

Case update

Now approaching the end of 2016 the new complex is just about finished, and the last initiative planned, the incorporation of kindergartens in the complex, is under way.

Almost 25 associations are based in the new Lyngby Idrætsby, with an additional 10 associations using the facilities during for example the winter months. In total, 11,667 sports members are affiliated with Lyngby Idrætsby.

4.1.3 Mabos, Dublin

Mabos was created in the summer of 2011 by Dave Smith and Peter O Brien, in a disused warehouse at no 8 Hanover Quay in the Grand Canal area of the Dublin Docklands leased from the authorities. The space is now run by Dave Smith, and the users consists of a collective of artists, designers, carpenters, engineers, photographers, film makers, skaters, architects, musicians & more. They are focused on Arts & Incubation, Entertainment and Education, with an underlying focus on community integration in all work they do.

They describe themselves as follows: "*Mabos is a multi-purpose art space with a mission. We are on the path to developing a centre of excellence in the fields of experiential entertainment, creative education and community integration. We are looking to fine tune a new model in the fields of social entrepreneurship through the re-imagining what it means to live in a city in the 21st century*."

Picture 9: Mabos location

Picture 10: Mabos main entrance

Picture 11: Mabos indoor front-room

Picture 12: Mabos, indoor second room

Under the roof of the old warehouse building many different types of sharing is taking place. The space currently constitutes the location for an advertisement business run by Dave Smith himself along with 2 partners; it is the studio for 4 independent artists 2-3 days a week, with a further 4-5 other artists using the space on a more sporadic basis (1-3 times a month) and with many more wanting to join. Besides these regular daytime uses, the space is also rented out for think tank & workshop days, with The Craft Council of Ireland, Jameson Whiskey and Google all having used it for such purposes. On weeknight evenings Mabos is primarily a workshop and club space with activities for the young people in the local community such as a bushido club, a juggling club, an all-girls skate club, all meeting on a weekly basis. Saturdays are generally for a younger audience, with weekly parkour classes and once a month an open skills day for all ages with skateboarding /graffiti/ photography / t-shirt design and print amongst other things. Late evenings are for running events – a ping pong club as well

as a monthly 'trad' (traditional) music session and other music nights. Dave Smith describes the space as follows:

- "*A rethinking of what a community space is for this generation*"
- "*A playfully anarchic space – not accepting the norm, but only pushing when it is needed*"
- "*A place designed for social interaction*"

The financial model is largely based around the workshops, rental and the entertainment elements, with rental accounting for 40% of revenues, workshops 5-10% and the rest entertainment. The regular users – the artists, mainly use the space for free, with the condition that they make themselves available at work-shops, classes and other educational stuff for adults and children in the local community. "*They are here on a barter*" is how Dave describes is. When hosting workshops and other events participants pay a membership fee, because it takes up a lot of space and can have a bigger impact on others using the space. Evening workshops for adults are done via donations – people don't pay a membership, but donate what-ever they want.

Case study characteristics - Mabos	
Construction/project period	2011
Studied during	2013
Area	Unknown
Focus	Art, culture, education and community outreach
Ownership	Municipal – leased to private individual running the space
What is shared	Everything
People interviewed	The Dublin City planner, founder Dave Smith and a number of unnamed users.
Additional	Observations were conducted on site on numerous occasions, and material was collected through the press

Table 9: Mabos case study characteristics

This case was used to illustrate the use of the typology when it was first presented in a paper, and the majority of the information in the previous can therefore also be found in (Brinkø et al., 2015).

Case update

Because of difficulties with requiring the necessary permits in relation to for example fire codes etc., due to the ever-changing use of the space and wide range of activities being hosted; the space could according to Irish legislation not be permitted to function as an open community space as was the initial configuration. The space was very nearly shut down, but in collaboration with the municipality a new configuration was found so Mabos could stay open, and it now functions as a members-only club with weekly access memberships available for purchase. Despite this not being in-line with the initial vision of an open community space it allows Mabos to continue organising events and activities, also for members of the local community.

4.1.4 Microsoft, Lyngby, Denmark

Microsoft Lyngby is Microsoft's new domicile in Denmark, and the project was initiated in the beginning of 2013 and was taken into use in the autumn of 2015. The building is owned by Danica, a Danish pension company, rented to Microsoft on a longterm lease, and has been developed by the two partners in collaboration in connection with the development of the 'Kanalvej area' in Lyngby. It was constructed to replace Microsoft's two previous locations in northern Zealand, and co-locates employees from the previously separated development and business part of Microsoft in Denmark. These two different functions require very different workspaces, and the new building is constructed to provide the necessary flexibility to accommodate both of these.

Picture 13: Microsoft, location

Picture 14: Microsoft building [property of Microsoft]

Picture 15: Microsoft, entrance

Picture 16: Microsoft, café and atrium

The new building will besides the private workspaces that will constitute most of the building, have two main spaces within the structure that are to be shared with parties outside of the organisation. The first sharing initiative is a number of workstations that will be made available for students from the surrounding educational facilities to apply for. These workspaces will be available for pre-approved students during regular working hours, and the users will be granted access to the first part of the building not open to the public, but higher levels reserved for classified development work and the like will still be off limits.

The second initiative is a public café incorporated in the ground floor area. Due to security considerations the café which initially was planned as one became divided in two, with one section serving Microsoft employees and the other serving the public though a separate entrance in the façade. Despite of this separation the public section of the café is still often used by Microsoft employees to host small informal meetings etc. The café will unlike the student workspace be open for the public outside regular office hours, meaning that both simultaneous and serial sharing is taking place.

In this case there are three parties involved in the sharing, Microsoft as a private organisation, the general public and selected students. It is an owner/user type relationship, with Microsoft opening up the space for the general public as users of the café and parking spaces, and ‘approved’ students as users of the workspaces. According to Microsoft, the main reason for incorporating these shared spaces is to achieve a closer connection with both the city and for example the nearby university DTU, but an open an interactive ground floor has also been a requirement from the municipality for strategic alignment with the Lyngby-Taarbæk Knowledge City vision.

Case study characteristics - Microsoft	
Construction/project period	2013-2015
Studied during	2014/2015
Area	18.000 m^2
Focus	Shared workspace, shared cafe
Ownership	Private, rental
What is shared	Support facilities such as café/cantina and a few desks for students
People interviewed	The director of facilities management, the managing director at Microsoft Development Centre Copenhagen, a representative from the architectural company and the head of centre for the municipality's planning department.
Additional	A large number of documents from the press, the municipality and internally in the organisation were used to inform the study.

Table 10: Microsoft case study characteristics

This case was used as a part of a cross-case analysis for a journal paper, and the majority of the information in the previous can therefore also be found in (Brinkø & Nielsen, 2016a)

Case update

Despite the cafe not being as shared as originally planned, it has according to Microsoft actually ended up working as an integrated part of the building with many employees hosting meetings with clients and partners in the public part of the café. In addition to this planned shared use of the building, many of Microsoft's partner-companies has been invited to host their own events in the building, with more than 70 of such events having taken place during the first 6 months of 2016.

Hosting events for parties outside Microsoft itself is an initiative that has also been extended to the local community, resulting in the building having been opened for a number of events hosted by FOF, Denmark's largest provider of adult liberal education as well as a number of concerts with the local symphony orchestra. In addition to these activities, the underground parking spaces connected with the building have been made available for the public outside regular office hours as an additional sharing initiative.

4.1.5 Elisabeth Centre, Holbæk, Denmark

The Elisabeth centre is a care-centre for the elderly located in the Danish municipality Holbæk in a former hospital building. The building was converted to its current use in 1991, and functions as a place for the elderly to go for, for example medical care, physical therapy, socialising etc. In the spring of 2014 a project was initiated to improve, optimise and streamline care-centres such as Elisabeth Centre by applying a more integrated approach to the use and organisational set-up. Earlier the different functions in the building were all handled separately since belonging to different sections of the municipal care-system, and the desire with the approach was to better support a development towards increased synergy and collaboration between the different professions working in the building.

An additional benefit of this new approach was also to improve the users – the elderly – experience of the centre as an inviting, open place to go for seniors, also when it was not a medical necessity. A shift from a place they have to go to, to a place they would like to go to, also when they are not in need of medical care.

Picture 17: Elisabeth Centre, location

Picture 19: Elisabeth Centre main building

Picture 18: Elisabeth Centre, main building

The Elisabeth centre is a pilot case for the approach, and if successful the plan is for all municipal care-centres for the elderly to be adapted to this new approach. As a part of the transformation the name of the centres have been changes to “active centres”, to better reflect the desire for the elderly to actively participate in the wide range of activities the centres are meant to host.

At a building level, the Elisabeth centre can be seen as one big shared space, with a number of different professions sharing the one building. The rooms and facilities in the building are meant to be shared by all, though with “home-zones” assigned to the different groups so all have a base. Floating or activity-based workspace has been implemented throughout most of the building, and the different professions now share desks in pre-assigned computer-rooms that are organised with work zones and silent zones. Furthermore, all teaching- and meeting rooms are now defined as flex rooms that must accommodate many different types of use for the different professions.

From an overall building perspective the sharing will be simultaneous since all professions will be present during the same period of time, but when looking at the complex on a room to room basis the

sharing is mainly serial, with the different professions taking turns to use the different spaces. The purpose with integrating the different functions and working with shared space at the Elisabeth centre is according to the municipality to optimise the use of the building and create a work environment that enables a higher degree of collaboration between professions.

Case study characteristics – Elisabeth Centre	
Construction/project period	2014-2016
Studied during	2014 and 2016
Area	1.800 m^2
Focus	Care for the elderly
Ownership	Municipal
What is shared	Everything
People interviewed	The director of the architectural firm in charge of the project, each of the three members of the municipal project group and informal interviews with a number of users
Additional	Observations, workshops, project brief and press material have been used to inform the study

Table 11: Elisabeth centre case study characteristics

A part of the empirical core material has been collected by a master student, as a part of her project on shared space conducted in connection with this PhD. The original material such as transcriptions from interviews was made available for this study. This case was also used as a part of a cross-case analysis for a journal paper, and the majority of the information in the previous can therefore also be found in (Brinkø & Nielsen, 2016a)

Case update

A part of the original plan from the municipality when commissioning the above project was that if successful it should be implemented in care-centres throughout the municipality. The final concept program included a description of how the new centre would be characterised by cooperation and synergy, as well as a description of how the physical environment should be organised in and around the individual building, with a focus on flexibility and operational efficiency.

Many of the proposals included in the concept have now been incorporated, and according to the architectural firm, an evaluation workshop held in January 2016 showed great satisfaction with the reinforced feeling of collective ownership among the various users of the building, supporting the many activities the building have to accommodate in order to service the citizens, but also benefiting the employee health and safety.

4.1.6 IKC Zeeburgereiland, Amsterdam, Netherlands

IKC Zeeburgereiland is a new educational building in Amsterdam, Holland, and was finished in 2013. It comprises space for a nursery, kindergarten, preschool, primary education (<12 years), afterschool day-care, a sports hall and unspecified 'neighbourhood functions', all in one building. The project was developed to tackle a number of challenges, among which was providing adequate facilities in fast growing newly developed areas with increasing population numbers. The building would have to be constructed in a way that was flexible enough to adapt to changing needs without resorting to temporary facilities, should also function as a centre for the local communities, and should be easily convertible to a different use if a school was no longer required.

Zeeburgereiland has been developed according to the new Dutch concept "Integral Child Centres", meaning that it should provide the necessary facilities and services for all aspects of children's education, care and development from aged 0 to 12, in order to create optimal conditions for continuous learning and development. [(Gemeente Amsterdam - Stadsdeel Oost, 2011) Translated from Dutch]

Picture 20: Zeeburgereiland, location

Picture 21: Zeeburgereiland [property of studionine-dots.nl]

Picture 22: Zeeburgereiland [property of studionine-dots.nl]

Picture 23: Zeeburgereiland [property of studionine-dots.nl]

Due to more strict legislation regarding safety, hygiene etc., regarding the smallest children, the nursery has their own space in the building and their own entrance. The other sharing parties have separate sections of the building that they call their own, but in addition to these zones several aspects of the building is shared. The sports facility is used by all, after school care is located in classrooms after teaching hours to mention some. Besides the physical aspects, most service aspects of running the building are shared; cleaning, catering etc. Sharing is on an overall building level both simultaneous and serial, but on a room basis mainly serial. The building is owned by the local authority and managed/maintained by the contractor for a predetermined period of approximately 30 years, and shared between the 3 different childcare/school groups as well as the local community. When the building was first taken into use, the different user groups all had their own manager/director. This has now changed, and one common director was chosen to be in charge of all groups and run the facility.

Case study characteristics - Zeeburgereiland	
Construction/project period	2011-2013
Studied during	2014-2016
Area	App. 2500 m^2
Focus	Childcare and school
Ownership	Municipal
What is shared	Core space such as classrooms and sports facilities
	Support space and facilities such as cantina, cleaning, maintenance etc.
People interviewed	A senior project manager for the childcare centre, an architect involved in the briefing process who had worked specifically on the internal flow of users in the building among other things, and a representative from ICOP, the company responsible for the development of the design brief and tender specification for the project
Additional	In addition to these interviews the original project description/brief was used as well as press material to inform the study

Table 12: Zeeburgereiland case study characteristics

This case was used as a part of a cross-case analysis for a journal paper, and the majority of the information in the previous can therefore also be found in (Brinkø & Nielsen, 2016a)

4.1.7 Case summary

The six cases presented in the previous have as mentioned been the focus of the most intense studies during the PhD. Musicon was used to create a first broad understanding of what shared space in practice entails, followed by the addition of Lyngby Idrætsby to deepen this understanding with further studies and add potential other aspects to the knowledge base. The information from these two cases as well as the cases studied through literature presented in section 4.1 was used to create the first overview of different types of shared space through the development of the Typology of Shared Use of Facilities, see section 6.1. The purpose of this typology was illustrated by use of the case Mabos, and through a first refinement process by use of further studies of the case Lyngby Idrætsby, three themes were identified as being essential when working with shared space; territoriality, involvement and practicalities, presented in section 3.5. In order to test and refine these themes three additional cases were added to the study; Microsoft, Zeeburgereiland and Elisabeth Centre, each representing a type from the typology.

4.2 Survey: Investigating attitudes towards shared space

One main survey was as described in section 2.3.4 developed during the PhD, and send out to two different groups of respondents in an effort to map the attitude towards shared space among practitioners.

The total number of responses from these two surveys is as mentioned 53 with a response rate of approximately 20%. Due to the relatively low representation also described in section 2.3.4, the results of these surveys have only be viewed as indicative, but with this limitation in mind they still provide a number of valuable insights in relation to perceived barriers and motivators among the respondents, and point to a number of themes that should be managed carefully when working both with and in a shared space. The main results from the survey centre around four different aspects of sharing space;

- What is the overall attitude towards sharing in general?
- What facilities could be shared with others?
- What is the greatest obstacle for sharing?
- What is considered the greatest motivator?

The results from these questions from survey 1 can be seen in **Figure 4**.

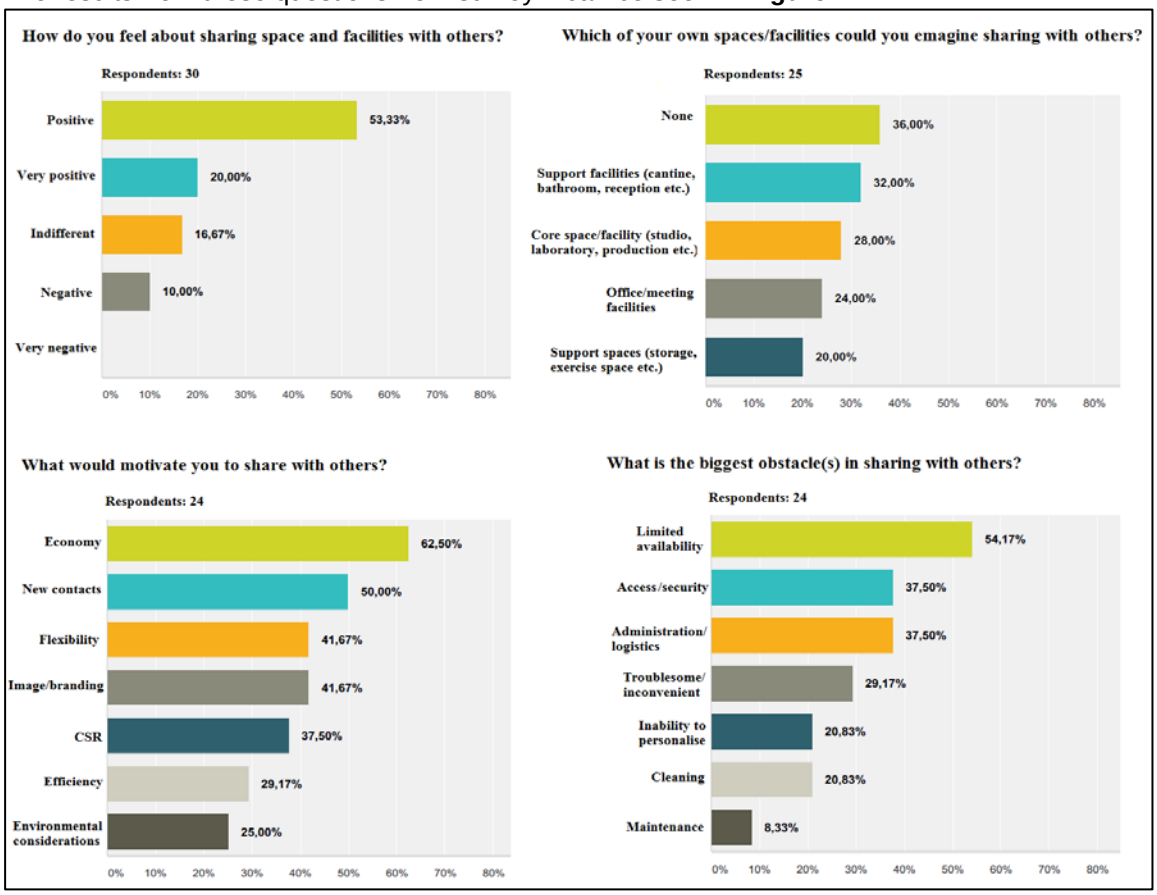


Figure 4: Four main results of survey 1: Shared space in Lyngby-Taarbæk City of Knowledge (Nielsen & Brinkø, 2016)

What can be seen in **Figure 4**, the results from the first survey, is that while 73% are positive or very positive when asked how they feel about sharing space with others, only 10% are negative and none are very negative, 36% answer that they will not share anything when asked about specific possibilities for sharing.
The types of spaces/facilities that seem least problematic to share are support facilities such as bathrooms, receptions etc.; the types of facilities that do not require any significant interaction between the different parties involved in the sharing, and still only 32% say that they would consider sharing these facilities. If we move to core spaces/facilities such as laboratories, offices, etc. the percentage of positive replies drop to between 24 and 28%, and if we look at support spaces such as storage etc. the positive replies drop even further to 20%.

When moving to motivators and barriers, 62% say that economy is the biggest motivator in sharing with others, and only 25% consider environmental considerations as an important motivator. 54% say that the limited availability following from shared space is the biggest obstacle, with the practical aspects involved; administration, access, security, cleaning and maintenance, following closely after.

Results from survey 2 can be seen in Figure 5.

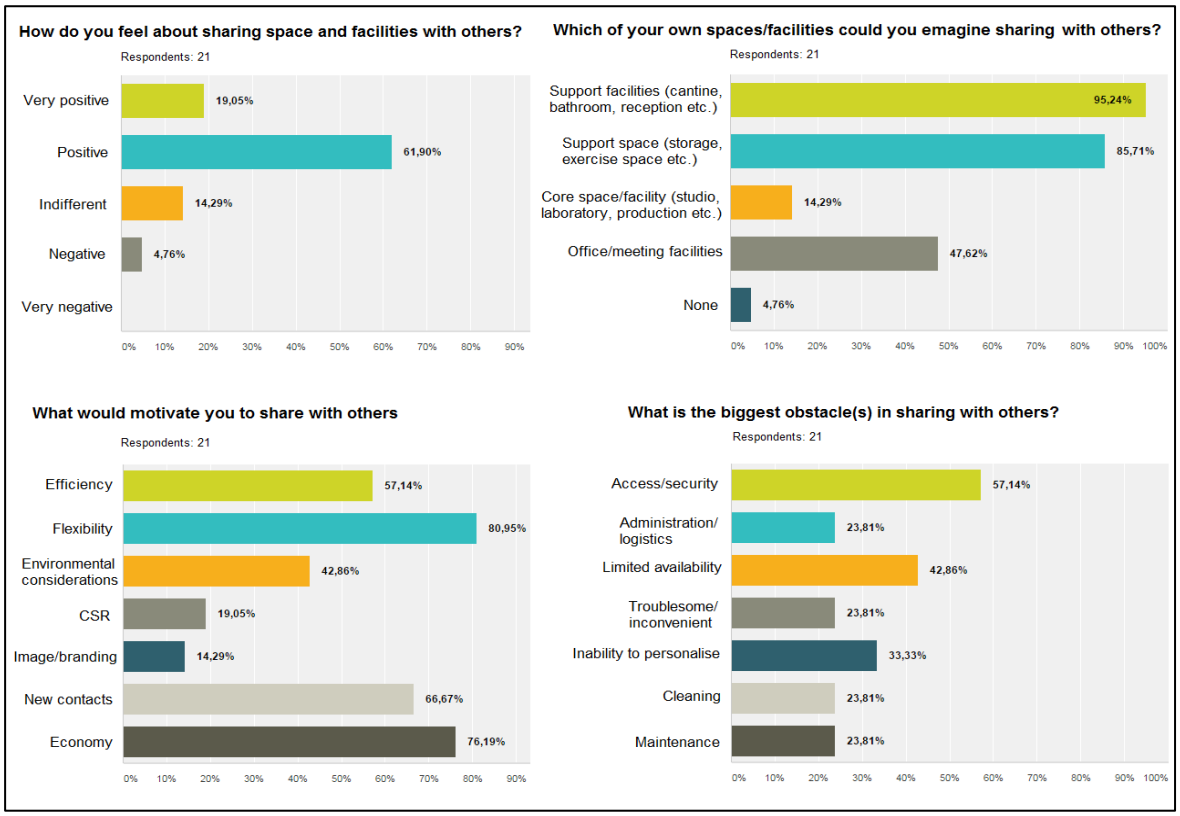


Figure 5: Four main results of survey 2: Shared space in DFM

When looking at the feelings towards shared space in this second survey, the response distribution between positive and negative is very similar, though with a larger proportion being 'just' positive and not 'very positive'. A significant difference on the other hand appears when moving to the question of which own spaces the respondents can imagine sharing. While no possible answer got more than app. 30% in survey 1, more than 80-90 % answered yes to the possibility of sharing support space and support facilities in survey 2. Regarding motivators there are some differences between answers from the two groups, but not any of significant importance; economy and flexibility are still in the lead in both, and this same observation is also true when looking at perceived obstacles, where access/security and limited availability are the top two answers.

What is really interesting to see, is the difference between the results of the two surveys. The population for the first survey is not necessarily people who are used to working with buildings and spaces but they have entered in to a commitment with the Lyngby-Taarbæk Knowledge City association, focused on sharing knowledge and working together. The population from the second survey on the other hand is the Danish Facilities Management Network, many of whom work with spaces and buildings on a daily basis. The results from these surveys have been used to further inform the general study on shared space, especially in relation to the potential barriers and motivators among practitioners, and have played an important role in identifying some of key aspects of the intricate processes involved in working with and in a shared space.

4.3 Workshops: Shared space in practice

As described in section 2.3.5, two workshops were conducted during the PhD. The first workshop built on data from the survey described in section 2.3.4 and 4.2, and focused like the survey on studying the motivations and perceived barriers among practitioners, for entering in to a shared space collaboration, adding the additional layer of collecting suggestions from the participants at the workshop for how these could be overcome. The second workshop was as described in section 2.3.5 focused on with practitioners co-creating a guide to establishing a shared space in a municipal real-estate portfolio. The results of these two workshops will be presented in the following.

4.3.1 Workshop 1: 'What we share we give to each other"

The first workshop was as described in section 2.3.5 conducted as part of a meeting for the Lyngby-Taarbæk City of Knowledge members with approximately 39 participants, and the format was a poster containing the four main questions;

- If only I could…?
- If only I knew…?
- If only I had…?
- Shared space I don't believe in it.

Two examples of posters can be seen in Picture 24 and Picture 25.

Picture 24: Posters from workshop 1

Picture 25: Posters from workshop 1

Following the end of the workshop, all answers to the four questions were collected in a large excel sheet, after which similar answers were combined and the information condensed. From this a maximum of three main answers to each question was identified and collected in a single table summarising the main findings of the workshop, illustrated in Table 13.

	If only I could…	If only I knew…	If only I had…	Shared space I don't believe in…
1	*If only I could…* merge city, university and companies at the local level ... Then we would also get more people and knowledge	*If only I knew…* what spaces I already have and what is available 'out there'	*If only I had…* a system that could facilitate the sharing	*Shared space I don't believe in…* there is too much unknown regarding rules and regulations etc.
2	*If only I could…* Have access to an overview of the legislative and practical regulations involved - clear guidelines	*If only I knew…* where to find shared spaces	*If only I had…* help to achieve clarity concerning my actual needs and current situation	*Shared space I don't believe in…* will people be willing to compromise in the long run?
3	*If only I could…* have sufficient flexibility for a space to be adapted to many different uses		*If only we had…* better cooperation and communication across institutions	

Table 13: Summary of results from workshop 1 (Nielsen & Brinkø, 2016)

Among the results identified, clarity about the rules and regulations involved in sharing was singled out as one of the key problems with shared space in the current situation, and was mentioned in different variations under two of the four questions. The second issue identified as being a major concern was

actually finding possible shared spaces, and how to proceed with communications and facilitation of the sharing in practice.

The results have in combination with the data collected through the survey been used to inform and develop the study of the barriers and motivators for working with and in shared space, and have played an important role in creating an increased understanding of the intricate processes and mechanisms involved in shared spaces in general.

4.3.2 Workshop 2: 'Creating a guide for shared space in municipalities"

The second workshop was, as mentioned, conducted with the purpose of creating a guide for working with shared space in practice in collaboration between researchers and practitioners.

Picture 26: Group work, workshop 2

Picture 27: Group work, workshop 2

Picture 28: Group work, workshop 2

Picture 29: Group work, workshop 2

The processes and format for the workshop is described in detail in section 2.3.5, and was as mentioned structured around a framework that divided the discussion in four phases, portfolio analysis, pre-project, project and post-project. A guiding question was provided within each phase (Table 14) as well as a task to define seven necessary steps in connection with each question.

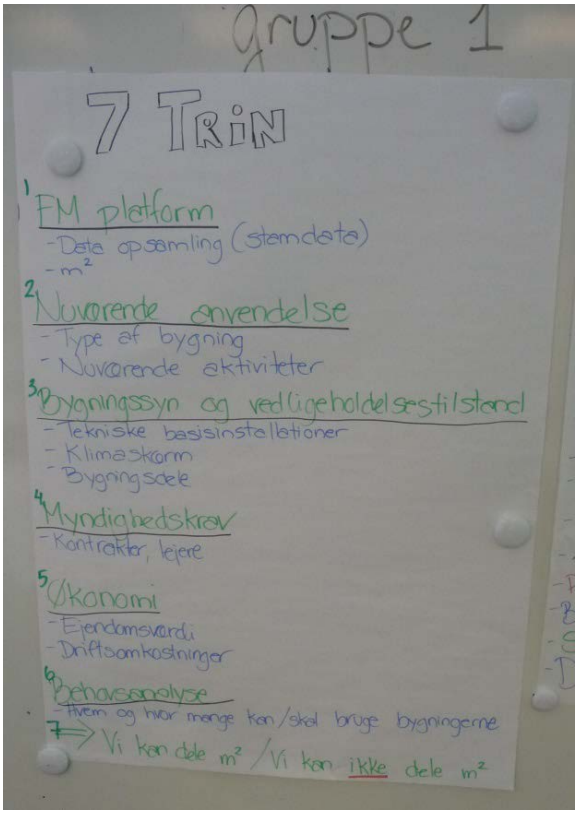
Question for discussion during workshop 2
What information should you have a about building portfolio to identify potential for shared space?
What should be done to ensure clear objectives and frameworks before establishing a shared space?
What activities does it take to ensure that the planned project is implemented in a satisfactory way?
How do you ensure that the proposed use is realised and maintained, and how to evaluate the effects?

Table 14: Question for discussion during workshop 2

During the workshop these four questions were debated in and among the different groups present, in an attempt to develop key steps to guide the development of shared space in a municipal real-estate

portfolio. It became clear that the seven steps proposed were not ideal, so this was downgraded to a guideline during the later stages of the actual workshop and the groups were instead asked to develop the steps they felt necessary, just making sure they had enough detail in their proposals.

The approach to answering the questions varied quite significantly among the different groups, as did their chosen focus within the questions, but the results from all groups all centred a number of key aspects concerning condition of the building(s), location, match with existing use, potential for development and financial situation. Examples of the answers to two of the four questions can be seen in Picture 30 and Picture 31.



Picture 30: Posters, workshop 2

Picture 31: Posters, workshop 2

The many steps proposed from each group were following the end of the workshop collected in one big table and any doubles were removed, resulting in the first draft of the main figure illustrated in section 6.2, Figure 9, forming a key part of the final guide to be produced.

The final result of the workshop, the finished guide to shared space in municipalities, is described in detail in section 6.2 and will therefore not be presented here.

5. Empirical data analysis

This chapter will first present an analysis of the empirical material collected throughout the PhD, and secondly an analysis of the six main cases presented in section 4.1.

5.1 Data analysis and development of themes

All empirical data from the case studies, interviews, surveys, observations and workshops has as mentioned been stored and analysed by use of the IT program Nvivo10, and the process of analysing the large amount of data has been divided in several phases throughout the PhD, focusing on different aspects and sub-goals of the project.

The process of analysing the data by use of Nvivo has been one of open and axial coding as described in section 2.3.8 , a new set of codes and connections developed to suit the individual purposes of different phases. The main analysis process has been carried out with an overall focus on identifying critical aspects of the processes involved in establishing a shared space as well as working in one. Through the process of coding these critical incidents and subsequently connecting similar ones, three main 'clusters' of statements/notes/comments were identified, and based on the general 'theme' of statements within the individual clusters, each was given a label; these are territoriality, involvement and practicalities. Illustrations of the identified themes based on the Nvivo clusters can be seen in Figure 6, Figure 7 and Figure 8, with the theme label in the middle, surrounded by a number of the quotes that led to the identification

The first cluster, named territoriality (Figure 6), represents a very important challenge, or barrier, in relation to realising shared spaces. During the analysis it was observed to occur more frequently the more interconnected the sharing became, if the sharing involved core-facilities and not just support facilities, and especially if the sharing was forced and not voluntary. The theme/title represents the issues of control, individuality, personalisation, fear of losing rights etc. that were frequently mentioned in the empirical data.

Figure 6: Cluster illustration of 'territoriality' based on Nvivo coding

Following from territoriality the second cluster, named involvement (Figure 7), represents a key method to tackling many of the difficulties connected with shared space, such as for example territoriality. Being heard and taken serious as well as being kept informed about the process and how it would affect a specific group was in the empirical material often highlighted as key to a good process, and contributed on more than one occasion to increased acceptance of the change resulting from shared space.

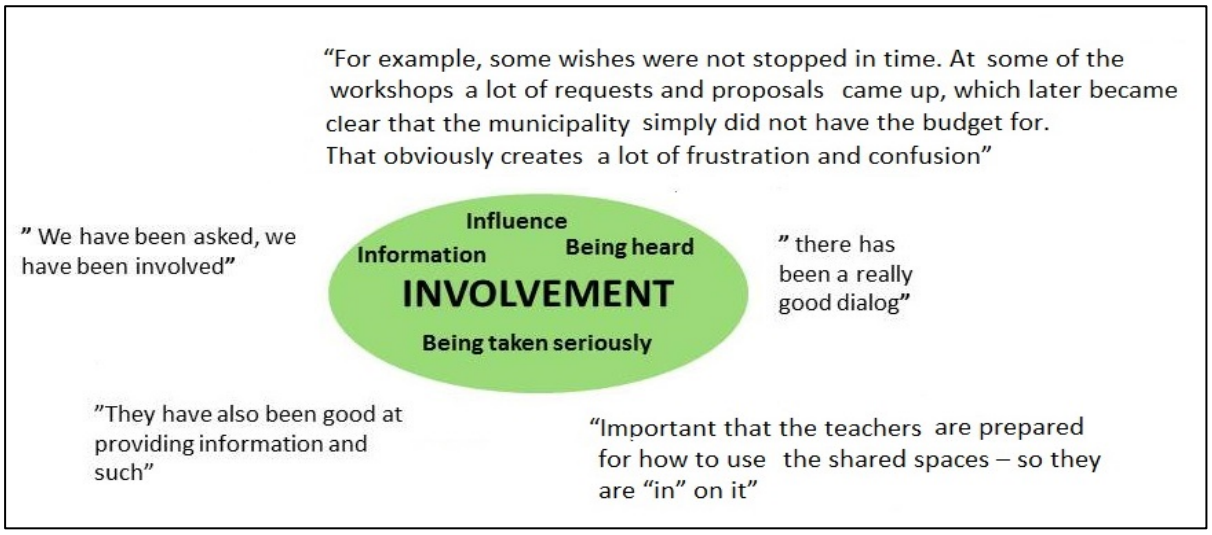


Figure 7: Cluster illustration of 'involvement' based on Nvivo coding

The final cluster identified, labelled practicalities (Figure 8), is of a very different nature than the first two. Where the first two themes were seen in very different amounts and versions from case to case and dependent on the degree and nature of the shared space in question, issues with practicalities were observed in almost all the empirical data. Considerations regarding security, access, maintenance, cleaning, booking, design and availability surfaced in the analysis of all cases, no matter the type, size or focus.

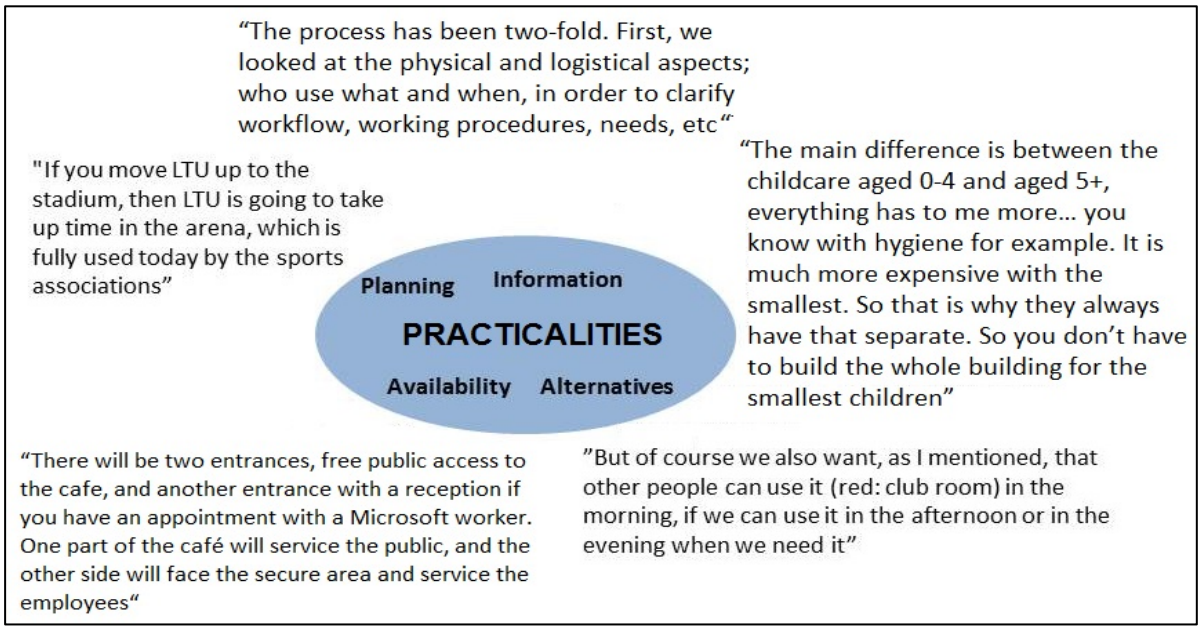


Figure 8: Cluster illustration of 'practicalities' based on Nvivo coding

This identification of these three themes prompted a second literature review looking in to each of them, and this is presented in section 3.5.

The themes have also been incorporated in both of the practical tools developed during the PhD (6), and will also be used to structure the comparative case analysis in the following.

5.2 Comparative case analysis: similarities and differences

This section will present an analysis and discussion of the six cases presented in section 4.1, focused on the characteristics and processes of shared space, as well as how the three themes territoriality, involvement and practicalities have come in to play.

The six cases have one thing in common, and that is shared spaces. The have been chosen by use of the typology of shared use of space and facilities and represents the different categories defined in this. Due to this they represent different degrees of sharing from very little to all, and are all very different in relation to both the organisational set-up and motivation in relation to shared space;

- Musicon is a public initiative directed mainly towards private individuals and groups with the overall aim of creating a lively urban area focused on the entertainment industry
- Lyngby Idrætsby is a municipal non-profit initiative mainly focused on sports and education
- Mabos is a private non-profit space focusing on community outreach
- Microsoft is a private company focusing on attracting talent and creating a more open image and stronger connection with the surrounding local community
- Elisabeth Centre is a public initiative focusing on supporting all aspects of care for the elderly
- IKC Zeeburgereiland is a partnership between public and private organisations focused on childcare and education

Taking Microsoft first, it is connected with the degree of sharing titled “invited sharing” in the typology (section 6.1), and the sharing consists of making space for student workspaces and a public café. None of these spaces would be considered core-functions for the company and from the empirical data it was also evident that territoriality had not played any significant role in the project, and involvement only to a lesser degree, matching very well with what was expected based on the study of the themes. Practicalities on the other hand, had been of great concern during the project.

A high degree of focus on security, access and the flow of employees and visitors; how to plan the layout and use of the building in a way that allows for shared spaces and optimised use, while at the same time living up to certain standards regarding rules, regulations, safety aspects etc. have characterised the work with shared space at Microsoft. One example of this has been the work that has gone in to ensuring public access to the cafe and the invited students while also maintaining private areas for employees. This has also let to the fact that the café in the finished building is divided in two, with one part servicing the employees, and another part with a separate entrance serving members of the public; *“Everyone but the public cafe will have to register in the reception. The ground floor will be semi-secure, you can walk around in it, but if you need to go a meeting room you have to go through turnstiles. There will be no guests in the work areas, so guest will primarily be kept on the ground floor of first floor level. Anything else will only be on guided tours”* [Interview, representative managing level, Microsoft]. The result of this is a space that is not as shared as initially planned, though with employees still using the open public part of the café for meetings with costumers as mentioned.

Moving to IKC Zeeburgereiland and Musicon they both belong to the category in the typology titled “collaborative sharing”. For these two cases the higher degree of sharing, among other things, leads to the introduction of more complexity on the process, a trend visible in the empirical data. Beginning with the theme of involvement, much work has gone into creating an organisation around both projects, not only during project development but also after the spaces has been taken into use. At Musicon a secretariat has been set up on-site to handle the day-to-day administration of the space, and the secretariat functions not only as a visual presence in the area but provide an easy contact point for the users regarding all matters related to the use and management of the site.

At IKC Zeeburgereiland much emphasis has been put on involving the different parties who will be working in the building in order to secure that the spaces are being used as intended; *”It is important that the teachers are prepared for how to use the shared spaces – so they are “in” on it”* [Interview, architect, IKC Zeeburgereiland]. For this to be achieved it was important to make sure the wishes of the individual parties were heard and incorporated in to the final design, and all felt a part of, and contributed to, the one overall vision that was formulated for the complex.

While involvement has played a big role in both of these projects, this does not deter from the importance of the matter of practicalities. At IKC Zeeburgereiland, securing an effective workflow and flow of the different users has been one of the main concerns; how to plan the layout and use of the building in a way that allows for shared space and optimised use, while at the same time lives up to certain standards regarding rules, legislation, safety aspects etc., as well as how to secure suffient flexibility in both the overall building design but also the interior, for the building to be able to accomodate all the many functions needed. These were just some of the considerations that were evident in the empirical material; *"One of the main focuses was the relationship between the spaces; looking for how the spaces and the institutions could be integrated" [*Interview, architect, IKC Zeeburgereiland], *"We had to figure out how to connect them (red: the day-care and the schools). They have a strange relation since one is subsidised and the other is not"* [Interview, architect, IKC Zeeburgereiland] and *"The main difference is between the childcare aged 0-4 and aged 5+, everything has to me more… you know with hygiene for example. It is much more expensive with the smallest. So that is why they always have that separate. So you don't have to build the whole building for the smallest children" [*Interview, project manager, ICOP, IKC Zeeburgereiland].

For Musicon, the practicalities are also extremely important in the day-to-day management of such a large site with so many and so diverse users. Making sure everybody has access to the necessary facilities such as bathrooms, coordination of events, users moving in an out and so on.

Despite the above having focused on involvement and practicalities, this is not to say that territoriality did not play any role at all in the projects. It was not investigated at Musicon, but it was touched upon by the architect in the case of IKC Zeeburgereiland. The planners involved in the project predicted from the beginning that feelings relating to territoriality would play a role when co-locating day care, kindergarten, school and neighbourhood functions in one building. To tackle this, a big effort was put into creating a space that 'trumps' these feelings, and instead promote a new feeling of belonging to the building rather than an organisation; *"The character of the building is strong enough for the users to acclimate to it"* [Interview, involved architect, IKC Zeeburgereiland], and *"So how do you plan a new way of organising space? You have to change the culture from the beginning"* [Interview, architect, IKC Zeeburgereiland]. The fact that territoriality do play a role despite not being listed under this category in the typology, also illustrate that the typology is divided by archetypes/categories, and there will be a more fluent transition between the categories in real-life cases, and some cases will fall entirely in-between categories.

The last three cases presented, Mabos, Elisabeth Centre and Lyngby Idrætsby fall in the last category of the typology, "complete sharing", and despite all of them being in the same category there are still significant differences between the cases, also regarding how the three themes play out.

Taking Elisabeth Centre and Lyngby Idrætsby first, the two cases are actually relatively similar. They are both municipal, they both involve a change from traditional use of space – having their *own* space, to shared space within an existing building and with the same users before and after the change, and in both cases territoriality played a significant role in the project. At Elisabeth Centre, territoriality was in play regarding the employees whom after the renovation would have to share what used to be *'their'* space, thereby giving up having a personal workspace and instead share across professions and organisations. This has been addressed through workshops etc. with focus on creating unity among the users, and a common feeling that no one owns the space more than others; "*It is important to create a common spirit - a collective feeling that nobody owns this place more than others"* [Interview, architect, Elisabeth Centre].

At Lyngby Idrætsby territoriality was evident in relation to the majority of the sports associations, whom after the rebuild would no longer have their own clubroom, as well as with some of the new functions which were being relocated to the Idrætsby; "*We would rather not have it so that our members are*

mixed with the others" [Interview, user, Lyngby Idrætsby]. The reservations were especially clear in relation to being able to personalise clubrooms and create a clear identity of "this is us, here we belong"; something that plays a big role in creating and maintaining unity and team spirit within the different clubs and associations; "*We would like that we could personalise it so you can see that here we have <u>our</u> gathering place*" [Interview, user, Lyngby Idrætsby].

The second theme, Involvement, also played a very big role during the project at the Elisabeth Centre. Much work went into having workshops with the employees and users, both to collect wishes and ideas, but also to convey the importance and relevance of the project. The purpose of this was to try and get everybody on-board; thereby optimising the chance for the new concept to be accepted and for the new space to be used as planned; "*How do you create that necessary collective feeling? We need to create a deeper understanding and deeper meaning of why it is relevant to do it this way"* [Interview, architect, Elisabeth Centre].

At Lyngby Idrætsby the involvement was organised by hiring a facilitator to be the link between the municipality and the users, and this facilitator put great emphasis on communicating *why* the change was happening, why it was necessary and what the benefits were. This action was highlighted among many users as having played a large role in their acceptance of the change and new circumstances where they would have to share with others; "*We have been asked, we have been involved*" [interview, user, Lyngby Idrætsby]. In addition, representatives of all user groups, including representatives from the local community, were invited to take part in a reference-group that was kept informed and invited to participate in design-workshops along the way, The purpose of these initiatives were to take the user's experience and wishes into considerations in order to design and plan a space that suits the need of the users as best as possible.

The last theme, practicalities, was for Elisabeth Centre especially focused on identifying workflow and flow of the different users. How to plan the layout and use of the building in a way that allows for shared space and optimised use, while at the same time lives up to certain standards regarding rules, regulations, safety aspects etc. Securing that the functionality of the building and its uses will stay intact and be given optimal conditions.

For Lyngby Idrætsby the practical considerations were divided in to main parts; the first during the renovation and construction of new facilities where many users had to be relocated for extended periods of time, and secondly after the finished complex was taken into use. For this last part especially, many practical considerations were connected with managing who can use what and when. There is a large number of associations as well as other groups from the local community using the space, and coordinating use, access, and all other aspects related to the different types of uses and users plays an important role in keeping the space attractive and successful; "*Do not put fitness or Zumba in the room right next to the yoga class, unless you have very good sound insulation*" [interview, user, Lyngby Idrætsby].

The third case in the category "complete sharing" is Mabos. This case is quite different from the Elisabeth Centre and Lyngby Idrætsby in that the sharing here is completely voluntary. All the users of this space come because they want to be a part of such a shared space, and the vast majority of decisions are as a general rule made jointly by the regular users. Due to this special characteristic involvement is inheriently incorporated in the project and territoriality does not play any significant role, in contrast to the other two cases. The practicalities on the other hand, are despite the cases being so different actually quite similar. The large number of different people using the space means access is an issue that must be managed, and so is cleaning, repairs, orgainising events etc. Much of these though is handled between the regular users in unison, due to the nature of the space and the people using it.

This chapter has been focused on the cases that have been at the center of the empirical study presented in this dissertation. The main cases have been presented and a number of the intricate processes involved in shared spaces have been discussed, also in relation to how the three themes, territoriality, involvement and practicalities has played out. An analysis of four of the cases Lyngby Idrætsby, Microsoft, Elisabeth Centre and IKC Zeeburgereiland was presented in (Brinkø & Nielsen, 2016a), and some of the material in the following can also be found in that publication.

The following chapter will move on from the presentation of the cases, to a presentation of the practical tools and conceptual frameworks developed on the base of the empirical data collected through the study of these cases, combined with the theretical knowledge collected through literature reviews.

6. Developed tools and theoretical frameworks

A need for the development of tools and frameworks to support facilities managers in their work is touched upon in much literature within the field of for example sustainable facilities management (BIFMA, 2006; Nielsen, Sarasoja, & Galamba, 2016), and is very much in line with one of the main goals set forth as a part of this PhD; connecting the theoretical knowledge developed to practical application.

So based on the theoretical and empirical work described in the previous chapters two 'tools' were developed to support the discussion and development of shared spaces by synthesising the knowledge developed throughout the PhD. The first of these is a 'Typology of shared use of space and facilities', which is not only a practical tool but also a theoretical framework, and the second is a 'Guide to shared space in municipalities'. Both of these will be presented in the following.

6.1 Typology of shared use of space and facilities

There are as mentioned in section 3.4 many different types of sharing, and shared space can have a number of different meanings depending on in which profession it is used, and in order to define a common ground from which shared space in connection with physical space and the built environment could be discussed, the first tangible result from the project was The typology of shared use of facilities.

The typology was developed in order to create an overview of the different types of shared spaces possible as well as defining a common language around the topic of shared space in relation to buildings and facilities, from which more precise discussions could be had, and to create a common understanding and platform from which shared spaces could be described and developed. The instances of sharing included are the sharing of buildings and the spaces within them among parties from different organisational affiliations. The development process is described in detail in (Brinkø et al., 2015) and a summery will be given in the following:

1. **Gather secondary data via literature review:** The literature review have been conducted by searching multiple databases in order to secure that a significant portion of the literature available was included in the review, as well as to validate the results from one individual search. The information gathered from the review was used to form the theoretical starting point and framework for the development of the typology, as well as to form a first very rough draft for a typology to be used as a base to guide the collection of examples for the inventory described in the following.

2. **Make an inventory of examples:** The guideline created based on the literature review was as mentioned used as a guideline in the search for both national and international examples of existing shared spaces. A total of 20 examples from Europe, Australia and USA were selected, and an initial analysis of these examples was undertaken. The characteristics identified were grouped together according to theme and used to refine the rough draft outlined based on the literature review. The result of this was a more focused typology that could be used to guide the case studies and interviews to be completed in the next step.

3. **Collect primary data from interviews:** To better understand the complex processes involved in shared spaces, two examples from the inventory was selected for further studies. These cases were Musicon in Roskilde, Denmark, and Lyngby Idrætsby in Lyngby, Denmark.

4. **Develop the typology** as a continuous process concurrently with the data collection process, so each step is used to develop, validate and refine both the data collected and the typology developed.

The process of creating the typology has been a pursuit of diversity and variation, to ensure that the final types represented a maximum range of shared spaces. The result is a typology constructed around archetypes and due to this choice there will inevitable be examples and instances of sharing that will fall in-between the categories. The resulting typology is directed towards both researchers and professionals, and is focused on sharing that takes place between different organisations or businesses that would traditionally prefer exclusive use or ownership, and is presented as 'Typology V1.0" in the following section.

Typology V. 1.0

The first version of the typology was originally presented in the conference paper titled "The shared building portfolio – an exploration and typology" (Brinkø et al. 2014), and later on in the journal paper "Access over ownership – a typology of shared space" (Brinkø et al., 2015). The typology is structured around four main types of sharing, representing the decisive factor in the typology and grouping the many different examples of shared space in to a more manageable number. The types are decided by 'what' is being shared and sorted by scale varying from sharing a desk or workspace to sharing a network of buildings, with the smallest instance to the left and most comprehensive on the right. A short description containing general attributes of the individual types is linked to each of these types along with an illustration to provide a visual characteristic to ease recognition and discussion.

The first type presented in the typology is '*sharing a specific facility – a desk or a work-space in a semi- closed community*', and it represents sharing on the smallest physical scale in the typology. It include spaces such as cowork spaces and instances where a company invites for example individuals or business partners in, and provides workspace within their company.

The second type is '*sharing several facilities in an open or semi-closed community'*, and it represents the instances where a company, organisation or municipality makes a part of their facility that in normal circumstances would only be accessible to individuals inside the organisation available for a larger group of people. The type can also cover spaces like shared spaces for the community, shared sports facilities etc.

The third type is '*sharing physical space in a building or a building in itself in a closed community'*, and represents sharing of several facilities within the same building or building complex among pre-agreed partners. It is within this type the most significant growth have been observed during the period of this study, and the type that due to the scale and structure is really interesting for businesses and organisations in developing and utilising their property portfolio.

The fourth and last type is '*sharing facilities between users in a network of buildings/organisations in an open, semi-closed or closed community'*, and is the most extensive type of sharing as well as the only one that involves more than one building. This type of sharing is often kept within a relatively closed community and requires a big commitment from the involved parties due to sheer scale. Following these four main dividers are four discriminators, "when", "why", "who" and "how" which are used to provide the characteristics for each type, and these discriminators will be described in the following.

When; meaning is the sharing taking place simultaneously or serial

Another aspect that was identified repeatedly as a significant feature in the different examples and cases is the second discriminator, 'time'. Sharing and what the expected gain of establishing a shared space is, has close ties to the time aspect involved. The choice between simultaneous or serial use leads to significant differences regarding outcome in terms of synergies, administration, management etc. This makes it very important to be aware of these aspects and how they are linked with the time aspect, when determining if it is simultaneous sharing, where different people/organisations uses the

same space at the same time, or serial sharing where one person/group/organisation use the space during some hours of the day and another person/ group/ organisation during other hours of the day.

Why; meaning what is the motivation behind the sharing

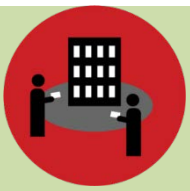
'Why' a given space or facility is shared, or should be shared, is the third discriminator in this typology. Choosing to share can be due to considerations regarding costs, increased sustainability by optimised use of resources – or sharing resources, a desire to create synergies or agglomeration effects, just to mention some of the possibilities. Identifying the "why" is therefore an important aspect of determining which type of sharing is most suited to a specific situation or organisation, as well as achieving clarity for all partners involved regarding what a given project of sharing is working towards achieving.

Who; meaning who are the parties taking part in the sharing

The fourth discriminator in the typology is the aspect of 'who' is sharing. The typology presented in this paper is as mentioned focused on sharing between organisations or individuals, and the purpose with this discriminator is to be clear about the participants engaging in sharing. To define whether the sharing is initiated by a public or private organisation, institution or individual; what the relationship is between user and owner, meaning are the sharing partners equal or not; if the sharing is restricted to one or more specific groups with specific limitations regarding access or the sharing is open for all to participate in. These are all important aspects to have clarified before entering in to using or establishing a shared space, and can help focus the search for a specific type of sharing.

How; meaning how is the sharing organised

"How" the sharing is organised is the fifth and last discriminator, and also the one that can be the most difficult to describe. The aspect of how can be translated into a myriad of different configurations depending on the partners involved, the goals with using or establishing a given shared space, the people it is directed towards, the time frame etc. These many aspects all contribute to the high degree of difficulty but it is also due to this that it is also the one that seems to possess the most relevance in relation to counselling in regards to the topic of shared space. The final typology (v.1.0) can be seen in Table 15.

TYPOLOGY OF SHARED USE OF FACILITIES				
				
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/organisations 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 organisations	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 Optimised use CSR activity	Keep costs down Optimised use Surplus space	Keep costs down Optimised 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 pre-agreed 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 organisation 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
Examples	1) Republikken, DK 2) Plywood sheds, USA 3) School sharing, NED 4) The HUB, DK	5) Lyngby Idraetsby, DK 6) Ramboll, DK 7) Frivilligcenter Hillerod, DK 8) Risskov Library, DK	9) FOF Lyngby, DK 10) Fjaltring-Trans, DK 11) Churches, England 12) Shared use hubs, AUS 13) Space for entrepren., USA 14) Airport passenger buildings 15) Use of school premises, England 16) Center for A & E, LTK, DK 17) Denver Shared Spaces, USA	18) Musicon, DK 19) Manchester Media City, England 20) Shared school campus, NIR

Table 15: The typology of shared use of facilities (Brinkø et al., 2015)

The typology was after completion tested on several cases in order to evaluate the usability of the work, and with the knowledge gained from these tests along with additional data and experiences from working with the subject, it became clear that the typology was not perfect. Firstly, it did not take in to account if the spaces shared were support functions or core functions for the participants involved. A factor that through the additional case studies conducted was identified as being of key importance to the challenges that would arise during the process of establishing and working with and in a shared space. Secondly, it was through working with the typology and presenting it to both researchers and practitioners discovered to require quite a bit of introduction and explanation in order to be used in the way intended, which is not conducive for users to acquire optimal benefit from it.

With this in mind the typology was redesigned with this new knowledge and experience in mind, resulting in a typology v 2.0.

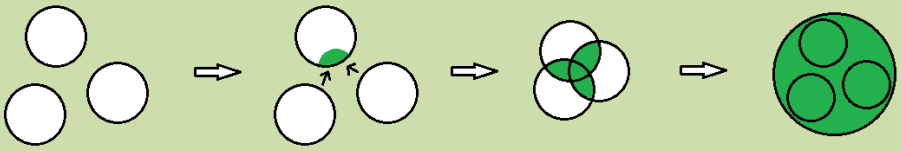
Typology V. 2.0

The Typology of shared use of facilities version 2.0 was developed based on the original version and the additional knowledge gained through tests as described in the previous section. The original typology has been simplified by working with three levels of sharing instead of four types, with the new levels representing the extent of sharing and thereby incorporating the aspect of core vs support functions, instead of the physical scale as was the case in the original version. The new version still presents a common language and understanding of what shared space is in the context of the built environment, a key aspect of the original version, and still represents maximum diversity and variation of shared spaces, organised by scale with the least comprehensive to the left and increasing complexity towards the right, as did the original.

The three levels that have replaced the four original types, are as mentioned based on the degree of sharing taking place, from ‘no sharing’, to ‘invited sharing’, ‘collaborative sharing’ and last ‘complete sharing’, focusing not on the physical facility being shared but instead on the amount of inter-

organisational collaboration required. The discriminators ‘when’, ‘why’, ‘who’ and ‘how’ used in the original typology are still a key aspect of the new, but are now held in a separate table and are meant to be used to describe a specific shared space and not as a description of a type. The new version of the typology also incorporates another new aspect not included in the original typology; the three themes ‘territoriality’, ‘involvement’ and ‘practicalities’ identified through analysis of empirical data as described in section 5.1.

What was concluded from the identification and study of these three themes was that they are essential to consider when working with shared spaces whether the shared space in question is a new one under development or an already well-established existing one. How they should be managed depend on the specific shared space in question, since the extent to which they arise is depended on a number of characteristics of the shared space, such as extent of sharing, forced or voluntary sharing, sharing of core or support space etc., but do to their importance they should be incorporated in the typology. The new typology, the Typology of shared use of facilities version 2.0 with the three themes incorporated is illustrated in Table 16, with the 6 main cases used to exemplify the different degrees of sharing.

Typology of shared use of facilities version 2.0				
				
Degree of sharing	**No sharing**	**Invited sharing**	**Collaborative sharing**	**Complete sharing**
Examples		Microsoft, DK	Musicon, DK Zeeburgereiland, NL	Mabos, IRL Elisabeth Centre, DK Lyngby Idrætsby, DK

Characteristics of shared space	
What	Core facilities; Support facilities;
When	Simultaneous sharing; Serial sharing;
Why	Optimising use of m2; Keep costs down; CSR activity; Synergy;
Who	Unlimited access; Access available for employees of the sharing partners; Access restricted to individuals/groups approved by owner;
How	One party has ownership and makes the space available either free or for a fee; Different owners come together and agree on sharing specific facilities or locations with each other; A third party has ownership and manages the space for the parties sharing;
Themes	Practicalities:
	Involvement
	Territoriality

Table 16: The typology of shared use of facilities v2.0 (Brinkø & Nielsen, 2016b)

Following this main part of the typology that is to be used for classifying the shared space is as mentioned a table of characteristics of shared spaces derived from the original typology, to be used to describe the shared space; whether it being an existing one or a new one under development. This sec-

tion is also where the three themes are now included, and what is important to remember is that if and to what degree they occur is depended on the specific characteristics of the shared space in question

These two typologies represent an ongoing development of the understanding of shared space, and are meant for researchers and practitioners alike. They therefore not only represents a base from which further research on shared spaces can take its starting point, but also a language and framework to be used for discussing, developing and operating shared spaces in practice.

6.2 The guide to establishing a shared space

The guide for creating and operating a shared space in a municipal real-estate portfolio is the second and last tool developed during the PhD. It has been developed in cooperation with practitioners from both municipalities and the private sector, through a process that has been described in detail in (Brinkø & Nielsen, 2016b) and can be summarised by the following steps;

1. Conduct workshop with practitioners and plan group work
2. Write up all steps proposed from all groups and take out steps repeated.
3. Sort the steps into three categories related to either users, buildings or organisation
4. Send this first documentation of the steps created during the workshop out to workshop participants for feedback
5. Further develop this initial draft based on previous knowledge of shared space; adding steps missing from the original draft and formulating all in a more precise way to minimise misunderstandings and optimise content, as well as adding an introductory text describing the topic and a number of different aspects involved in working with shared space
6. Send this second version out to workshop participants for feedback
7. Further develop the content created to a final draft version
8. Send this final version out to workshop participants for final commenting and approval
9. Finalise guide with explanations

The guide contains two main parts, a theoretical part containing the theoretical knowledge developed through the PhD, and a main figure containing the necessary practical steps to take during a given project, with the majority of the information having been co-created with practitioners at a workshop (described in section 2.3.5 and 4.3.2).

The guide is meant to support municipalities in working with shared space as a part of their real-estate strategies, and combines the theoretical knowledge developed during the PhD with practical knowledge in the form of a number of steps to be taken during the different phases in a project from identification of potential on portfolio level to evaluating the finished space in the post-project phase.

The guide is constructed around two main parts, followed by a list of words and suggestions for further reading. It has been presented in (Brinkø & Nielsen, 2016b) and the following is a summarised version of the content in this paper.

Part 1: An introduction to the guide containing the following sections

1. An introduction to shared space as well as a number of the benefits connected.
   This first section contains the general introduction to shared space, followed by a list of 5 possible benefits of working with shared space, with a short description of each to motivate and inspire shared space initiatives in a municipal building portfolio. The explanatory text introduces shared spaces as a collective term for space and facilities shared between people from organisational contexts, and how it can lead to a number of positive aspects for the stakeholder involved

   a. Optimised use of square meters
      Optimised use of fewer facilities and buildings will allow for fewer buildings total in the portfolio, and will therefore be able to contribute to an overall space optimisation
   b. Reduction of costs
      Optimised use of fewer facilities and buildings will mean fewer buildings to be maintained and operated, allowing for a release of funds to be used elsewhere
   c. Synergies
      If the focus in addition to space optimisation and reduction of costs also is on gathering users who could benefit from each other, it is possible to create a situation that allows for synergies to develop between the users and thereby achieve an additional benefit of shared use.
   d. Sustainability
      If multiple users are moved to one building instead of several buildings are left empty much of the time, but still have to be maintained and operated, it can have a positive effect on the overall sustainability, despite the increased use resulting in a greater load on the specific building.
   e. Flexibility in the portfolio
      The possibility of, for example, launching a new initiative in an existing building or room provides the opportunity to assess the viability of the initiative before a permanent space is assigned, which represents one of the ways in which shared space can contribute to flexibility in a portfolio

2. Introduction to identifying the potential of shared space by focusing on the types of users that could potentially be co-located, followed by a number of specific suggestions in a municipal perspective
   This second section provides a short introduction to identifying potential for shared space on a portfolio level, followed by three suggestions for possible user-types or functionalities that could be co-located in shared spaces in a municipal context to serve as inspiration. The text starts by introducing two different approaches to identifying users that will be able to interact successfully in shared space; meaning what should a building owner or portfolio manager look for when trying to identify potential for sharing among several different buildings and users. This is followed by three suggestions for co-location:

   a. Co-location of schools, youth clubs and after school activities
   b. Co-location of offices and/or administration for different departments or groups
   c. Co-location of functions such as libraries, community centres and other ‘open’ functions serving the local area.

3. Introduction to the practical considerations connected with working with shared space
   The third section, part 1c, contains very little introductory text, and is mainly constituted by a list of practical tasks that must be managed when working with shared space, with a focus on the day-to-day aspects of running a shared space to ensure optimal satisfaction.

a. Time of use
   Should the sharing take place simultaneously or in succession, and should the sharing be equal or should one or more users have "priority rights"?
b. Security/access
   If the sharing is not available to all, but only pre-approved groups or individuals, how then should the access control be managed? ID cards, keys, passwords etc.? Furthermore, if a building for example, must be available to certain users at odd times of the day, how should the security be handled?
c. Difference in functions and needs
   If the different users of a space have different needs in relation to, for example, interior and storage how should this be handled?
d. Legislation
   If a building needs to be shared by for example a school and a day-care, there will be different regulatory requirements in relation to the two user groups which must be considered in the planning and design of the buildings and premises. A similarly dilemma could also arise if the sharing is taking place between a public and a private party and is important to consider in the planning.
e. Cleaning and maintenance
   When you have many different users of a building, room or facility, there is always a chance that 'everyone's room is nobody's responsibility'. Who is responsible if something breaks? Who is responsible for cleaning? What to do if the space is a mess when you arrive? etc. etc. etc.

4. An introduction to the challenges to be managed when working with shared space
   This fourth and last section introduces three main challenges to be managed when working with shared spaces. They have in previous research been identified as essential, and the introduction is meant to create awareness in the person or organisation working with establishing the shared space.

   a. Territoriality
      Territoriality deals with the emotions and reactions that arise when transitioning from a situation of having one’s own space to a situation with shared space, and the consequent loss of control following this transition. Several factors affect the degree of territoriality that will occur, and thus also the amount of time and energy that should be allocated to deal with it.
   b. Involvement
      There is a big difference between sharing with people you know and people you do not know, and in addition to this there is a significant difference between being "forced" to share and to be "participatory" in the decision to share. Engaging the individuals or groups having to change habits from having their own to having to share, can contribute to a greater understanding of each other, something which will have a positive effect in itself, but it can also create a feeling of having a say in the matter even if you have not had influence on the decision itself.

   c. Practicalities
      There are a large number of practical aspects to be considered when working with shared space. Unlike traditional use, shared space involves multiple users from several different organisations, each with their administration, financial situation, etc. There are basic logistics in relation to all aspects of ensuring that a building and its users function as optimal as possible, as well as considerations about cleaning, maintenance, administration, security, access, etc., and all these must be met in order to get from idea to realisation.

Part 2: A description of the necessary steps to be taken from identifying potential on a portfolio level to evaluating the project after completion, divided in four main elements, being;

1. An introduction to the overall elements contained in the step-by-step figure (see Figure 9)
   This part of the guide is focused on a how to develop a specific shared space from beginning to end, and is structured around four basic elements, representing an idealised process which in practice will inevitably happen more fluid and different parts will inevitably overlap.

   a) Portfolio analysis
      The first step in the process concerns the identification of potential locations for shared space at the portfolio level, and the overall focus of the section is on collecting general knowledge of the buildings in a given portfolio, and on what information is needed in order to identify potential for shared space.
   a) Pre-project
      The purpose of this part of the process is to prepare a detailed description of the framework for the project by performing an in-depth study of the needs of users, buildings and organisation to ensure an optimal situation for the transition to shared space. The overall focus is therefore on describing the basic project framework and to ensure a clear objective before establishing a shared space.
   b) Project
      After the basic framework of the project is decided, the next part of the process begins; the main project. This is where the transition to shared space is realised, and the overall focus is therefore on what activities are needed to ensure that the planned project is being implemented in a satisfactory manner.
   c) Post-project
      After completion of the main project and the shared space is realised, there still lies a task in evaluating if the purpose of the project and the desired outcome have been achieved as intended. The overall focus of this part is therefore on the stage after the project is completed, and on how to ensure that the intended use is realised and maintained.

These are followed by a figure illustrating the steps to be taken within each element, see Figure 9 and a wordlist and suggestions for additional reading. The content of the different sections have been carefully selected and written to equip the user with an introduction to the subject and a general understanding of the different aspects and processes involved. The full content of the sections are described in (Brinkø & Nielsen, 2016b) and (Brinkø, 2016) and is therefore not reproduced in full here but instead with excerpts of the main points.

Figure 9: Main figure of the guide to establishing a shared space in a municipal real-estate portfolio (Brinkø & Nielsen, 2016b)

7. Conclusions and discussion

This chapter will start out by outlining how the individual research questions formulated to guide the study have been met and summarising the main findings of the PhD. Second is a discussion of the academic and practical implications of the work undertaken, and last the limitations and generalisability of the results accompanied by some thoughts on further research.

7.1 Answering the research questions and summery of findings

The research question formulated to guide the study presented in this dissertation are:

How can shared use of facilities and spaces be understood and what mechanisms and processes are involved?

- *What is shared space in a facilities management context*
- *What types of shared space are there?*
- *What are the benefits and disadvantages of shared space?*
- *How can a building be evaluated for potential for sharing?*
- *How can shared space be implemented in practice?*

This section will begin with a presentation of the work that have gone in to answering the five sub questions, followed by a description of the findings from each of these have contributed to answering the main research question.

Sub question 1: What is shared space in a facilities management context?

The answer to this first sub question began in existing literature, looking through many different descriptions of sharing within for example the sharing economy, and finding an actual definition by Gavan Rafferty from the field of policy: "*co-existence in place—shared spatiality— that embodies a relationship between shared local identity, citizenship and ownership. It invokes notions of mixed neighbourhoods, shared services, safe civic spaces and parks accessible to all*" (Rafferty, 2012). The descriptions found though were still too focused on 'stuff' and the definition by Rafferty too 'urban' and a little too abstract for the very practical oriented field of facilities management; therefore not fully capsuling the term as it was understood for this PhD.

Looking towards the more building oriented field instead revealed among others, a Canadian organisation, Tides Canada, working for the promotion of social change initiatives across the country and fostering social innovation through shared spaces was working with four definitions of different types of shared space; "***Co-location****: space shared among a number of separate organisations.* ***Community hubs****: space that brings together service providers to help the surrounding area by offering a range of supports such as language instruction, job training, and after school programs.* ***Co-working****: sharing of space among freelancers and independent workers.* ***Incubators****: provide strategic, administrative and/or financial support to small projects and organisations*" (The Centre for Social Innovation, 2008, 2009, 2011; Tides Canada, 2016). These are closer to the view of this PhD but still not incorporating the aspects of sharing outside the workplace desired.

In addition to the information collected through literature, additional important insights in to how

shared space can be viewed and defined was collected through contact with practitioners, during the many interviews conducted throughout the study as well as during the workshops.

Based on the existing information and definitions from theory, and the knowledge collected from practitioners, a new definition of shared space was formulated to guide the research and this is; "***Multiple***

***individuals/groups/organisations /businesses, organisationally independent of each, other making use of the same space, either simultaneously or serial*."**

Sub question 2: What types of shared space are there?

The focus with this second sub question was generating an overview of the different possibilities – types – of shared spaces. This was done by conducting a thorough search for existing shared spaces of all kinds, from all over the world and by use of as many different medias and search engines as possible, in order to map a maximum variety of shared spaces. This portfolio of examples then underwent extensive work, resulting in the Typology of Shared Use of Facilities (v.1.0) presented in section 6.1, Table 15, illustrating four main types of shared spaces, all connected with the physical scale of the space or facility shared.

During the latter parts of the PhD, after additional studies and testing of the typology, it became clear that the physical scale of the shared space or facility was not as important as first thought. This realisation resulted in a reworking of the typology, cutting the original four types of sharing down to three, now decided by degree of sharing and interaction between the parties and not the physical scale of what is shared. This typology was titled the Typology of Shared Use of Facilities v.2.0, and is illustrated in section 6.1, Table 16.

Sub question 3: What are the benefits and disadvantages of shared space?

Both parts of this question are essential in the debate concerning shared spaces as it relates to the question of *why* should we share, and focus on motivation and obstacles has been a part of two different data collection processes during the PhD.

First of all it has been a question in the majority of the interviews conducted during the PhD, aiming at creating an understanding of the processes involved in establishing and working in and with a shared space, as well as the literature study conducted on the topic. This resulted in a table illustrating a number of the benefits and disadvantages experienced in connection with shared spaces and can be seen in Table 17 and was published in (Brinkø et al., 2015). The table can also be found in section 3.4 of this dissertation.

Potential benefits	Potential disadvantages
Sustainability (Fewer buildings, optimised use)	More complicated logistics
Synergy (between different users)	Risk of lack of demand
Cost reduction (increasing economics of scale)	Management difficulties due to unclear ownership
Better connection to surrounding community (CSR)	Less control over availability
Creating a more vibrant atmosphere (avoiding 'dead space')	Physiological objections due to feelings of territoriality or privacy
Professional management (in case of third party ownership)	

Table 17: Potential benefits and disadvantages (Brinkø et al., 2015)

The second way in which it has been incorporated is in the surveys/questionnaires send out to the members of both Lyngby Knowledge City and the Danish Facilities Management Network. In this survey the respondents were as described in section 2.3.4 and 4.2, among other things asked what they considered the biggest obstacle and the biggest motivator for shared space. The result of these two questions is described in section 4.2 and can be seen in Figure 4**.**

These empirical findings support the initial results identified through literature illustrated in Table 17, while also adding a number of significant new ones. Access and security considerations were considered a significant obstacle to shared space among the respondents of the survey, whereas added complexity in relation to the responsibility of cleaning and maintenance were considered as less of a drawback than expected.

On the motivation / benefits side, the possible financial gain was at the top of the scoreboard for the respondents of the survey, as was expected, whereas efficiency in itself as well as the environmental considerations related to optimised use of the building stock came in at the bottom of the list, though still with a score of 25%. The combined results of the findings from literature and practice are illustrated in Table 18 and Table 19. The individual benefits/motivators and obstacles/drawbacks are listed in random order and not according to importance.

Benefits
Sustainability (Fewer buildings, optimised use)
Synergy (between different users) and new contacts
Cost reduction (increasing economics of scale)
Better connection to surrounding community (CSR)
Creating a more vibrant atmosphere (avoiding 'dead space')
Flexibility
Image/branding
Efficiency
Corporate-Social Responsibility (CSR)
Professional management (in case of third party ownership)

Table 18: Combined benefits

Disadvantages
More complicated logistics
Risk of lack of demand
Management difficulties due to unclear ownership
Less control over availability – limited availability
Physiological objections due to feelings of territoriality or privacy
Access and security considerations
Cleaning
Maintenance

Table 19: Combined disadvantages

The knowledge of these potential benefits and disadvantages, or motivations and barriers, can provide an early insight in to the mechanisms involved in working with, and in, a shared space, and where there might be need for an extra effort during planning and realisation. They can therefore play an important role in the development of shared spaces not only on an individual level but also on a more strategic portfolio level.

Sub question 4: How can a building be evaluated for potential for sharing?

The fourth sub question was investigated as a part of several different studies during the PhD, due to the importance of incorporating the view of both users, owners and managers and thereby including all parties involved in the shared spaces.

The theoretical aspects were covered by searching through literature and collecting passages dealing with this specific subject. This search unfortunately did not reveal much so the majority of the information gathered for answering the question stems from the empirical studies conducted throughout the PhD. This part of the study was completed mainly during interviews, by asking the different respondents what was of importance according to their specific view and in their specific circumstances, as well as during the workshops. The result of these searches and questions is a number of factors that appear to be of special importance to those using shared space, and thereby factors that should be incorporated in the evaluation processes when choosing a potential existing location or when planning a new structure.

The last part in answering the question was completed as a part of the study directed at answering the final sub question; the development of the practical guide to establishing a shared space in a municipal real-estate portfolio. An essential part of the creation of this guide was a workshop held with practitioners from both municipalities and the private sector, and one of the group work sessions during this workshop was focused on exactly this question; how to evaluate a building for potential for sharing. During this session the workshop participants were asked to define a number of key aspects for identifying potential for sharing, in order to define potential for shared space in a building portfolio.

A full description of the workshop can be found in section 2.3.5 and 4.3, but the results relating to evaluating for potential, combined with the results from the two other studies on the subject presented here are illustrated in Table 20.

Factor
Flexibility
Closeness to public transport
General infrastructure in the area
Other buildings or addresses owned/leased in the area
Capacity
Condition of the space/building - Basic technical installations - Building envelope and structural components - Interior/modernisation needs
Existing use of the space/building - Type of building - Type of activities
Regulatory requirements - Existing contracts - Existing tenants
Financial situation - Value of property - Running- and maintenance costs

Table 20: Relevant factors for evaluating potential for sharing

First of all, these factors are not a complete representation of all possible factors in existence, but a representation of the factors identified through the studies mentioned above. Secondly, they are not equally relevant for all types of shared space. If the space or building is a school then it will most likely be targeted towards the local community, and easy access to public transportation might be of lesser importance, whereas if the building is a company, employees might come from far and wide; increasing the importance for good access to public transport.

With this in mind it still provides a general overview of a wide range of factors that should be considered when evaluating a building for potential for sharing, keeping in mind that the importance of individual factors should be considered on a case-by-case basis.

Sub question 5: How can shared space be implemented in practice?

The last sub question was investigated with the development of the practical guide to establishing a shared space in a municipal real-estate portfolio. The whole purpose of this part of the study was to connect the theoretical knowledge collected and developed during the PhD with the practical experience of professionals working with the management of spaces and buildings on a daily basis, thereby having the potential to develop actual shared spaces. The work was conducted via a workshop and subsequent feedback loop, and the process is described in section 6.2, and published in (Brinkø & Nielsen, 2016b). The result is a guide for practitioners to use when exploring the potential for shared space in a municipal real-estate portfolio, and is described in more detail in section 6.2. It outlines a number of tasks that must be completed in different stages of a project when working with or in a

shared space. It is developed in collaboration between researchers and practitioners and is a tool to be used for working with shared space as a property management strategy in Municipalities.

The work completed for these five sub questions and the answers provided in the above, provide the answer to the main research question posed**: How can shared use of facilities and spaces be understood and what mechanisms and processes are involved?**

A summary of the main findings can be seen in Table 21.

Summary of findings		
Question:	Answer:	Published paper
What is shared space:	Multiple individuals/groups/organisations /businesses, organisationally independent of each, other making use of the same space, either simultaneously or serial.	(Brinkø & Nielsen, 2016a, 2016b)
Types of shared space:	How much - None - Invited - Collaborative - Complete What - Core - Support When - Simultaneously - Serial With whom - Willingly/forced - Co-owners/users	Covered by (Brinkø & Nielsen, 2015, 2016a; Brinkø et al., 2015)
Benefits:	- Sustainability - Efficiency - Optimised use of m^2 - Cost reduction - Synergies - Flexibility in the portfolio	Covered by (Brinkø et al., 2014, 2015)
Disadvantages:	- More complicated logistics - Limited control over availability - Psychological objections from users - Access and security considerations - Cleaning - Maintenance	Covered by (Brinkø et al., 2014, 2015)
Challenges in the process	Territoriality Involvement Practicalities - Time of use - Booking system - Security/access - Difference in functions and needs - Legislation - Cleaning - Maintenance	Covered by (Brinkø & Nielsen, 2015, 2016a; Nielsen & Brinkø, 2016)
How to implement	- Analysis at portfolio-level - Consider functional overlap between potential users - Involve chosen users in the project - Consider the challenges and practicalities - Evaluate and refine	Covered by (Brinkø & Nielsen, 2016b)

Table 21: Summary of findings

The final discussion based on these conclusions will be presented in the following sections of the chapter.

7.2 General discussion

The material presented in this dissertation is the result of three years of study for the PhD project "Sharing Space in the Knowledge City". The work has been based on both theoretical and empirical studies, with a constant focus on connecting the knowledge and tools developed with practice. The answers to the research questions posed (section 1.2) and the summary of the final results presented (Table 21) in the first part of this chapter, forms the main part of the conclusion from the study presented in this dissertation. The final question to be answered is the question, and motivation, behind conducting this PhD in the first place: Can the 'hype' of sharing and shared space live up to real life?

I began this project with the initial impression that shared space was a very interesting concept with a lot of potential, and I was very keen to see if this potential could be realised. If the theoretical potential I saw in the concept to contribute to a new and more optimised and sustainable method for space and property management could be implemented in practice.

The lessons learned from the empirical studies conducted throughout the project, clearly illustrate the challenges faced by both individuals, companies and municipalities interested in using shared space, but also the challenges facing the concept from an administrative perspective. Almost all cases and respondents had an initial very positive reaction to the concept, and were very enthusiastic about the possibilities it could bring. Despite of this though, a very large proportion also became much more reserved and cautious when the talk moved from shared space as a concept to potentially sharing one's own space. Something that was clear in for example the case of Lyngby Idrætsby, where many users experience reluctance when moving from having one's own space to having to share with others.

This trepidation and uncertainty is also an aspect that is clear concerning the managerial and legislative aspects around shared space. The change in users and functions that follow with more and different users occupying a space presents a set of challenges in relation to many different aspects of realising shared spaces. For the Irish case, Mabos, the many different changing functions housed in the space meant they were unable to acquire the necessary permits for fire safety etc. and were very nearly closed down due to this. Finally they were eventually forced to change their open policy for a much more restrictive one in order to stay open. Another example of difficulties implementing shared space is also visible in the Danish case, Microsoft, where the planned café ended up being divided in two in order to live up to the security considerations related to, among other things, the company's classified development work.

So what does all this mean for the possibilities of shared space to optimise the use of the building stock? Well, I still think there is a lot of potential – but there is much more work to be done before it can be realised in full. There still needs to be a general change in mentality from both a legislative and administrative mind-set, but also among the potential users of shared spaces. As the situation is now, there is a general positive attitude towards the concept of sharing, which was very clear in both interviews and the survey results. Despite of this there seems to be a very large gap between this initial feeling towards the concept and the desire to do it with one's own spaces and buildings. A trend that also seem to be true from the legislative side that forms the overall societal frameworks necessary for the spaces to be realised, who in some instances still seem unsure on how to 'handle' shared space in practice.

So before shared space can be fully integrated in companies and society as an alternative space management strategy, this discrepancy between concept vs. reality needs to be addressed, and the mind-set of both users and administrators must change with it.

In the following sections, the implications of the research for academia and practice will be presented, as well as considerations regarding limitations of the research results and thoughts on further research. Following these, the last section will present the final conclusions of the PhD.

7.2.1 Academic and practical implications

As mentioned in both the introduction and the theory section, shared space is a relatively new topic and not much scientific material has been published on the subject so far. The work undertaken for the PhD presented in this dissertation adds to the so far limited knowledge of the complex processes involved in both planning and managing a shared space within both theory and practice.

Since the focus throughout the PhD have been on not only developing theoretical knowledge for the benefit of researchers, but also on how this knowledge can support working with shared space in practice, the theoretical and practical contributions are closely intertwined and many of the results will have relevance for both. In the following a summary of the contributions to first academia and second practice will be given.

Contribution to academia

For academia the results from the PhD offer insight into what shared space means in real-life, with all its complexities. It is a phenomenon that is receiving quite a lot of popular attention, and this study is a first in taking a neutral, descriptive view on it, separating hype from real-life. Furthermore, the study is a first in presenting a definition and typology of shared space in relation to the built environment, also including the identification of the three themes territoriality, involvement and practicalities.

The typology was the first tangible contribution from the PhD, and is intended for use by both researchers and practitioners, as one of the main purposes with the development of the typology was to create a common language from which shared spaces could be discussed and developed. This common language along with an overview of the different types/degrees of sharing identified and which characteristics play a role, has been of key importance throughout the development of the PhD.

This same is true for the newest version of the typology, V2.0. Despite both appearance and structure having been changed significantly, the purpose with the development of the typology as well as the intended use remain the same. The redevelopment have been undertaken to incorporate the newest knowledge and improve the usability of the original typology, thereby forming a base and increased understanding from which further research can take place.

Contribution to practice

The main contribution for practice is the Guide to Shared Space. The guide synthesises the large amount of theoretical knowledge developed through the PhD and combines it with practical steps to be taken, identified through co-creation with practitioners. Though it has not been fully tested and validated yet, it is an attempt to provide practitioners with accessible and practical knowledge that can be used when considering the application of the shared space concept.

Looking beyond the practical and theoretical contribution of the PhD, the results produced also comes with inherent limitations due to choice of research design, time constraints etc., and these will be presented and discussed in the following.

7.2.2 Limitations and generalisability

As with any research project, there are a number of limitations connected with the choice of methods and research design for the study.

First of all there are inherent limitations connected with the fact that the PhD has been a very qualitative empirical based study, which although very well suited to study the issues of interest in depth, does constrain the generalisability of the results (Miles & Hubermann, 1994; Yin, 2009)

In addition to the limitations stemming from this overall choice of type of study, the choice of a diverse-case selection strategy for the case studies (section 2.3.2) also entails a low generalisability due

to the nature of the strategy as described by for example (Gerring, 2007). This in combination with the fact that the case study population, with a mix of private and municipal cases, is not uniform is a further limitation. In addition to these considerations there is also the nationality of the cases to consider. Out of the six main cases, four are from Denmark and only 2 are from other countries, with none being from outside of Western Europe, meaning that the applicability for companies and countries outside Europe is definitely to be questioned.

Another aspect of the study related to the case studies is that they have all been mainly cross-sectional studies, and despite some having been studied over a period of years, none have been evaluated in relation to how the finished result have lived up the expectations and if they are still being used as planned, and how the three themes territoriality, involvement and practicalities have played out over time.

All these limitations connected to the cases are following from the choice of research design. But since the focus of the study from the start was to explore and describe a new area within research, in order to form a first hypothesis or framework that can be tested in future research, and not make the inference that the reasons identified will be the only reasons or the 'true' reasons, the limitations are some that I have been aware of during the study, but they have not hindered the fulfilment of the research goals.

In addition to the above, there are two main limitations to the final results, and that is that neither the final version of the typology or the guide to shared space in municipalities has been tested in practice, nor whether or not they will actually work as intended has yet to be seen.

This last statement leads to the next section; thoughts on further research which will be presented in the following.

7.2.3 Further research

There are two main lines of further research that could be undertaken on the base of the work presented here. First of all there have for this work been made a number of assumptions in order to limit the scope of the research to fit with a three year PhD study. The most important one of these is the assumption that there is expected to be a sustainability benefit to the sharing of spaces and facilities. In chapter 3 the notion of compact sustainable cities is mentioned, and in several of the papers published during the PhD, the assumption of shared space having the potential to contribute to a more sustainable management of real-estate portfolios is mentioned.

The assumption is based on the reasoning that if the use of one underutilised space or building is optimised by use of shared space, this will mean that several other underutilised buildings, that still have to run and maintained, can be used for other purposes instead of building new to fulfil future requirements. So despite the increased environmental impact of the one building, several others will have a significantly lower impact, resulting in an overall sustainability benefit. This assumption however is exactly just that, an assumption, and an important one in the argument for shared space, so studies in to whether or not this is a valid assumption would be very interesting.

The second line of potential further studies is the testing of the two main frameworks resulting from the work; the "Typology of shared use of facilities v.2.0" and the "Guide to establishing a shared space in a municipal real-estate portfolio". Whereas the first version of the typology was tested on several cases and presented and discussed with both researchers and practitioners from different fields, the newest version of the typology has not been the focus of any such tests, and the usability in practice is therefore still unknown. The same is true for the guide, which although having been developed in collaboration with professionals and have been through more than one feedback loop, have yet to be tested in practice.

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Papers

Total Research papers

Nr & type	Title	Status	Date	Place	Appended
1: Conf. paper	The shared building portfolio: A typology of shared facilities	**Published**	2014	CIB conf. proceedings	No
	1. author				
2. Journal paper	Access over ownership: A typology of shared space	**Published**	2015	Facilities	Yes
	1. author				
3: Conf. paper	Shared space in a municipal sports facility: The case of Lyngby Idraetsby	**Published**	2015	EuroFM conf. proceedings	Yes
	1. author				
4: Journal paper	Shared space in practice and theory: A cross-case analysis	**Submitted**	2016	Journal of Urban Design	Yes
	1. author				
5: Conf. paper	Access over ownership: The case of meeting facilities in Lyngby Knowledge City	**Published**	2016	CIRRE2016 conf. proceedings	No
	2. author				
6: Journal paper	The characteristics to consider in municipal shared spaces	**Accepted for publishing**	2016/ 2017	Journal of Facilities Management	Yes
	1. author				
7: Journal paper	Access over ownership: The case of meeting facilities in Lyngby Knowledge City	**Accepted for publishing**	2016/ 2017	Facilities	Yes
	2. author				

Popular articles

Nr.	Title	Status	Date	Place	Appended
1	Arbejdsfællesskaber (coworking) og deres relevans for FM	Published	2013	FM Update	No
	2. author				
2	Working apart together	Published	2014	FM world	No
	2. author				
3	Working apart together	Published	2014	EuroFM Insight	No
	2. author				
4	Shared space – mellem vision og realitet	Published	2015	FM Update	No
	1. author				
5	Tips og tricks til mere idræt på samme areal	Published	2016	Teknik og Miljø	No
	1. author				
6	Sharing space i teori og praksis	Published	2016	FM Update	No
	1. author				

Appendix

This appendix contains the questions for the 2 surveys conducted during the PhD, as well as papers appended to the dissertation and signed co-author statements.

Survey: Lyngby-Taarbæk City of Knowledge Association. ‘Titled: Shared Space i Vidensbyen’

Survey: Danish Facilities Management Network. Titled: ’Hvad og hvordan kan vi dele smartere’

Paper 1: Access over ownership: A typology of shared space (Brinkø et al., 2015)

Paper 2: Shared space in a municipal sports facility: The case of Lyngby Idraetsby (Brinkø & Nielsen, 2015)

Paper 3: Shared space in practice and theory: A cross case analysis (Brinkø & Nielsen, 2016a)

Paper 4: The characteristics to consider in municipal shared spaces (Brinkø & Nielsen, 2016b)

Paper 5: Access over ownership: The case of meeting facilities in Lyngby Knowledge City (Nielsen & Brinkø, 2016)

Survey: Lyngby Taarbæk City of Knowledge

Shared Space i Vidensbyen

Intro

Kære medlem af Vidensbyen

Vi ser frem til et spændende medlemsmøde i Vidensbyen den 7.oktober, hvor vi sætter fokus på Lyngby-Taarbæk som ”Den delende by”.

Forud for mødet vil vi gerne undersøge jeres interesse for at dele fx mødelokaler, motionsfaciliteter, kantine eller andet i Vidensbyen? Klik på 'næste' for at svare på de 9 korte spørgsmål. Alle svar behandles anonymt.

På forhånd tak for din tid.

Næste

Shared Space i Vidensbyen

Generelt om at dele

***1. Hvad synes du om at dele lokaler eller faciliteter med andre?**

- Meget positiv
- Positiv
- Hverken eller
- Negativ
- Meget negativ

***2. Hvordan er pladssituationen i din virksomhed?**

- Mangler lokaler/faciliteter
- Lokaler/faciliteter i overskud
- Hverken eller

Uddyb gerne svaret

Forrige Næste

Shared Space i Vidensbyen

Generelt om at dele

***3. Når du tænker på de lokaler og faciliteter i bruger i din virksomhed, hvilke af dem kunne du så forestille dig at dele med andre? Sæt gerne flere x'er**

- Støtte faciliteter (så som printerrum, toiletter, kantine, reception osv)
- Støtte lokaler (depotrum, personalerum, motionsrum osv)
- Kerne lokaler/faciliteter (så som produktionslokaler, laboratorier, salgslokaler, atelier osv)
- Kontorlokaler (så som kontorarbejdspladser, mødelokaler osv)
- Ingen

Andet (uddyb gerne)

***4. Tænk igen på de lokaler og faciliteter i bruger i din virksomhed. Hvilke af dem kunne du så ikke forestille dig at dele med andre?**

- Støtte faciliteter (så som printerrum, toiletter, kantine, reception osv)
- Støtte lokaler (depotrum, personalerum, motionsrum osv)
- Kerne lokaler/faciliteter (så som produktionslokaler, laboratorier, salgslokaler, atelier osv)
- Kontorlokaler (så som kontorarbejdspladser, mødelokaler osv)
- Ingen

Andet (angiv venligst)

Forrige Næste

Shared Space i Vidensbyen

Motivationsfaktorer

***5. Hvad ville motivere dig til at dele med andre? Sæt gerne flere x'er.**

- Effektivisering
- Fleksibilitet
- Hensyn til miljø (Bæredygtighed)
- Hensyn til samfund (Corporate Social Responsibility)
- Image/Branding
- Skabe nye kontakter (Synergi)
- Økonomi

Andet (angiv venligst)

***6. Hvad er den/de største udfordringer eller barrierer i forhold til at dele med andre? Sæt gerne flere x'er.**

- Adgangsforhold/Sikkerhed
- Administration/logistik
- Begrænset rådighed
- Besværligt
- Manglende mulighed for at sætte personligt præg på rummet
- Rengøring
- Vedligehold

Andet (angiv venligst)

Forrige Næste

Shared Space i Vidensbyen

Lidt om dig

***7. Arbejder du i en privat virksomhed, offentlig institution, forening eller andet.**

Privat virksomhed

Offentlig institution

Forening

Andet (angiv venligst)

***8. Hvilken branche arbejder du indenfor?**

***9. Ville du karakterisere dig selv som... :**

Topledelse

Mellemleder

Ansat

Andet (angiv venligst)

Forrige Næste

Shared Space i Vidensbyen

Afslutning

Tak for din deltagelse.

Undersøgelsen udføres i forbindelse med PhD projektet "Sharing space in the knowledge city" v/Rikke Brinkø. DTU Management Engineering, Center for Facilities Management
Læs mere om PhD projektet, der udspringer af Vidensbynetværket for Klima og Grøn Teknologi her:

http://www.vidensby.dk/Projekter/PhD-projekt-om-Facilities-Management.aspx

Forrige Færdig

Survey: Danish Facilities Management Network (DFM)

Hvad og hvordan kan vi dele smartere?

Intro

Tusind tak fordi du tager dig tid til at svare på denne undersøgelse.

Når du på næste side starter på selve spørgeskemaet, skal du forestille dig at du er inde på en nyoprettet 'match making' portal hvor virksomheder ol. kan udbyde og finde lokaler (fx. kontor, mødelokale, foyer, depot) og faciliteter (fx kantine, reception, printerrum etc.) - kun fantasien sætter grænser. Når du nu sidder og søger rundt på denne portal skal du stille dig selv spørgsmålene:
-Er det her med at dele overhovedet noget for dig?
-Hvilke lokaler ville du stille til rådighed på sådan en portal?
-Eller ville du istedet søge efter ledige lokaler andre har lagt op?

Alle svar vil blive behandlet anonyme og betragtes som et udtryk for en personlig holdning. De vil ikke betragtes som værende repræsentative for hele virksomheden.

Næste

Hvad og hvordan kan vi dele smartere?

Generelt om at dele

***1. Hvad synes du om at dele lokaler eller faciliteter med andre?**

- Meget positiv
- Positiv
- Hverken eller
- Negativ
- Meget negativ

***2. Hvordan er pladssituationen på din arbejdsplads?**

- Mangler lokaler/faciliteter
- Lokaler/faciliteter i overskud
- Hverken eller

Uddyb gerne svaret

Forrige Næste

Hvad og hvordan kan vi dele smartere?

Generelt om at dele

***3. Når du tænker på de lokaler og faciliteter, I bruger på din arbejdsplads, hvilke af dem kunne du så forestille dig at dele med andre? Sæt gerne flere x'er**

- Støtte faciliteter (så som printerrum, toiletter, kantine, reception osv)
- Støtte lokaler (depotrum, personalerum, motionsrum osv)
- Kerne lokaler/faciliteter (så som produktionslokaler, laboratorier, salgslokaler, atelier osv)
- Kontorlokaler (så som kontorarbejdspladser, mødelokaler osv)
- Ingen

Andet (uddyb gerne)

***4. Tænk igen på de lokaler og faciliteter, I bruger på din arbejdsplads. Hvilke af dem kunne du så ikke forestille dig at dele med andre? Sæt gerne flere x'er.**

- Støtte faciliteter (så som printerrum, toiletter, kantine, reception osv)
- Støtte lokaler (depotrum, personalerum, motionsrum osv)
- Kerne lokaler/faciliteter (så som produktionslokaler, laboratorier, salgslokaler, atelier osv)
- Kontorlokaler (så som kontorarbejdspladser, mødelokaler osv)
- Ingen

Andet (angiv venligst)

Forrige Næste

Hvad og hvordan kan vi dele smartere?

Motivationsfaktorer

***5. Hvad ville motivere dig til at dele med andre? Sæt gerne flere x'er.**

- Effektivisering
- Fleksibilitet
- Hensyn til miljø (Bæredygtighed)
- Hensyn til samfund (Corporate Social Responsibility)
- Image/Branding
- Skabe nye kontakter (Synergi)
- Økonomi

Andet (angiv venligst)

***6. Hvad er den/de største udfordringer eller barrierer i forhold til at dele med andre? Sæt gerne flere x'er.**

- Adgangsforhold/Sikkerhed
- Administration/logistik
- Begrænset rådighed
- Besværligt
- Manglende mulighed for at sætte personligt præg på rummet
- Rengøring
- Vedligehold

Andet (angiv venligst)

Forrige Næste

Hvad og hvordan kan vi dele smartere?

Lidt om dig

***7. Arbejder du i en privat virksomhed, offentlig institution, forening eller andet.**

Privat virksomhed

Offentlig institution

Forening

Andet (angiv venligst)

***8. Hvilken branche arbejder du indenfor?**

***9. Ville du karakterisere dig selv som... :**

Topledelse

Mellemleder

Ansat

Andet (angiv venligst)

Forrige Næste

Hvad og hvordan kan vi dele smartere?

Afslutning

Tak for din deltagelse.

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Forrige Færdig

Paper 1

Access over ownership: A typology of shared space (Brinkø et al., 2015)

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Access over ownership

- A typology of shared use of facilities

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ABSTRACT

Purpose
This paper explores shared use of space and facilities as a concept, and presents and illustrates the use of a typology to help classify and describe the different options for sharing space and facilities within buildings for optimised use of a building portfolio.

Approach
The content presented is based on a cross-sectional study with an inductive approach. The results are based partly on secondary data in the form of a literature review and a mapping of 20 examples from Europe, USA and Australia, and partly on primary data from observations and interviews with key actors from two cases in Denmark and an illustration case from Ireland.

Results
The typology classifies and describes 4 archetypes of sharing between different people, building owners and organisations, to be used when discussing, planning, establishing and evaluating new and existing shared spaces.

Practical Implications
The typology is intended for both researchers and practitioners, and aims at increasing the understanding of sharing as a way to minimize the need for building new by better utilization of the existing building stock.

Research limitations
The typology is the result of a first exploration of shared use of facilities, and does not claim to be fully comprehensive or final.

Originality/value
Shared space and facilities is a relatively new topic with not much research undertaken. This typology provides a language for discussing shared spaces and a base for further developing the research field.

Keywords: Facilities management, shared space, shared facilities, sustainability, collaborative urbanism, collaborative consumption, sharing economy

INTRODUCTION

Many cities around the world are experiencing an increase in population and from this also a strain on the existing buildings and a pressure to provide adequate square meters for the population. Urban development and development of new city profiles has traditionally been focused on building new, but with increasing populations, urban space for new buildings will inevitable become increasingly scarce and expensive.

This combined with the new economic situation experienced over the last decade or so and an increased focus on sustainability and optimised use of resources, has helped spark a new sharing mentality, where the mind-set of many are moving towards "*access rather than ownership"*(Botsman & Rogers 2010). Sharing is starting to move outside office space and office buildings, where non-territorial- and open space offices have been on the agenda for some time now, and into a broader spectrum of buildings and organisations as an alternative sustainable view on property-, real-estate and space management. The focus is on optimising use by allowing different types of use and users at different times of the day or different times of the week.

With this in mind shared space is still a relatively new field of study, and not much research has been published so far. The purpose of this paper is therefore to present a typology of shared use of space and facilities, to help evaluate and discuss both existing and new shared spaces, in order to help answer the overall research question; "*How can shared use of space and facilities be understood and managed and what value can it bring to companies and cities*". A research question that is guiding the larger project this study is a part of.

The typology presented is a first exploration of the concept of sharing space within and between both public and private organisations, and is meant to play a role in establishing a common language in relation to the topic of shared space since existing literature is not always clear, and varies depending on from which field it originates.

The paper is mainly directed towards larger property owners such as municipalities and companies with a facilities management department. It takes its base in the assumption that such organisations should take a critical look at their building portfolio, and start questioning the need for having" own" buildings and facilities and instead look at the possibility of sharing with others.

The typology presented in this paper was first published in an early version as a conference paper in the conference proceedings for the joint CIB W070, W111 and W118 2014 conference "Using facilities in an open world - Creating value for all stakeholders". This paper is a further development of the original conference paper, and includes among other things a more detailed account of the methods used in creating the typology, as well as considerations regarding the practical applications of the typology based on an illustration of use with a case from Dublin, Ireland.

SHARING

Sharing as a general concept is not a new thing; we have many examples just in Denmark – agricultural cooperatives, consumer cooperatives and cooperative dwellings (http://www.uwcc.wisc.edu, www.denstoredanske.dk), and the term "shared space" can also refer to street design (TrinityHaus 2012), internet based communications platforms (Rafferty 2012) etc. From this it is clear that sharing is by no means a new idea, but in the last decade or so, the concept of sharing has taken another leap as the term *Sharing Economy*, or the similar *Collaborative Economy*, has been introduced, launching a renewed focus on sharing.

The sharing economy

The term 'sharing economy' or 'collaborative economy' is used to describe a new form of sharing developing in societies today; the sharing of anything from a saxophone or a lawnmower to a car. The share economy is in the literature described in many different ways by many different authors, among which are "*a trend that is reshaping our service-based society*" by Voight (2013) and as "*access rather than ownership*" and a mentality of live light, waste less, to protect the environment by Rosenberg (2013). Silver (2013) defines the sharing economy as "*a way of sweating underutilised assets, by*

building communities around them and turning consumers into providers", and Owyang et al. (2013) defines it as "*...an economic model where ownership and access are shared between corporations, start-ups, and people...*".

This development has been made possible by the internet and social media, which has aided the development by constituting a not before seen platform for sharing-interested individuals, groups, communities and companies, and the sharing economy, collaborative economy and also collaborative consumption are all fast growing concepts. Websites facilitating diverse forms of sharing are numerous (thesharehood.org n.d.; collaborativeconsumption.com n.d.; nesta.org.uk n.d.; greenvillages.com.au n.d.; shareable.net n.d.), and several books have been published on the subject, where Botsman & Rogers (2010) publication "What's mine is yours – the rise of collaborative consumption" are among the more well-known.

But the sharing has not stopped with the sharing of smaller items or possessions, and is now starting to move from *stuff* to *space* by the progression of the Collaborative Economy to *Collaborative Urbanism;* a concept that takes the same ideas of sharing, openness and cooperation as seen with the Sharing Economy, and applies them to the built environment (nobox-lab.com n.d.; streetplans.org n.d.;inclusiveurbanism.org n.d.; collaborative-urbanism.com n.d.; collaborative-urbanism.org n.d.). This collaborative urbanism, along with other emerging and existing concepts in society, are directing new attention to how we use the limited resources and facilities in cities that buildings represent; attention that have also sparked the interest of municipalities and space- and property managers at private companies. It is developing and utilizing this attention that constitutes the inspirational background for the development of the typology presented in this paper.

FM and Shared facilities

What can be derived from these previous sections is that despite sharing in general not being a new thing, shared space and shared facilities as we are experiencing them now are a relatively new field, especially within research, and not much has been written on the subject. Theory therefore, must come from a variety of sources connected to, or on the edge of, the specific topic, and be brought together to constitute a knowledge base that is relevant for *shared facilities* in relation to the field of FM.

When looking at shared space and shared facilities in a facilities management context there are a volume of literature already available to inspire; sharing in the context of an office or workplace, for example. Guidelines from FM on designing shared space for offices in the form of open-office spaces and *the new office* (Becker & Steele 1995; Duffy & Powell 1997) have been around for some time now, and we are also seeing the trend moving towards the newer *activity based workplaces*. This literature though, mainly addresses inter-organisational sharing, and not sharing with outside participants, or outside the office space.

If we instead look outside the office and even outside buildings, towards the field of urban planning, we also find guidelines on designing shared space, although the focus here is outdoor spaces such as parks, squares, streets etc. (Gehl 2010; Gehl 1971; TrinityHaus 2012) . The limitation within this field in relation to the topic of the study presented in this paper, however, is the focus on out-door space, and not space within buildings.
Additional subjects that provide inspiration and literature is the field of community facilities management (Alexander 2009; Alexander & Brown 2006; Moss et al. 2009) and the field of urban facilities management (Roberts 2004; Michell 2013). These are fields that are starting to build a bridge between urban planning and facilities management, but despite of this they still have their limitations in relation to the topic of this study, since the focus has yet to reach systematic use of shared space and facilities between organisations.

In addition to the research mentioned above, a smaller number of articles also exist, that are directed specifically towards shared spaces and facilities as they are understood in this paper. These are for example (Lee et al. 2010) where interior shared space in apartment buildings is the focus, or (Rafferty 2012) who introduces a concept for physical shared space in more general terms.

These illustrate different perspectives on the subject of sharing, and the overall question being raised when looking beyond the theoretical backdrop; *why should building owners and FM organisations share their buildings and facilities with others – why should they open up*? This is not a simple question to answer, but increasing focus on FM and professionalization of FM in many municipalities and larger companies with a large building portfolio means that it is an interesting aspect to study. Space and square meters are expensive, and financial and sustainability considerations promote optimised use of the existing building stock to help reduce the need for building new. This is where sharing comes in play.

In relation to this, it is important to note that this study will not focus on the benefits and advantages of sharing, but aims at developing a neutral description of different types of sharing and their characteristics in relation to 4 discriminators identified during the research. However, in order to provide an overview of some of the possibilities and potential pitfalls observed during the study and literature review (Uzairiah et al. 2013; Moss et al. 2009; Rafferty 2012; Fawcett 2009 to mention a few), table 1 provides a quick illustration. This however is not an exhaustive list, but merely provides an excerpt of examples, and will require more research to develop.

Potential benefits	Potential pitfalls
Sustainability (fewer buildings, optimised use)	More complicated logistics
Synergy (between different users)	Risk of lack of demand
Cost reduction (increasing economies of scale)	Management difficulties due to unclear ownership
Better connection to outside world (CSR)	Less control over availability
Creating a more vibrant atmosphere (avoiding 'dead space')	Psychological objections due to feelings of territoriality or privacy
Professional management (in case of third party ownership)	

Table 22: Examples of potential benefits and pitfalls when establishing a shared space (Brinkø et al. 2014)

APPROACH

The development of the typology presented in this paper was divided into three main steps, followed by a fourth step in the form of an illustration of use with an international case (see figure 1), from Dublin, Ireland.

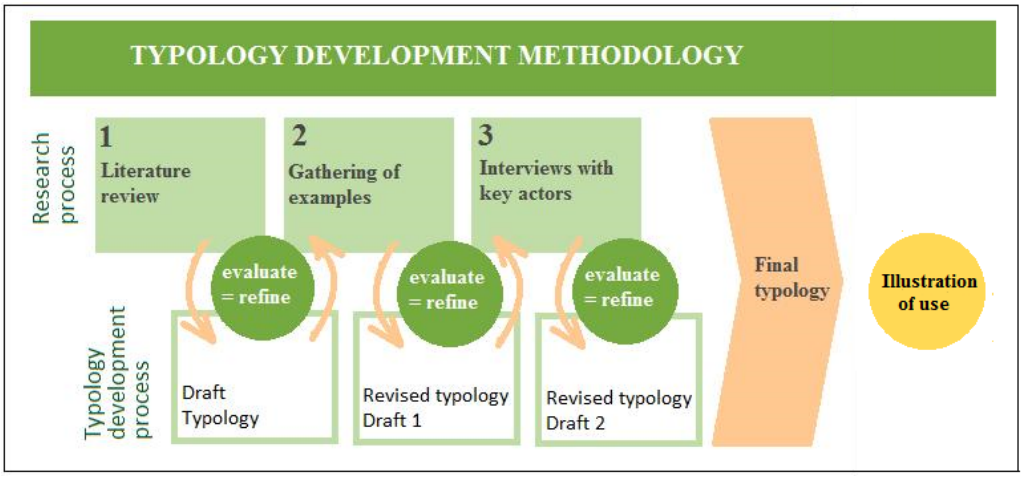

Figure 10: Typology development methodology. Adapted from (Brinkø et al. 2014)

The three main steps were as illustrated in figure 1 used to continuously improve and refine the previous step to ensure the highest possible quality and validity of the typology. Step one was a literature review to identify existing knowledge, step two was a gathering of examples of shared space in practice, and step three was interviews with key actors from two Danish cases, as mentioned previously, to gain deeper insights. These steps were all used to evaluate and refine the previous, leading to the development of the final typology presented in this paper.

The use of the typology was subsequently illustrated with a case from Dublin, Ireland.

Literature review

The literature review completed as a part of this study has been undertaken with inspiration from the "Eight steps for conducting a systematic literature review" presented by Okoli & Schabram (2010), adapted to fit the specific needs, purpose and design of this study. The steps used are:

6. *Define the purpose of the literature review*: The purpose must be clearly defined in order to secure optimal consistency in the search and review process. For this study the purpose has been to collect a broad section of literature connected to the field of shared space, in order to map existing knowledge within the area, and identify possible sources to form the theoretical starting point for a more in-depth exploration of the meaning and implications of shared space.
7. *Search for literature*: Since journal papers are an important part of scientific communication these were chosen as primary source for the literature review. Four databases containing a broad and comprehensive spectre of journals and papers were chosen for the search (Scopus, Web of Science, DTU Digital Library and Google Scholar). All searches undertaken were done so by systematic use of two sets of pre-determined keywords; one set to specify the first initial round of searches for journals, and another to further narrow down the field for articles in a second round of searches. The keywords can be seen in table 2.
8. *Practical screen and Quality appraisal*: An initial screen and quality appraisal was conducted based on paper abstracts, in order to identify the articles most relevant and to ensure sufficient quality. The screening process and criteria for selection was based on the researcher's assessment of relevance to the subject of the study.
9. *Data extraction:* After the search has been completed, relevant information from each paper chosen is systematically extracted by the reviewer
10. *Synthesis of literature review:* Analysis of the data extracted by the reviewer

Keywords							
1	Building	Built Environment	Sustainability/ Sustainable	Facilities/ Facility	Social responsibility	Housing	Property/ Real-estate
2	Knowledge city	Knowledge Town	University city	University town	Shared space	Shared facilities	Urban FM

Table 23: Keywords for literature review

To summarize, the approach for the literature review have been to use multiple databases for the searches in order to secure that a significant portion of the literature available have been included in the review, as well as to validate the results from one individual search. The searches themselves have been completed using predetermined keywords to secure a consistent and well-defined approach for identifying and collecting articles, and the focus of the review has been to identify the existing theoretical knowledge within the subject. All in all 64 scientific journals was systematically searched, resulting in a total of 78 relevant articles from which 12 main articles within the subject were chosen based on relevance to the study as judged by the author (Fawcett 2009b; Rafferty 2012; Moss et al. 2009; Roberts 2004; Uzairiah et al. 2013; Larsen et al. 2011; Wood 2006; Hoffmann et al. 2012; Komarova 2008; Dempsey 1999; Andersen 1985; Michelini & Fiorentino 2012). The information gathered from the review was used to form the theoretical offset and framework for the development of the typology, as well as to form a first very rough draft for a typology to be used as the theoretical base to guide the collection of examples for the inventory described in the following.

Inventory of examples

The literature review described above was as mentioned used to create an outline containing topics and characteristics, to be used for guiding the search for both national and international examples of existing shared spaces. In order to secure both scientific well-described examples as well as newer 'popular' examples, searches were carried out by use of scientific journals as well as newspapers, magazines etc.. To ensure validity by using multiple sources of information as well as an as large variety of examples as possible, several industry professionals were asked for input; adding to the total inventory of examples. A total of 20 examples from Europe, Australia and USA were identified and

chosen, and were subsequent used to form an inventory of examples, illustrating an as diverse base of examples as possible.

An initial analysis of these examples was undertaken with the purpose of describing the characteristic of all 20 examples in order to identify themes and commonalities. A number of characteristics were identified as being common for all – or a majority – of the examples collected and thereby judged to have special significance. These characteristics were grouped together according to theme in a follow-up analysis, and the themes identified are illustrated in table 3.

Themes							
Type of sharing	Reason behind sharing	Goals hoped to achieved	Users	Suppliers/ owners	Time as-pect	Organizations involved	Focus of sharing

Table 24: Themes identified from first analysis of the inventory of examples

These themes were used to refine the rough draft outlined based on the literature review, resulting in a more focused typology, from which the following work in the form of interviews would take its starting point.

Interviews

To gain deeper knowledge of the nature of shared spaces, two examples from the inventory was selected for further studies. These cases were Musicon in Roskilde, Denmark, and Lyngby Idrætsby in Lyngby, Denmark. The choice was made based on criteria such as degree of complexity and accessibility and illustrative purposes to mention some. Sharing in these two cases was directed towards private individuals, private businesses and associations, providing a look in to the processes involved in sharing between parties outside a single organisation, an important aspect in relation to the focus of the typology.

Semi-structured interviews based on the works of (Kvale 2002) were conducted with key actors from both of these cases with a focus on the themes identified in the analysis of the inventory of examples as described above. The specific type of interview was chosen based on its ability to provide insights into a specific subject or theme, and to ensure answers to predetermined key questions and aspects, while at the same time having the opportunity to obtain further non-anticipated information from the individual being interviewed.

Illustration of use of developed typology

The choice of case for this illustration has been based on a number of different considerations. The case represents a type of sharing that is usually very un-organised but Mabos have an approved business plan, are in continues dialog with the city council and are working with them in formulating new ways of managing this type of space and use of a public level. Furthermore Mabos as a case is a bit of an outlier in relation to the typology and the examples used for the development of it, so illustrating the usability and generalizability of the types and discriminators on an outlying case can help provide new insights and possibilities of further development to increase the usability of the typology.

Information on the case has been gathered via a number of different sources:

- Video with comments from 12 main users
- Interview with founder Dave Smith
- Interview with City Planner, Dick Gleeson
- Observations of the space ‘in action’ at 4 separate occasions over a period of 2 months

Defining typology

The term *typology* is in the Oxford Dictionaries defined as: “*A classification according to general type, especially in archaeology, psychology, or the social sciences*” (Dictionary n.d.). Typologies are used in a variety of fields, for example in the field of planning theory (Allmendinger 2002) use a typology to organize and explain the different positions within planning theory in relation to different schools of theory, other disciplines and planning practice. Within building research (Dascalaki et al. 2011) use building typologies as a tool in the effort to asses energy performance, and within design

and architecture (Lang 2005) uses a typology to create an overview of procedures and products in order to "*make some sense of what various people (and fields) are talking about when they refer to urban design"*.

In the study presented in this paper *typology* is understood as defined in the Oxford Dictionary, and is used to describe the classification of 4 main types of sharing, creating an overview of the different possibilities for working with shared spaces in practice.

A TYPOLOGY OF SHARED FACILITIES

This typology was first presented in a conference paper titled "The shared building portfolio – an exploration and typology" (Brinkø et al. 2014). It is directed towards both researchers and professionals, and is focused on sharing of buildings and on sharing that takes place between different organizations or businesses that would traditionally prefer exclusive use or ownership ('intra organisational' use).

The result of this process is a typology that is sorted first of all by type, the decisive factor in the structure of the typology, grouping the different types of sharing observed in to four individual groups. Secondly, the four different types are sorted according to scale varying from sharing a desk to a network of buildings, with the smallest on the left to most comprehensive on the right. A short description of general attributes is linked to each type, along with an illustration to provide a starting point for recognition and discussion, after which the remaining 4 discriminators, "when", "why", "who" and "how" are used to provide the characteristics for each type.

What is being shared - type?

'**What**' is being shared, meaning the type of sharing taking place, is the main discriminator for the typology. It represents the physical space or facility being shared and is used to organise the different forms of sharing into four overall categories of sharing. In both the literature and the examples studied during the process of developing the typology, sharing was identified to take place at many different levels and scales. From sharing a desk or workstation as observed in for example co-workspaces, to sharing office facilities and canteens between groups or sections, or sharing rooms or facilities between organisations, and the list goes on. So grouping the different types into four categories representing four archetypes of sharing provides a first overview to guide further investigation and discussion.

When is it being shared?

Another aspect that was identified repeatedly as a significant feature in the different examples and cases is the second discriminator, '**time**'. Sharing and what the expected gain of establishing a shared space is, has close ties to the time aspect involved. The choice between simultaneous or serial use leads to significant differences regarding outcome in terms of synergies, administration, management etc. This makes it very important to be aware of these aspects and how they are linked with the time aspect, when determining if it is simultaneous sharing, where different people/organizations uses the same space at the same time, or serial sharing where one person/group/organization use the space during some hours of the day and another person/ group/ organization during other hours of the day.

Why is it being shared?

'**Why**' a given space or facility is shared, or should be shared, is the third discriminator in this typology. Choosing to share can be due to considerations regarding costs, increased sustainability by optimised use of resources – or sharing resources, a desire to create synergies or agglomeration effects, just to mention some of the possibilities. Identifying the "why" is therefore an important aspect of determining which type of sharing is most suited to a specific situation or organization, as well as achieving clarity for all partners involved regarding what a given project of sharing is working towards achieving.

Who is sharing?

The fourth discriminator in the typology is the aspect of '**who**' is sharing. The typology presented in this paper is as mentioned focused on sharing between organisations or individuals, and the purpose with this discriminator is to be clear about the participants engaging in sharing. To define whether the sharing is initiated by a public or private organisation, institution or individual; what the relationship is

between user and owner, meaning are the sharing partners equal or not; if the sharing is restricted to one or more specific groups with specific limitations regarding access or the sharing is open for all to participate in. These are all important aspects to have clarified before entering in to using or establishing a shared space, and can help focus the search for a specific type of sharing.

How is it being shared?

"**How**" the sharing is organised is the fifth and last discriminator, and also the one that can be the most difficult to describe. The aspect of *how* can be translated into a myriad of different configurations depending on the partners involved, the goals with using or establishing a given shared space, the people it is directed towards, the time frame etc. These many aspects all contribute to the high degree of difficulty but it is also due to this that it is also the one that seems to possess the most relevance in relation to counselling in regards to the topic of shared space.

The typology

The process of creating the typology has been a pursuit of diversity and variation, to ensure maximum range and types that would complement each other to as high a degree as possible.

When talking about scale in connection with the types included in this typology as described in the following, it is the physical structures that are shared that is in focus, and not the extent of the actual sharing, meaning for example the level of interaction, integration etc. between the sharing partners. This is due to the chosen focus on the optimised use of buildings, space and facilities as an alternative way of looking at sustainable space- and portfolio management, and not on the social interaction of the parties taking part in the sharing. Not that this is not important and play a large role in relation to sharing, but this aspect is for another study.

The first type presented in the typology, *sharing a specific facility – a desk or a work-space in a semi-closed community*, represents sharing on the smallest physical scale in the typology. It covers spaces like cowork spaces that specialize in facilitating sharing where you rent a desk – not necessarily a specific desk, just a desk – in a shared working space, and also instances where a company invites for example individuals or business partners in, and provides workspace within their company. Examples of this from the material used to develop the typology are Republikken in Copenhagen, Denmark; Plywood sheds for artists in USA or The HUB in Denmark. (Republikken.net n.d.; Hodara 2011; copenhagen.impacthub.net n.d.).

The second type, *sharing several facilities in an open or semi-closed community*, represents the instances where a company or the like makes a part of their facility that would usually only be accessible to individuals inside the organization available for a large group of people. The type can also cover spaces like shared spaces for the community, shared sports facilities etc. Examples of this type could be Rambøll in Ørestaden, Denmark; Lyngby Idrætsby in Lyngby, Denmark or Risskov Library in Risskov, Denmark. (ramboll.dk n.d.; Risskov_bibliotek n.d.; lyngby-idraetsby n.d.).

The third type, *sharing physical space in a building or a building in itself in a closed community*, is sharing of several facilities but within the same building or building complex. It is within this type the most significant growth have been observed during the period of this study, and the type that due to the scale and structure is really interesting for businesses and organizations in developing and utilizing their property portfolio. Examples of this type are Shared Use Hubs in Australia, Denver Shared Spaces in USA or FOF in Denmark. (Denver Shared Spaces 2012; hubaustralia.com n.d.; fof.dk n.d.).

The fourth and last type, *sharing facilities between users in a network of buildings/organizations in an open, semi-closed or closed community*, is the most extensive type of sharing, and the only one that involves more than one building. This type of sharing is often kept within a relatively closed community and often requires a big commitment from the involved parties due to sheer scale. Examples of this type of sharing are Musicon in Roskilde, Denmark or Manchester Media City, Manchester, UK.(musicon.dk n.d.; mediacityuk.co.uk n.d.).

All four types along with the discriminators mentioned and described previously make the 'typology of shared use of facilities' which can be seen below in table 4.

TYPOLOGY OF SHARED USE OF FACILITIES				
				
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 pre-agreed 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
Examples	1) Republikken, DK 2) Plywood sheds, USA 3) School sharing, NED 4) The HUB, DK	5) Lyngby Idraetsby, DK 6) Rambøll, DK 7) Frivilligcenter Hillerød, DK 8) Risskov Library, DK	9) FOF Lyngby, DK 10) Fjaltring-Trans, DK 11) Churches, UK 12) Shared use hubs, AUS 13) Space for entrepren., USA 14) Airport passenger buildings 15) Use of school premises, UK 16) Centre for A & E, LTK, DK 17) Denver Shared Spaces, USA	18) Musicon, DK 19) Manchester Media City, UK 20) Shared school campus, NIR

Table 25: Typology of shared use of facilities (Brinkø et al. 2014)

CASE; COMMUNITY SPACE WITH MULTIPLE USE

Use of the typology was as mentioned illustrated with a case from Dublin, Ireland, called Mabos, in order to gain some insights into the practical application of the typology in a real world setting.

Mabos was created in the summer of 2011 on the base of 5 years of successfully running a festival called Kings of Concrete. The initiators were Dave Smith and Peter O Brien who in July 2011 leased a disused warehouse at no 8 Hanover Quay in the Grand Canal area of the Dublin Docklands. The space is now run by Dave Smith and consists of a collective of artists, designers, carpenters, engineers, photographers, film makers, skaters, architects, musicians & more. They are focused on the following three categories, with an underlying focus on community integration in all work they do:

- Arts & Incubation

- Entertainment
- Education

In relation to sharing, Mabos is a diverse example. The space currently constitutes the location for an advertisement business run by Dave Smith himself along with 2 partners; it is the studio for 4 independent artists 2-3 days a week, with a further 4-5 other artists using the space on a more sporadic but still regular basis (1-3 times a month) and with many more wanting to join. Besides these regular daytime uses, the space is also rented out for think tank & workshop days. The Craft Council of Ireland, Jameson Whiskey and Google have all used it for these purposes. Weeknight evenings Mabos works primarily as workshop space. There are a number of different regular meets such as Bushido/Juggling/All girls skate club to more sporadic workshops, like for example a monthly projection mapping workshop. Saturdays are generally for a younger audience, with weekly parkour classes and once a month they have an open skills day for all ages with skateboarding /graffiti/ photography / t-shirt design and print amongst other things. Late evenings are for running events – a ping pong club as well as a monthly 'trad' (traditional) music session and other music nights. Dave Smith describes the space as follows:

- "*A rethinking of what a community space is for this generation*"
- "*A playfully anarchic space – not accepting the norm, but only pushing when it is needed*"
- *"A place designed for social interaction"*

The financial model is largely based around the workshops, rental and the entertainment elements, with rental accounting for 40% of revenues, workshops 5-10% and the rest entertainment. The regular users – the artists, mainly use the space for free, with the condition that they make themselves available at workshops, classes and other educational stuff for adults and children in the local community. "*They are here on a barter*" is how Dave describes is. When hosting workshops and other events and builds they pay a membership fee, because it takes up a lot of space and can have a bigger impact on others using the space. Evening workshops for adults are done via donations – people don't pay a membership, but donate whatever they want.

The approach for applying the typology to the case of Mabos can be seen in table 5. The basic questions used as discriminators in the typology are used as keywords from which the case is then described. The typology is originally developed with a focus on large property owners, but is expected to also be able to play a significant role in a broader societal context as for example Mabos represents.

Mabos	
General attributes	The space in which Mabos is located is owned by a third party and rented out to the founder of Mabos, Dave Smith. He then is in charge of daily and overall management, and oversees the use and events in the space
When	There are simultaneous sharing during the day with artist having workspaces there and the founder running a separate business from there, as well as serial sharing with different events, workshops etc. being held at other times.
Why	The core was to create a community integration initiative, and the vision to do this was threefold: to create an arts and incubation space, to create a creative education space and to host experimental entertainment.
Who	The sharing at Mabos is mainly directed towards the local community, with local artist having workspace there and the local population using it for workshops, relaxing, events and more. Furthermore is the space often used by larger organisations and companies to host workshops, meetings etc.
How	The space is rented from an owner with whom they have no contact. The founder Dave Smith is in charge but the 'collaborative spirit' of the space is important so all decisions are discussed with the 'regular' users and participants who agree on rentals and events. The space is open as a workspace/studio for pre-approved individuals; sports, games, etc. for the general public and as event/workshop space by agreement with the founder.

Table 26: Mabos described by use of the typology

This information can be used in connection with the typology to identify the type of sharing in question and thereby provide a basis for discussion about the development, management or similar of the space.

In the case of Mabos the type based on the above information is as illustrated in table 6:

	
Type	Type 2, “Sharing several facilities in an open or semi-closed community”

Table 27: Mabos as a type according to the typology

PRACTICAL AND ACADEMICAL IMPLICATIONS

As described in the previous sections of this paper, space management is already working with shared space, especially in relation to the office building, in the form of non-territorial offices or ‘free seating’ offices and the like, but this type of sharing is all kept strictly between a company’s own employees, meaning only intra-organisational sharing. The typology presented and used in this paper, takes sharing a step further and looks outside the boundaries of a single organisation towards inter-organisational sharing and an optimised management of property in general. The sharing economy has been a popular topic for some years now, and shared use of space and facilities has as a topic a wide societal relevance. Despite of this it has been chosen for this to only focus on the situation and needs of larger property owners and municipalities. This is due to the fact that it is within these types of businesses and organisations, that a significant part of the building stock not used for private housing can be found, and therefore also here a big difference can be made.

The typology described in this paper and presented is meant to support facilities-, property- and space managers in two different aspects of their work:

1) First of all, as an analytical tool to be used for investigating and describing existing or future shared spaces, for example in connection with building briefs etc.
2) Second, as an inspirational tool and a tool for dialogue, when thinking about sharing and shared spaces in general.

On a more strategic level, it can be used for starting a new discussion and provide a new view on property- and real-estate management, by beckoning facilities managers and large property owners to ask the question set forth in the introduction to this paper; “Do we need to build new, or can we maximise the use of the space and facilities we already have?”

The typology still has its limitations though. It is still a work in progress and needs to undergo further testing and is continuously being refined by including more examples. Furthermore will the pros and cons of the different options be investigated more thoroughly in later research, as the typology is part of a larger research project. So, at this stage the typology is not final, but more a tool for creating overview and discussions about how to share space in an inter-organisational context. It is a step towards a new strategy for how buildings and facilities can be understood, managed and used for a more optimised use of the built environment.

CONCLUSION

The result of the research behind this paper is a first version of a typology of shared use of facilities, and an illustration of applicability on a real-life case, to illustrate the use and application value. It is the intent that the typology at its finished state will be able to function as a tool to support facilities-, property- and space managers in introducing a new way of looking at sustainable building portfolio management.

The typology illustrates four types of sharing, using the five discriminators identified during the research to describe the individual types of shared spaces. These four types as first presented in (Brinkø et al. 2014) are:

1. Sharing a specific facility – e.g. a desk or a work-space - in a semi-closed community
2. Sharing of several facilities in an open or semi-closed community
3. Sharing physical space in a building or a building in itself in a closed community
4. Sharing facilities between a network of buildings/organizations in a closed community

The five discriminators as first presented in (Brinkø et al. 2014) are:

1. What (referring to the object of use)
2. When (referring to the time perspective)
3. Why (referring to the reason behind the sharing)
4. Who (referring to between whom the sharing takes place)
5. How (referring to how the sharing is organised)

The typology is developed with base in 20 examples from both Denmark as well as internationally, and covers a wide range of shared spaces, but does as mentioned in previous sections not claim to be fully comprehensive, and is under ongoing development and refinement as a part of a larger research project.

Based on the explorative overview the typology constitutes, as well as the illustration of use presented in this paper, it can be concluded that the concept of sharing space and facilities is a relevant topic for facilities management, with many potential benefits in relation to efficiency, innovation and sustainability but also with significant challenges that must be met. It can also be concluded though, that it is a very general topic and it is difficult to realise the potential benefits without further clarifying the different aspects of *what* is being shared, by *whom* and *how* it is managed, in order to counter the obstacles an organisation is presented with when entering into sharing facilities.

This means that there is still plenty of research to be conducted before the typology presented here is at a final operational level, where it can fulfil the goal of being a tool for facilities managers and the like to use in practice. Testing the typology on more cases will be essential in an effort to create a larger database of information to refine and validate the typology, covering different types of sharing regarding both *why*, *whom* and *how* as mentioned above, With this in mind however, the typology in its current version forms a solid base from which the needed further research can take its starting point, and can already now be used to open up discussions on this alternative way maximising the use of the resources our buildings and facilities constitutes.

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Center for Sundhed og Kultur, Lyngby-Taarbæk, Denmark

City Planner Dick Gleeson, Dublin, Ireland

Founder of Mabos, Dave Smith, Dublin, Ireland

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Paper 2

Shared space in a municipal sports facility: The case of Lyngby Idraetsby (Brinkø & Nielsen, 2015)

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Shared space in a municipal sports facility
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ABSTRACT

Purpose
The concept 'shared space', where different users use the same space, is expected to be a way towards a more environmental, economic and social sustainable build environment. This paper presents important aspects of establishing a shared space in a real-world context by studying Lyngby Idraetsby ('sports city') in Denmark, with the purpose of increasing the understanding of shared space as a strategy towards a more sustainable space- and portfolio management.

Theory
Shared space in the form of coworking and hot-desking are well described in literature. The case in this paper is a public real-estate complex within sports, and the theory used will be centred on usability, user involvement and space management.

Design/methodology/approach
The paper is based on a study of a specific case; Lyngby Idraetsby. The approach is inductive, and the information gathered via interviews with planners, facilitators and users, with additional information collected via documents and observations at planning and user meetings.

Findings
The project shows how shared space is relevant for the users and the project as a whole, and sheds light on key challenges regarding user involvement and facilitation that have to be handled when establishing a shared space.

Originality/value
Shared space is receiving increasing attention, as part of the topics of the 'sharing economy' etc. These themes illustrate trends in society, but there is little empirically material available when it comes to FM. This paper intends to fill part of this knowledge gap with an in-depth case study.

Keywords

Shared space, facilities management, sustainable FM, public FM

INTRODUCTION

Shared space is a term that for many different people can mean just as many different things. In this paper *shared space* is understood as '*multiple individuals, groups, or businesses making use of the same space, either simultaneously or at different times'*. Spaces is understood as anything from offices, laboratories and canteens to reception, workshop space and anything one can think of.

But why is shared space interesting? When we share we use one of the under-utilized tools we have to create value and consistency in our daily lives and in our businesses. We already share much more than we may realize, but when considering sharing most people often think about the typical aspects of sharing, such as sharing a car, a summer home, bicycles and much more. Therefore, we rarely consider the opportunity to share on a broader scale, although it may be a golden opportunity for many to not only utilize their resources better, but also in terms of what can be gained by entering into partnerships with others. Because sharing is not confined to office space; there may be opportunities to share a myriad of different rooms and many other aspects of a business. This paves the way for intensification of use, allowing different types of users and different uses over time. Such intensification might improve the liveliness of neighbourhoods, increase sustainability, and strengthen the ties between different actors.

THEORY

The field of shared space is part of the larger topics of The Share Economy, Collaborative consumption and not least Collaborative Urbanism, all describing the same overall phenomenon (Botsman & Rogers, 2010; Owyang, Tran, & Silva, 2013; Silver, 2013). The connection and relevance to the build environment has been described by (Brinkø, Nielsen, & Meel, accepted for publishing in 2015), and looking towards more established fields, there is theory describing shared space in office environments. Here one can find literature, also from a facilities management (FM) perspective, on for example co-working, hot-desking, designing and managing open space offices (Becker & Steele, 1995; Duffy & Powell, 1997). Since the case in question is a municipal complex, another set of theories also comes in to play; public FM and user involvement (Fronczek-munter, 2011; Jensen, Alexander, & Fronczek-Munter, 2011; Nardelli, Nielsen, & Jensen, 2015). The paper by (Nardelli et al., 2015) presents the following figure, Figure 1, illustrating an analytical framework with a complex relationship between actors, that is also used to guide the study in this paper.

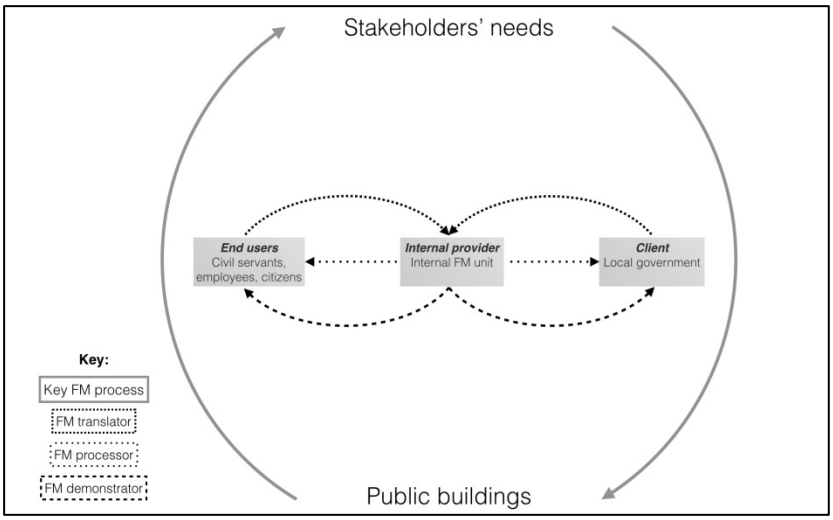


Figure 11: Analytical framework (Nardelli, Nielsen, & Jensen, accepted for publishing in 2015)

The figure illustrates the complex situation that must be handled by the *'internal FM unit'*; which in Lyngby idraetsby is the project group/municipality. Furthermore it illustrates the importance of considering both users and clients in relation to the public buildings, and it is exactly the usability and user involvement that have been the key focus in this study.

LYNGBY IDRAETSBY, A CASE DESCRIPTION

The case investigated, Lyngby Idraetsby, is a non-profit municipal sports facility in Lyngby, Denmark, approximately 12 km outside of the Danish Capital of Copenhagen. The project is a large renovation and construction project involving many stakeholders.

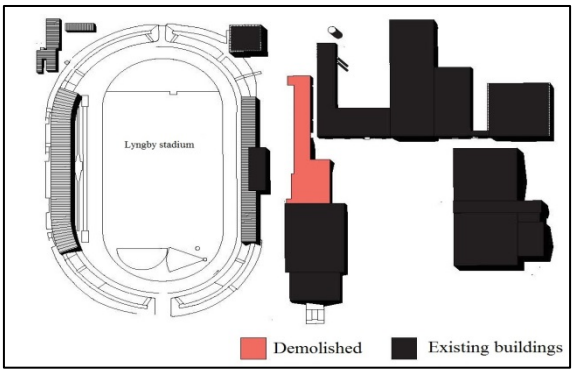
The complex was completed in 1948 with a swimming pool added in 1976 and the total complex consists of approximately 13700 m^2 (DGI projekt- og udviklingsværksted, 2012), not counting the outdoor areas. In 2010 mould was discovered during the initial phases of renovating a club's facilities, and an investigation to determine the extent of the problem found the mould to have spread throughout the building (DGI projekt- og udviklingsværksted, 2012). Renovating the building was estimated to be too expensive, and it was decided to replace them with new. Due to the entire complex being of an older date, a total renovation and updating of the complex into "Lyngby Idraetsby" was initiated.

Picture 32: Lyngby stadium [www.ltk.dk/lyngby-stadion-svoemmehal]

Previous configuration: Single purpose strategy

The existing complex of Lyngby stadium can be seen in Picture 2. The stadium offer facilities for indoor and outdoor sports, among which are:

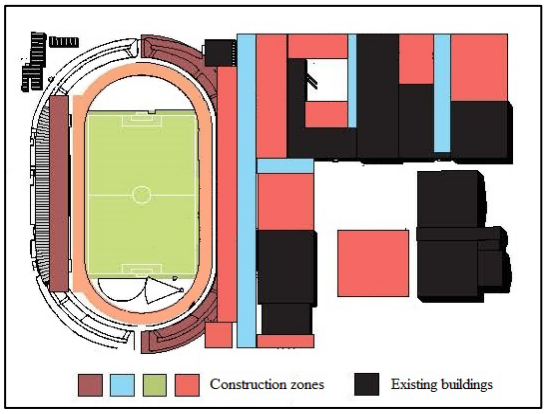
- show stadium for football as well as practice fields
- fitness, sports hall and athletics stadium
- swimming pool, diving pool and baby pool
- archery ranges and space for other sports associations.



Picture 33: Lyngby Stadium, with courtesy of DGI Denmark

Besides these, the stadium also houses a café, lounge area and private clubrooms. The layout means that not much interaction is taking place between users, and the majority of facilities are single-purpose spaces not necessarily suitable for other uses.

New configuration: Multi-purpose strategy



Picture 34 : Lyngby Idraetsby, with courtesy of DGI Denmark

Lyngby Idraetsby, the new complex, will consist of approximately 11800 new m^2 (DGI projekt- og udviklingsværksted, 2012) in addition to the existing 13700 m^2 of which 2420 will be torn down, giving a combined total for the new complex of 23080 m^2, not counting the outdoor areas. One of the proposed designs can be seen in Picture 3. The plan includes in addition to the existing facilities an area reserved for the business community, a physical education day-care and the Lyngby-Taarbaek Youth School (Lyngby-Taarbæk kommune, 2012a, 2012b). The facilities for recreational sports are meant to be shared, and are planned with multi-purpose use in mind. One of the main differences from the existing to the new complex is a plan to centre the sports associations around an "association zone". This means that no associations will have their own club rooms and no space should be usable for only one function. The association zone will be built as a specific area in connection with the sports facilities, and consist of a number of rooms the associations must share and can use to meet and gather when needed.

The vision is for Lyngby Idraetsby to be an area characterized by activity in as many hours of the day as possible, for as many different users as possible; *"Throughout the planning process there has been focused on the development of space that promotes community and interaction between different groups, and strengthen new forms of activity"* (Lyngby-Taarbæk kommune, 2012, p.4). This is backed up by the project manager; "*You could say the vision for the sports city lies in that […] there must be activities around the clock in order to attract many different types of users. […]And this is how we have worked throughout the project – we have always planned for multifunction"*. [Project manager]

User involvement

The user involvement process established as part of the process is an essential part of the project in relation to this study, and in the spring of 2012 a process was initiated to involve the stakeholders and collaborative partners in the process. Representatives of the sports associations as well as neighbours etc. have throughout the process been closely involved in the development of the project as illustrated in Figure 2

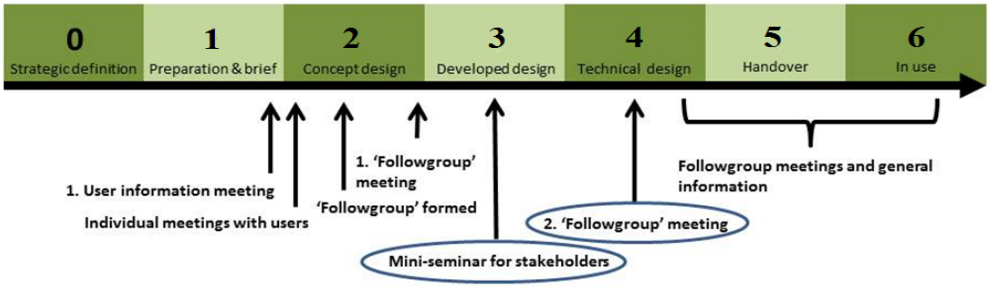


Figure 12: Adapted from The building design phases presented by RIBA (Royal Institute of British Architects, 2013) with illustrations of user involvement during the project period

From the project's beginning in 2012 until now, the user involvement have included the initiatives marked on. "*DGI Faciliteter og Lokaludvikling*" (DGI Facilities and local development), a Danish organisation working in collaboration with the Danish sports association DGI, were hired to facilitate the initial user involvement process. They were chosen based on

their ‘association-based’ profile, as it was thought that users of Lyngby Idraetsby might connect better with another association instead of the municipality [Project manager]. DGI Faciliteter og Lokaludvikling were in charge of hosting the first information meeting, individual meetings offered to all associations, a workshop with architects and users, as well as to provide drawings to form the base for the project. After these initial phases the user-followgroup was established and the responsibility for user involvement instead lies with the municipal project team.

METHODOLOGY AND APPRAOCH

This paper is based on a case study of Lyngby Idraetsby in Denmark; a choice of study type that has been chosen based on its special characteristics as described by Robert Yin; "*A case study is an empirical inquiry that investigates a contemporary phenomenon within its real-life context."* (Yin, 2009) and also Bent Flyvbjerg; “*For researchers, the closeness of the case study to real-life situations and its multiple wealth of details are important*” (Flyvbjerg, 2006).

Case study research as described by Yin can embrace many different epistemological orientations (Yin, 2009, p. 17). The study of Lyngby Idraetsby lies closest to philosophy of the critical realist as described by (Saunders, Lewis, & Thornhill, 2009, p. 140), and has been conducted with a mainly inductive approach. It is an exploratory study with the aim of identifying aspects of the project process that have played a significant role in relation to the outcome, both positive and negative. The purpose is increasing the knowledge of shared space within FM, and forming a hypothesis that can be tested in additional case studies and further research.

The design is a longitudinal study of processes involved in the establishment of a shared space in a municipal leisure facility context, with special focus on the interaction between users and planners. The majority of the information used for this study has been gathered via observations at meetings and interviews with a wide variety of parties involved in the project. In addition, secondary information has been gathered via documents related to the project, to gain another perspective. The overall process is illustrated in Figure 3.

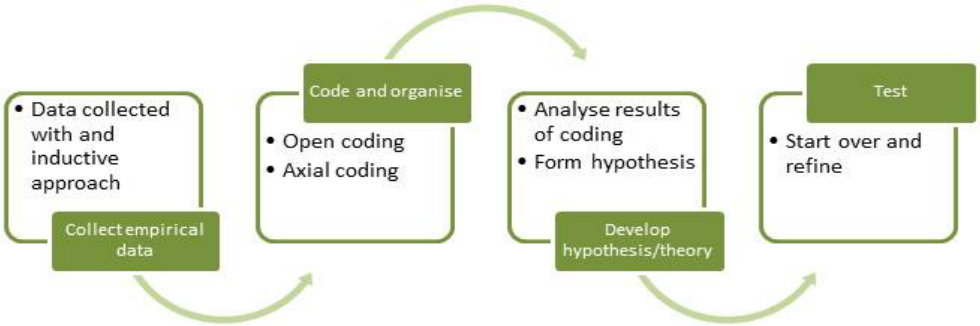


Figure 13: Methodology and approach

In the following, the different methods used during the information gathering and analysis process are described.

Observations

Observations were made by the author at user-involvement initiatives marked by a circle on Figure 2 as well as at an internal meeting in the planning group during the construction period, in total at the following three situations, during the period of May 2014 and August 2014.

- Observations at mini-seminar for users and stakeholders

- Observations at a planning group meeting
- Observations at meeting with the follow group of users

The observations have been made with inspiration from the method of participatory observations described by (Saunders et al., 2009) and as "*The researcher attempts to participate fully in the lives and activities of subjects and thus becomes a member of their group, organisation or community. This enables researchers to share their experiences by not merely observing what is happening but also feeling it*" by (Gill & Johnson, 2002)

Interviews

In order to gain first hand insights into different aspects and experiences during the process of planning, designing and constructing, representatives from users, architects and the municipal project group were interviewed, resulting in 5 interviews in total.

The interviews have all been conducted as semi-structured qualitative interviews based on the works of (Kvale, 2002); a type of interview that was selected based on the ability to deliver insights into a concrete topic, and ensuring the interviewer the possibility of obtaining non-anticipated information while at the same time ensuring answers to predetermined key questions. The focus of the interviews has been to gain insights in to different aspects of the project process seen from the perspective of different stakeholders, in order to understand which aspect of the project plays the biggest role from their point of view.

Users

Interviews have been conducted with representatives from 3 different user groups; the Gun association, the Handball association and the Popular Education Association (FOF). These three have been chosen based on a two main reasons. First they are three of the largest stakeholders and will be greatly impacted by the project. Second, they have been closely involved in the user involvement process, and can therefore provide insights in to how this has been experienced from a user perspective.

Architect/facilitator

An interview has also been made with a representative from the architect/facilitator organisation DGI Faciliteter og Lokaludvikling. The purpose of this interview was to learn about the user involvement process from the facilitator point of view.

Municipality

An interview with the project manager from the municipality as well as ongoing communication regarding the project, development and additional info have also been an important source of information during the gathering of empirical material for this study, in order to learn about the project from the planner and owner perspective.

Document analysis

In addition to the primary data collected via interviews and observations, additional information has been used to further illustrate the case. These are:

- Confidential meeting summaries from steering committee meetings
- Public meeting summaries from political discussion meetings
- Architectural drawings on the overall project as well as specific user projects
- Newsletters send out by the municipality regarding the project and official press material
- Local district plans made for the development of the area

These documents have been used and analysed based on the guidelines presented in (Saunders et al., 2009).

Analysing the empirical data

The methods for analysing the gathered data according to the process illustrated in Figure 3 are mainly open and axial coding as described in Grounded Theory (Boolsen, n.d.). Open coding has as mentioned been used for the initial analysis and mapping of themes, after which axial coding has been used for identifying possible connections between the previous identified themes. The purpose with doing this type of coding is to *"to develop theoretical explanations of social interactions and processes in a wide range of contexts*" (Saunders et al., 2009, p. 185). Coding helps secure a rigorous analysis process that can be displayed and controlled, and the program used to perform and manage the coding in this study is NVivo 10.

FINDINGS

The findings from the case, illustrates some of the challenges that must be taken in to consideration and handled when establishing a shared space in a public leisure facility context. During the open coding and analysis of the empirical information, a number of aspects appeared. These were connected via axial coding, and reduced to just three aspects, illustrated in the three boxes below; territoriality, logistics, and involvement (see Figure 4, Figure 5 and Figure 6). The three aspects are located in the centre of the coloured circle, surrounded firstly by some of the aspects the specific term symbolises, and secondly by quotes from interviews that led to identifying the different aspects.

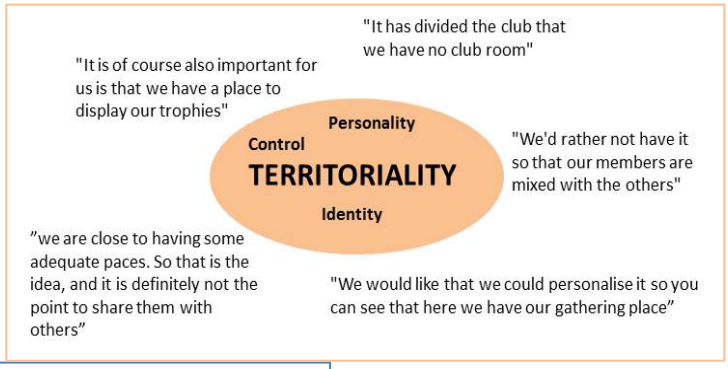


Figure 14: Territoriality. All quotes have been translated from Danish [SKL, LHK, FOF]

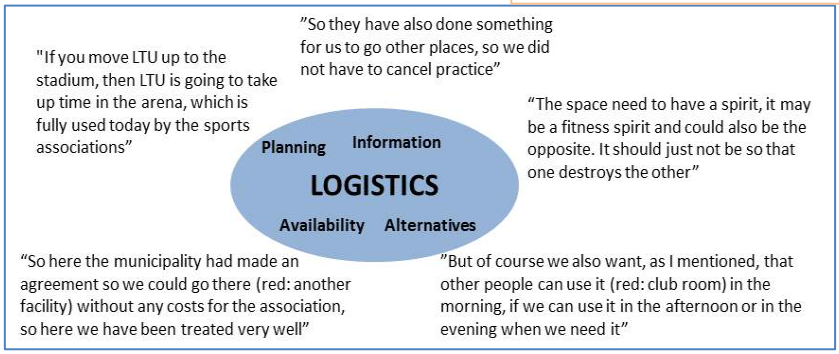


Figure 15: Logistics. All quotes have been translated from Danish (LTU = Lyngby Taarbaek youth school) [SKL, LHK, FOF]

Figure 16: Involvement. All quotes have been translated from Danish [SKL, LHK, FOF]

Territoriality

Territoriality seems to play an extremely important role when asking about a person's/groups attitude towards sharing in general. Control, individuality, personalisation, fear of losing rights etc. has been mentioned in many different forms during the interviews, and is without a doubt an aspect that is necessary to be aware of when establishing a shared space.

Logistics

Logistics was mentioned many times as important during both the construction/renovation phase but also in the period after the space is put into use. Information and planning in regards to how "daily life" will run during construction as well as after, and also the importance of managing the different activates that must share space, so they do not interfere with each other. Not necessarily in time but in space. An example was, '*do not put fitness or Zumba right next to the yoga class unless you have good sound insulation*'.

Involvement

Involvement was the third key aspect that was considered extremely important among users. Being heard and taken serious as well as being kept informed about the process and how it would affect a specific group was highlighted as one of the best parts of the process in this case, and also as one of the main reasons for why most had chosen to accept having to share.

The three aspects illustrates key features that through the analysis process is recognised as being of significant importance for the successful process of establishing a shared space in this context, with special focus on managing the practical aspects of working with the users and satisfying user needs.

They aspects are not blank slates within existing theory, and have been described to varying degrees within fields such as FM, architecture and psychology. So the new knowledge resulting from this study is not necessarily the three aspects in them self, but the fact that they have been identified in this specific context. This means that a lot can be learned from existing theory but with the knowledge combined in new ways and in relation to a new strategic target; ensuring the best possible chance of creating a successful shared space. Combined this can lead to an increased understanding of how to manage the complex process illustrated in the case.

DISCUSSION AND FUTURE PERSPECTIVES

The case investigated in this study is as mentioned a municipal sports and recreation centre in Denmark. It is therefore focused on sports associations and athletes, both professionally and amateurs, so what can be learned from the results outside this framework?

Well none of the three aspects identified are uniquely linked with sports facilities, but are as mentioned also of more general interest individually, within several different fields of research. Secondly, shared space and how to work with it in general is receiving increasing interest as part of the greater topic of 'the sharing economy' as described in section 2. This is also happening within FM, for example within the office environment. The results are also interesting when looking beyond this single case in a leisure setting, since it by the municipality is being considered a pilot project. The experience gained from this project is to be incorporated in other real-estate projects in the municipality, outside the world of sports, as for example regarding public housing complexes etc. The results can therefore play a role in many different types of shared space situations where the complex *user/internal FM unit/client* relationship as illustrated in Figure 1 is present and interaction with users is key. The knowledge and experiences gained therefore have a possibility for playing a role in relation to for example schools, kindergartens, nursing homes etc. More research though, will have to be done, to

understand fully how to best handle the three aspects presented in section 5, for example by studying what has already been written on the subjects within for example architecture, phycology and existing FM research.

In addition, further studies of different types of cases from outside the leisure setting represented here, would help to support and uncover settings, in which the aspects presented here can be of importance, thereby strengthening the relevance of the results presented in this study. Studies such as these are planned for the near future.

The final result of this research is expected to be a set of guidelines and a tool to guide interested organisations or municipalities in establishing and working with a shared space in practice, thereby increasing the understanding of the concept as a way to a more optimised and sustainable space- and portfolio management

CONCLUSION

The purpose of this cases study was to gain empirical insights in to some of the processes involved in establishing a shared space in a real-world municipal context, in order to increase the understanding of how to work with shared space.

By identifying the aspects of *Territoriality*, *Logistics and Involvement*, presented in section 5, the goal is that organisations and groups interested in working in or with a shared space can better navigate the process, and have a better chance at securing a good result. In this way it can be a step towards creating guidelines for FM management practice on how to work with shared spaces, first of all in leisure setting, but perhaps also in the greater field of Public FM. In this way it can help to begin and fill part of the knowledge gap that exists regarding shared space and FM as a field.

ACKNOWLEDGMENTS

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SKL, Representative from gun association, (02.09.2014), personal interview
LHK, Representative from handball association, (03.09.14), personal interview
FOF, Representative from the Popular Education Association, (30.06.2014), personal interview
DGI, Representative from DGI Faciliteter og Lokaludvikling, (11.08.14), personal interview

Paper 3

Shared space in practice and theory: A cross case analysis (Brinkø & Nielsen, 2016a)

Submitted to Journal of Urban Design, and will due to copyright reasons not be featured in the public version of this dissertation.

Paper 4

The characteristics to consider in municipal shared spaces (Brinkø & Nielsen, 2016b)

Accepted for publishing in Journal of Facilities Management, 2017, vol:15, iss:4

The characteristics to consider in municipal shared spaces

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ABSTRACT

Purpose
The purpose of this study is through collaboration with practitioners to identify key characteristics of municipal shared spaces and based on these developing a guide for establishing a shared space in a municipal real-estate portfolio.

Design/methodology/approach
This paper builds on existing theory on the subject of shared space as well as the practical experience of professionals within the fields of property management, space management and facilities management. The guide presented is the result of data collected through case studies, interviews, surveys and literature reviews. This knowledge is combined with data collected through a workshop with practitioners from municipalities and the private sector, in order to provide a final guide that is directly applicable as a tool for working with shared space as a part of a property management strategy.

Findings
The result presented is a guide to establishing a shared space in a municipal real-estate portfolio, created in collaboration between researchers and practitioners. It provides an introduction to the topic and outlines a number of tasks that must be completed in different parts of a project, thereby providing a tool which practitioners can use to realise shared space as a strategy in the context of public real-estate management.

Originality/value
The guide presented is a first in connecting theory with practical application and through collaboration between researchers and practitioners creating a tool to be used when working with shared space in a municipal real-estate portfolio.

Keywords: Co-creation, facilities management, property management, public real-estate, shared space, space management

INTRODUCTION

With global development continuing to move towards cities being the preferred place to live, the capacity of cities all over the world is being pushed to the limits (The World Bank, 2012). In many larger cities space is becoming scarcer and more expensive, with the opposite happening in smaller more rural areas where buildings are standing empty and abandoned. No matter the situation, the traditional way of organising use and many other aspects of city life must be reconsidered, and new business concepts are popping up at a rapid rate. Accommodation can be found via 'Airbnb', transport through 'Uber', services through 'Upwork', working space at coworking offices and the list goes on. Some of these businesses and concepts that started out not so many years ago as small independent initiatives, such as 'Airbnb', has now reached a point where they are surpassing the established industry (Penn & Wibhey, 2015).

These new challenges and possibilities not only apply for the private sector but also for municipalities. More people moving to cities means an increased population that needs a myriad of different facilities, and spaces to accommodate these functions in order to make city-life work. The result is an increased pressure on the physical infrastructure and facilities that are typically provided by municipalities such as day care institutions, schools, sports facilities, health care facilities, cultural facilities and workspaces for an increasing number of civil servants. With the growth usually comes a need for extra space, while resources do not always allow for this. The sharing of space between different individuals, groups or organisations can be a method to solve some of the problems experienced by cities world-wide (Gaffikin, Mceldowney, & Sterrett, 2010; Talen, 2006; Williams, 2005). Think of different schools sharing the same sports facilities; day care institutions share the same outdoor space as an elderly home; civil servants of different departments sharing the same office space. In such examples lies the potential of making more efficient use of resources, from both a sustainability-, economic- and social point of view (Walsh, 2011).

Earlier research on shared space (Botsman & Rogers, 2010; Brinkø & Nielsen, 2016; Nielsen & Brinkø, 2016), however, also showed that there can be a number of barriers and unknowns involved making the establishment of a shared space difficult. This is the problem this paper is attempting to tackle by building on theory within the topic of shared space combined with knowledge and experience from practitioners working within the field of property management from both the private industry as well as municipalities. The result of this collaboration is a guide co-created by researchers and practitioners, presenting a method for how to work with shared space in a municipal real-estate portfolio.

THEORY

Shared space

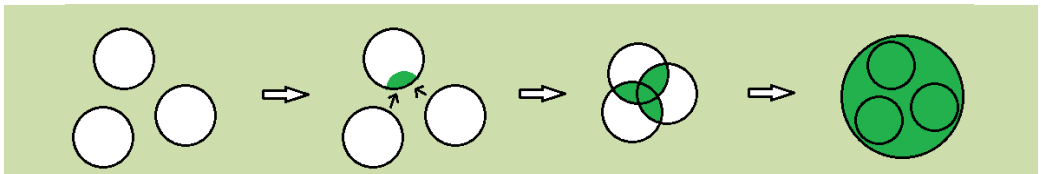
Shared space is a unifying term for organising the use of many different types of spaces, with the one thing in common that the space or facility in question is shared between at least two different individuals, groups or organisations. Shared space as field of study has been receiving increasing attention over the last decade or. so with publications covering topics from 'the new office' to the first broad typology of shared space (Duffy & Powell, 1997; Rafferty, 2012). Moving outside the office, studies on how flexible interior and a focus on adaptable buildings can help increase the possible users over time (Barbosa, Araújo, Mateus, & Bragança, 2016) are also emerging, as are some of the fist evaluations of shared space. This literature not only illustrates the potential benefits of shared space but also reveals some of the difficulties connected with the concept (Fawcett, 2009; Khajehzadeh & Vale, 2016; Moss, Ruzinskaite, & Alexander, 2009; Pitt & Bennet, 2008; Rafferty, 2012; Uzairiah, Tobi, Amaratunga, & Noor, 2013).

The reasons behind the sharing of space can vary widely as can how the sharing is organised, but looking beyond these initial differences the diverse types of shared spaces also have many things in common, especially when looking from an organisational point of view.

(Brinkø, Nielsen, & Meel, 2015) presents a typology of shared use of space and facilities outlining 4 main types of shared space and describes their individual characteristics using the questions *who, what, when* and *why*, meaning who is sharing, what are they sharing, when is the sharing taking place and last but not least, why is the sharing taking place and what is the motivation.

Based on further studies of shared space, and the application of the typology to relevant FM professionals it was found that this typology require quite a bit of introduction to be used as intended, and does not include the aspect of sharing core vs support facilities; an aspect that during additional research has been found to be of key importance. With this in mind the original typology of shared use of facilities by (Brinkø et al., 2015) has been developed in to a version 2.0, see figure 1, as a part of the work presented in this paper.

Typology of shared use of facilities version 2.0



Degree of sharing	No sharing	Invited sharing	Collaborative sharing	Complete sharing

Characteristics of shared space	
What	Core facilities; Support facilities;
When	Simultaneous sharing; Serial sharing;
Why	Optimising use of m2; Keep costs down; CSR activity; Synergy;
Who	Unlimited access; Access available for employees of the sharing partners; Access restricted to individuals/groups approved by owner;
How	One party has ownership and makes the space available either free or for a fee; Different owners come together and agree on sharing specific facilities or locations with each other; A third party has ownership and manages the space for the parties sharing;
Themes	Practicalities; Involvement; Territoriality;

Figure 17: The typology of shared use of facilities v2.0

The typology has been simplified with three levels of sharing, and still presents a common language and understanding of what shared space is in the context of the built environment, but the categories, or types, are now based on the degree of sharing taking place from ‘no sharing’, to ‘invited sharing’, ‘collaborative sharing’ and last ‘complete sharing’. The typology still represents maximum diversity and variation of shared spaces, now condensed to three main levels, and is as the original organised by

scale, with the least comprehensive shared space to the left and increasing complecxity towards the right.

The descriminators *what, when, why, who* and *how* used in the original typology are still a key aspect of the new typology, but are now held in a separate table in connection with the new levels, and are meant to 'be used to describe a specific shared space and not as a description of a type. The new version of the typology also incorporate another new aspect developed by (Brinkø & Nielsen). Building on the understanding of the original typology of shared use of facilities, (Brinkø & Nielsen) conducted additional studies, and presents three themes to be managed independently of what type, or level, of sharing is being addressed namely, *territoriality, involvement* and *practicalities,* as illustrated in table 1.

	Territoriality	Involvement	Practicalities
Statements	Personality Identity Control	Influence Information Being taken seriously	Planning & availability Information Access & security

Table 28: Three themes to be managed (Brinkø & Nielsen)

According to (Brinkø & Nielsen), these themes are essential to consider when working with shared spaces whether the shared space in question is a new one under development or an already well-estbablished existing one. How they should be managed depend on the specific shared space in question, since the extent to which they arise is depended on a number of characteristics of the shared space, such as extent of sharing, forced or voluntary sharing, sharing of core or support space etc. The themes were developed based on the original typology of shared space, but have been incorporated in the new version 2.0 presented in this paper.

The new typology with the three themes incorporated illustrated in figure 1 will in this paper be used as the theoretical framework for describing shared space, and to guide the discussion and development of the practical guide presented, in order to secure that the relevant information and factors are included in the final result.

Public real-estate

The management of property and real-estate in general, is a field that in short deals with the management of buildings on a strategic level. It encompasses the operation, control and oversight of real-estate in the broadest term of the word, and the real estate process can be described as the constant interaction of three groups; space users (consumers), space producers (those with site specific expertise) and public infrastructures (off-site services and facilities) (Graaskamp, 1992). Within this overall field of real-estate management lays the more specific management of public real-estate, which constitutes the context for the work presented in this paper.

Public real-estate management is different from private, or corporate, real-estate management in a number of ways. "*Public real estate portfolios have very specific characteristics and there is clear evidence of political influence on the quality and location of the buildings included in them. This, in turn, has a strong effect on how such properties are managed.*" (van der Schaaf, 2002). It is a discipline of growing significance for local government across the world (Phelps, 2011), and in many countries municipalities not only own but manage large real-estate portfolios in order to provide the necessary services for the population and community, such as public buildings, infrastructure, schools, hospitals, social housing etc., and also buildings necessary for carrying out the administrative functions connected with municipal obligations (Klumbyte & Apanaviciene, 2015).

In connection with the topic of this paper, the focus within public real-estate and real-estate management is mainly in relation to a municipality's objectives in working with real-estate management, meaning motivations, and secondly in relation to where a development towards shared space could or should take place. In this regard much can be learned from existing literature.

According to (Trojanek, 2015) the main objective of managing real estate owned by a municipality is to effectively use municipal real estate in the process of performing public tasks such as meeting collective needs of the community by providing local public goods. Within this overall purpose (Trojanek, 2015) also lists a number of different objectives of managing the public real estate, depending on the functions performed by the real estate. Municipal real estate may serve to:

- implement the municipality's statutory obligations (functions of an administrative and public utility character)
- generate one-off or periodical revenue streams (sales), e.g. rent, lease, lending
- implement investment projects or build up a reserve for the implementation of development objectives in the future

Moving to identifying potential on a portfolio level, (Dowall, 2007) presents an evaluation system that should be set up as a series of "screens" that a site must filter through before it is considered for development resulting in the following three 'classes' of sites.

1. Vacant, potentially developable sites not required for public use;
2. Under-utilized sites with potential for intensified development; and
3. Fully developed sites with no potential for further development.

According to (Myers & Wyatt, 2004) there is a need to identify and create a more efficient use (and reuse) of existing real estate, a need shared space potentially can assist in addressing. In connection with this an understanding of the mechanisms involved and where the greatest potential lies is key in implementing the use of shared space in a municipal real-estate portfolio. Considering the large amount of real-estate owned and management by public entities and municipalities means that public property management comes with a large potential when looking at the possible impact of shared space as a method for space optimisation. It is the realisation of this potential the guide presented in this paper is developed to assist.

Workplace and space management

Despite the fact that the focus of this paper is not on workplaces as such, but a more general rethinking of the single-user or single-function approach to buildings, much can still be learned on the mechanisms involved in managing change and transformation from existing literature.

Over the last couple of decades an increasing amount of literature has been published on the topic of shared space in the workplace, with (Duffy & Powell, 1997) describing "The new office", (Khamkanya & Sloan, 2009) writing on flexible working and shared workspace and (Luck, 2015) writing on co-location for design work. Following from the space management approach, agile working and the field of workplace management provides insights in to how to manage an organisational change such as transitioning to shared space must be considered to be (Bell & Anderson, 1999). The importance of providing physical solutions that meet the definition of 'agile' (easily adaptable, flexible, and varied) environments; a key component in shared space, is another topic touched upon by (Bell & Anderson, 1999). (Hewitt, 1997) describes 'the city workplace'; an experiment and test to demonstrate how different space could be used in numerous ways to support a multitude of tasks; another key component in shared space.

METHODOLOGY

In order to translate the theoretical knowledge on shared space developed via research to a practical tool to be used by municipalities, a workshop was chosen as the framework for collaborative development of a *guide to establishing a shared space*. This guide is a culmination of three years study of shared space, and is the result of a large number of case studies and interviews, culminating in a workshop with practitioners, in order to connect the theoretical findings with knowledge and experience from the industry. The product of which is a guide that can be applied and utilised in practice when working with shared space in a municipal real-estate portfolio. The overall research approach is illustrated in figure 2.

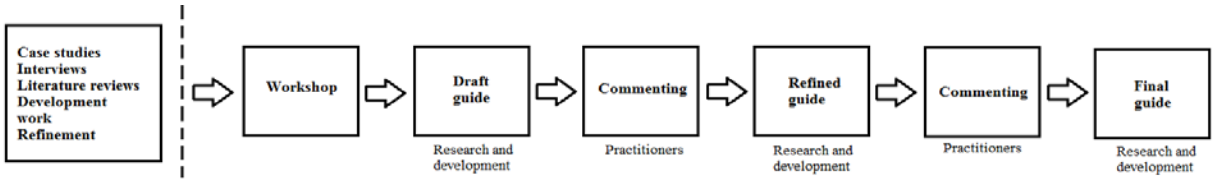


Figure 18: Research approach

As can be seen in the figure, the development process is that of a continuous cycle of feedback and improvement following the initial workshop. This method has been chosen in order to secure that the product developed was of a format and content that was easily implemented in the work of the practitioners, while still encompassing all the different aspects of shared space that has been identified through literature and empirical studies. An in-depth account of the workshop, both as a method and how it was conducted in this particularly case, will be given in the following.

Workshop

A workshop, similar to the focus groups described in (Saunders, Lewis, & Thornhill, 2016), can be used to acquire more in-depth knowledge about the participants views on a specific topic by "*encouraging interactions between participants as an effective means to articulate pre-held views"* (Saunders et al., 2016). This makes it very well suited for the purpose of this study – to create a guide for practitioners by practitioners. Facilitation of the workshop was conducting with inspiration from the work of (Ravn, 2014).

The participants invited to the workshop come from a variety of professions. The municipalities of Lyngby-Taarbæk and Copenhagen were represented by multiple participants due the study's focus on municipal real-estate. In addition to these a number of professionals from the private sector, with previous knowledge and experience from working with shared spaces in practice, were invited to provide valuable input from practical applications. A total of 15 participants attended the workshop, 8 from the two municipalities and an additional 7 from various companies from the private sector; among which were architects, consults and an owner of a successful shared space in Copenhagen, see table 2. An additional 4 had signed up for the workshop but were unable to attend for different last minute reasons, but were still involved in the processing and feedback loop taking place in the period after the workshop.

Workshop participants	Representative	Experience within:
Lyngby-Taarbæk	Director, properties	Planning, development, real-estate management
Lyngby-Taarbæk	Development consultant, properties	Planning, development, real-estate management
Lyngby-Taarbæk	Property operations manager	Planning, development, real-estate management
Lyngby-Taarbæk	Head of Department, secretariat	Planning, development, real-estate management
Lyngby-Taarbæk	Development consultant	Planning, development, real-estate management
Copenhagen	Operations manager, properties	Planning, development, real-estate management
Copenhagen	Development consultant	Planning, development, real-estate management
Copenhagen	Project manager, properties	Planning, development, real-estate management

ICOP	Director	Planning and designing office space
DTU Campus Service	Section Manager	Planning, designing and managing university space
Sweco	Chief Advisor	Space and construction management
Lyngby Vidensby	Director	Network management, creative environments
Republikken	Director	Managing a cowork space
SpacePro	Director	Planning and designing space and buildings
ArchiMed	Director	Planning and designing shared space
Aarstiderne	Project manager	Planning and designing shared space

Table 2: Workshop participants

These particular participants were invited based on the criteria of having had previous practical knowledge with shared space, and therefore being able to contribute with hands-on experience about the process.

The workshop itself was organised with a theoretical introduction to the subject at hand, shared space, and a presentation of the theoretical findings produced during the study so far. After this introduction the first task was introduced and the participants were divided in to two groups for the first group work session, focusing on screening for shared space in a municipal real-estate portfolio. After completion a representative from Lyngby-Taarbæk municipality presented a real-life ongoing case from the municipality for inspiration, and the second group work session was initiated, focusing on the steps necessary when creating a specific shared space at a chosen location. For both sessions an initial framework was introduced to keep the discussions centred on topics relevant for the guide and to ensure sufficient depth and usability of the result. The framework was centred on a short content description to steer the discussion and a connected question and task of coming up with 7 steps to complete the work proposed.

The choice of 7 steps was made to secure sufficient detail of the steps proposed while still keeping it manageable within the timeframe given, and was worked with as a guideline and not a strict requirement. Intervention by the facilitators only took place when groups approach for clarification of a question, or if it was clear that the discussions taking place were drifting off subject. The groups were asked to write their suggestions on posters which after both the group-work sessions were completed were presented by a representative from each group followed by a general discussion of the results among all participants, marking the end of the workshop.

Development of the guide

Following the end of the workshop all posters and notes collected during the event was collected and brought back for processing. The method of developing the information in to a guide consisted of the following steps:

1. Write up all steps proposed from all groups and take out steps repeated.
2. Sort the steps into three categories related to either *users*, *buildings* or *organisation*
3. Send this first documentation of the steps created during the workshop out to workshop participants for feedback
4. Further develop this initial draft based on previous knowledge on shared space; adding steps missing from the original draft and formulating all in a more precise way to minimize misunderstandings and optimise content, as well as adding an introductory text describing the topic and a number of different aspects involved in working with shared space
5. Send this second version out to workshop participants for feedback
6. Further develop the content created to a final draft version
7. Send this final version out to workshop participants for final commenting and approval
8. Finalise guide

The considerations for this part have mainly been on converting the data collected at the workshop in to a manageable list of steps to be taken, without losing important meaning or information in the process. Some suggestions made at the workshop were so close to one another that they have been merged in the final figure and others that contained too much information have been divided in to more steps. Lastly, knowledge obtained from additional studies, not already contained in the steps, were added to complete the guide to establishing a shared space in a municipal context. The final guide resulting from this work will be presented in the following.

RESULTS

The result presented in this paper is as mentioned a guide to identifying potential locations for shared spaces as well as establishing one when a location has been chosen, and it is developed within the context of municipal real-estate management. The guide is made up of two main parts;

Part 1) The purpose with this part of the guide is to provide a general understanding of what it is involved before starting to work with shared space in order to ensure the right mind-set. The information contained in this section has been collected through previous studies of shared space, containing knowledge from both literature reviews and theoretical studies of existing shared spaces, as well as empirical data collected through in-depth case studies, interviews etc., and contains the following elements:

a. An introduction to shared space
b. An introduction to identifying potential for shared space
c. A number of practical considerations to be managed when working with shared space
d. An introduction to the challenges to be managed when working with shared space

Part 2) The second part of the guide contains a step-by-step approach to establishing a shared space, and is divided in two overall parts; the first containing an introduction to the four different elements of the guide beginning with the portfolio level and ending with post project evaluations. The second part of this section is a one-page figure containing a number of steps within each element that must be considered. It is the most tangible part of the guide, and contains recommendations from practitioners to practitioners. The elements are:

a. Portfolio analysis
b. Pre-project
c. Project
d. Post-project

These are followed by a figure illustrating the steps to be taken within each element

Part 1a; introduction to shared space

This first section contains the general introduction to shared space, followed by a list of 5 possible benefits of working with shared space, with a short description of each to motivate and inspire shared space initiatives in a municipal building portfolio. The explanatory text introduces shared spaces as a collective term for space and facilities shared between people from organisational contexts, and how it can lead to a number of positive aspects for the stakeholder involved. The text also introduced a societal perspective, where shared space has the potential to create more vibrant and attractive urban environments which can stimulate cultural and economic innovation, by attracting more and different types of users to an area. So there are several different motivations that may lie behind the decision to establish a shared space, and the 5 examples listed in the guide are:

- **Optimised use of square meter**: Optimised use of fewer facilities and buildings will allow for fewer buildings total in the portfolio, and will therefore be able to contribute to an overall area optimisation

- **Cost reduction***:* Optimized use of fewer facilities and buildings will mean fewer buildings to be maintained and operated, allowing for a release of funds to be used elsewhere

- **Synergies**: If the focus in addition to space optimisation and reduction of costs also is on gathering users who could benefit from each other, it is possible to create a situation that allows for synergies to develop between the users and thereby achieve an additional benefit of shared use.

- **Sustainability**: Intensified use has on an overall level has the potential to contribute to increased sustainability in the building stock. If multiple users are moved to one building instead of several buildings are left empty much of the time, but still have to be maintained and operated, it can have a positive effect on the overall sustainability, despite the increased use resulting in a greater load on the specific building.

- **Flexibility in the portfolio***:* The possibility of, for example, launching a new initiative in an existing building or room provides the opportunity to assess the viability of the initiative before a permanent space is assigned, which represents one of the ways in which shared space can contribute to flexibility in a portfolio.

Part 1b; introduction to identifying potential for shared space

This section provides a short introduction to identifying potential for shared space on a portfolio level, followed by three suggestions for possible user-types or functionalities that could be co-located in shared spaces in a municipal context to serve as inspiration. The text starts by introducing two different approaches to identifying users that will be able to interact successfully in shared space. The first is identifying users in need of the same type of building, premises or facility, either at different times of the day or the same time if the amount and type of use permits this. The second approach is to identify different types of users who will be able to complement each other in their use of a given building, room or facility. This illustrates the importance of considering the functional overlap / match between different functions, user groups and organisations before selecting a location for a shared space. The three examples listed in the guide are:

- **Co-location** of schools youth clubs and after school activities, as the functional requirements of these buildings and facilities is comparable, used by the same group of users but at different times of the day.

- **Co-location** of offices and / or administration buildings for different departments or groups

- **Co-location** of functions such as libraries, community centres and other 'open' functions serving the local area

Part 1c; practical considerations to be managed when working with shared space

This section contains very little introductory text, and is mainly constituted by a list of practical considerations that must be managed when working with shared space, and the 5 examples listed are:

- **Time of use: S**hould the sharing take place simultaneously or in succession, and should the sharing be equal or should one or more users have "priority rights"?

- **Security / Access:** If the sharing is not available to all, but only pre-approved groups or individuals, how then should the access control be managed? ID cards, keys, passwords etc.? Furthermore, if a building for example, must be available to certain users at odd times of the day, how should the security be handled?

- **Differences in functions and needs:** If the different users of a space have different needs in relation to, for example, interior and storage how should this be handled?

- **Legislation**: If a building needs to be shared by for example a school and a day-care, there will be different regulatory requirements in relation to the two user groups which must be considered in the planning and design of the buildings and premises. A similarly dilemma could also arise if the sharing is taking place between a public and a private party and is important to consider in the planning.

- **Cleaning and maintenance:** When you have many different users of a building, room or facility, there is always a chance that 'everyone's room is nobody's responsibility'. Who is responsible if something breaks? Who is responsible for cleaning? What to do if the space is a mess when you arrive? etc. etc. etc. These are aspects of shared space that are necessary to have a plan for in advance.

Part 1d; introduction to the challenges to be managed when working with shared space
The last section introduces three main challenges to be managed when working with shared spaces, *territoriality, involvement* and *practicalities*, described by (Brinkø & Nielsen, 2016). The bullet points in the guide describe these three themes in more detail, and provide some information on why they occur and how they can be taken into account in the planning and construction process.

- **Territoriality**: Territoriality deals with the emotions and reactions that arise when transitioning from a situation of having one's own space to a situation with shared space, and the consequent loss of control following this transition. Several factors affect the degree of territoriality that will occur, and thus also the amount of time and energy that should be allocated to deal with it. Above all territoriality depends on the degree of sharing taking place; the more you have to share, the more likely it is for territoriality to occur, and the more important it will be to have a plan for how to cope with it. In addition to this, a pre-existing relationship with the other parties participating in the sharing plays a big role; the better you know the other parties the easier the transition to shared space will be. Last but not least, the location plays a role. The longer time spent at a given location, the stronger the feelings of territoriality are likely to be, and the more important it will be to address them.

- **Involvement**: Following the issue of territoriality, there is the matter of user involvement. As described above, there is a big difference between sharing with people you know and people you do not know, and in addition to this there is a significant difference between being "forced" to share and to be "participatory" in the decision to share. Engaging the individuals or groups having to change habits from having their own to having to share, can contribute to a greater understanding of each other, something which will have a positive effect in itself, but it can also create a feeling of having a say in the matter even if you have not had influence on the decision itself. There are countless ways in which users can be involved in the process, and the key is to identify which of these methods is best suited to a given situation and a given purpose, depending on the type of input and collaboration that is desired.

- **Practicalities**: There are a large number of practical aspects to be considered when working with shared space. Unlike traditional use, shared space involves multiple users from several

different organisations, each with their administration, financial situation, etc. A large part of these practical considerations are discussed in the previous section and will therefore not be described in depth here, but there are a few additions. There are basic logistics in relation to all aspects of ensuring that a building and its users function as optimal as possible. It is relevant in the project phase where the focus will be on the logistics of handling inventory and users in a possible transition phase, offering alternatives during renovations, providing information about the project and the process. It will be relevant in relation to providing booking systems, planning availability and use, maintenance, etc., when the room or the building is in use. There are considerations about cleaning, maintenance, administration, security, access, etc., and all these must be met in order to get from idea to realisation.

Part 2a-d; shared space step by step

These sections contain the introduction to the four different overall elements contained in the step-by-step figure following. The purpose with this is to create an overview and understanding of the elements that make up the establishment of a shared space from identifying potential to finished project, in order to secure that all elements in the process receive the necessary attention. The elements described are:

- **Portfolio level**: The first step in the process concerns the identification of potential locations for shared space at the portfolio level. For this step to be performed, it is necessary to collect a quite a bit of information concerning each building in the portfolio, and if the information is already present, it is necessary to make sure that it is up to date. The purpose of this is to create an overview of the property available, where they are located and in what condition they are in, after which a decision on which locations have a potential for shared space can be made on an informed basis. The overall focus is thus on collecting general knowledge of the buildings in a given portfolio, and on what information is needed in order to identify potential for shared space.

- **Pre-project**: In this next step in the process, the decision to develop a shared space in a specific building or group of buildings has been made, and the pro-project can begin, meaning the phase in the process where the framework for a specific project is decided. The purpose of this part of the process is to prepare a detailed description of the framework for the project by performing an in-depth study of the needs of users, buildings and organization to ensure an optimal situation for the transition to shared space. The overall focus is therefore on describing the basic project framework and to ensure a clear objective before establishing a shared space

- **Project**: After the basic framework of the project is decided, the next part of the process begins; the main project. This is where the transition to shared space is realised, and the overall focus is therefore on what activities are needed to ensure that the planned project is being implemented in a satisfactory manner

- **Post-project**: After completion of the main project and the shared space is realised, there still lies a task in evaluating if the purpose of the project and the desired outcome have been achieved as intended. The focus of this part of the process is to evaluate the measures undertaken and to examine whether the final shared space live up to expectations formulated for the project. Furthermore, it is also important in this phase to evaluate the lessons learned along the way so these can be incorporated in future projects in order to further optimise the process. The overall focus of this part is therefore on the stage after the project is completed, and on how to ensure that the intended use is realized and maintained.

The next part is the figure containing the necessary steps to be taken throughout the process, and this can be seen in the following.

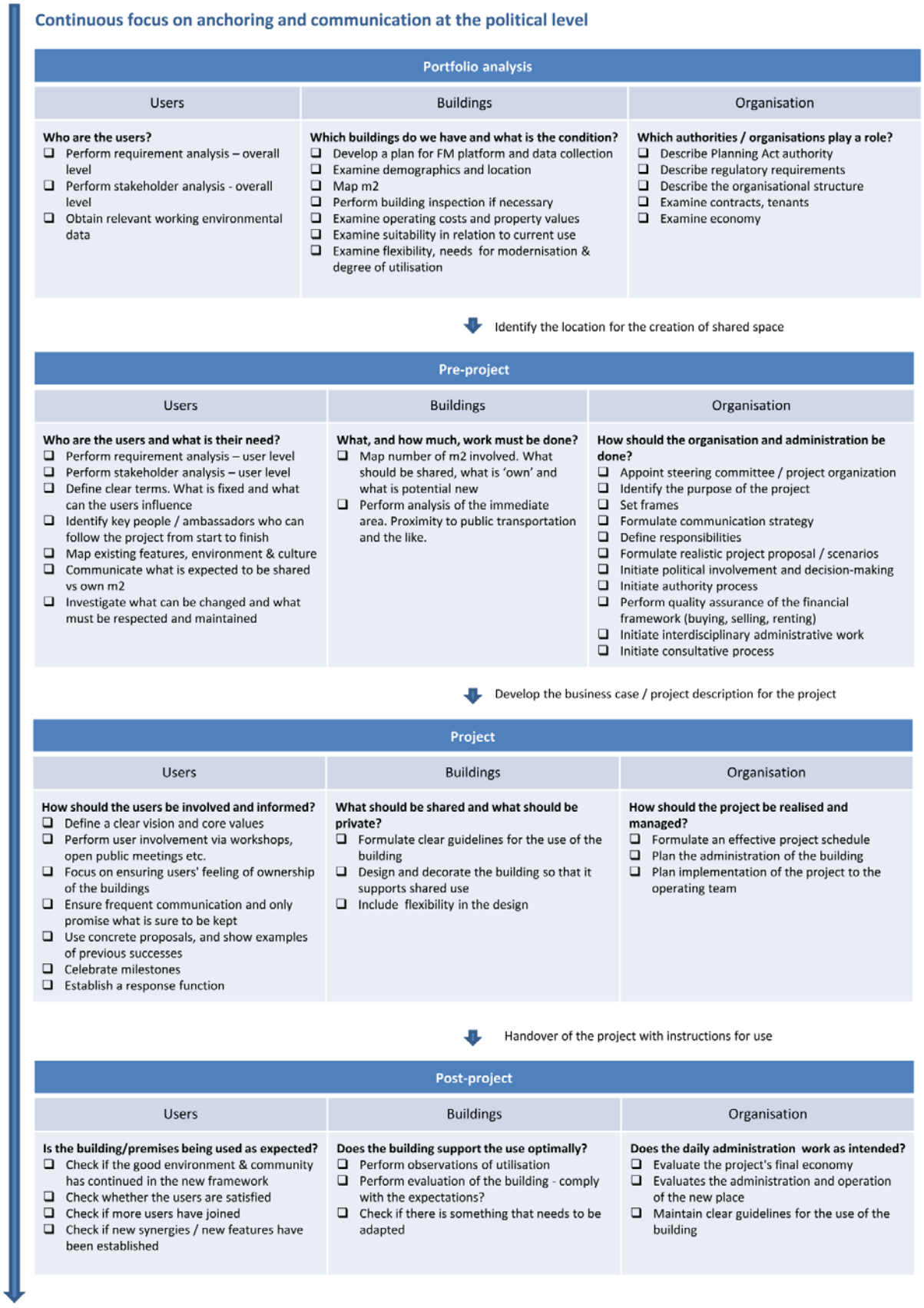


Figure 3: Main figure of the guide containing the steps from each element in the process

DISCUSSION AND CONCLUSION

The result presented in this paper is a guide to identifying potential locations for shared spaces as well as establishing one when a location has been chosen, and it is directed towards municipalities. The information contained in the guide has two main sources; the introductory texts consists mainly of information from previous studies on shared spaces, and the information contained in figure 3 consists mainly of information collected through a workshop with practitioners, as described in the methodology section.

The two main results from the workshop and subsequent development of the guide revolve around first of all a number of aspects to search for when trying to identify buildings or spaces where there could be a potential for establishing a shared space, and second on how to implement the change to shared space once a site has been selected. Beginning with identification for potential, the factors identified during the workshop are:

Identification of potential for shared space:

- Flexibility of the building or space in question
- Closeness to public transport
- General infrastructure in the area
- Capacity of the building or space in question
- Condition of the building or space in question (basic technical installations, building envelope, structural components, interior, modernisation needs)
- Regulatory requirements (existing contracts, existing tenants)
- Existing use of the building or space in question (type of building, type of activities)
- Financial situation (value of property, running and maintenance costs)
- Whether the municipality had other buildings or addresses in the area, either owned or leased

As described in the theory section (Dowall, 2007) and (Trojanek, 2015), among others, have presented work relevant for the motivation for public real-estate management and for screening for potential in relation to identifying potential sites re-development. The results presented in these papers support the findings from the workshop mentioned above.

Moving on to implementation of shared space, the factors identified and presented in the guide revolve around the following topics:

- Involve the future users and communicate continuously
- Consider the functional overlap of the people/groups who will be using the space
- Secure sufficient flexibility in the space so it can support the multiple users
- Consider the themes territoriality, involvement and practicalities

The themes of territoriality and involvement of uses are well-described phenomenons in literature and have been thoroughly researched in some of the work this paper builds on (Brinkø & Nielsen, 2015, 2016), and also presented in the theory section of this paper. As also mentioned in the theory section, the aspects of flexible working and agile workspaces, which are important elements in shared space and one of the key elements from the workshop, are described by a number of authors such as (Luck, 2015), (Bell & Anderson, 1999) and (Hewitt, 1997), not to mention the many guides on designing open space offices from for example (Duffy, Craig, & Gillen, 2011) and many others.

The guide presented in this paper draws not only on available literature but incorporates the practical knowledge and experience of practitioners and defines a number of more detailed steps that can be taken in practice, developing on the existing knowledge in the area and translating it to a practical tool

to be used municipalities. Yet, it is clear that the developed guide is just a guide—it is no magic recipe for success. One of the important messages of the workshops was that real estate decisions in the public sector are complex matters in which politics, power relations and the personal attitude of the people involved play a large role. In every day practice, the success and possibilities of sharing facilities are strongly dependent on the willingness and capabilities involved. A guide can help the involved stakeholders to get acknowledged with the concept and help them to plan the steps to take, but such projects will probably also need some 'pushing and shoving' or 'selling' to get all stakeholders on board.

LIMITATIONS AND APPLICABILITY TO GENERALISATION

In relation to practice there are a number of limitations connected with the guide. First of all it is important to note that the result presented is meant as a guideline, and all information will not be equally relevant for all shared space development projects. Furthermore it represents an idealised process, and during a real-life project some steps will most likely overlap while others will be the centre of either more or less focus than described in the guide, and there will also be the risk of the political establishment overruling the process.

Also; the guide has not yet been tested in practice, but based on the feedback from the workshop's participants we believe that the guide can make a practical contribution to the implementation of space sharing practices in municipal organizations. For ourselves, it is an important step in which we try to translate the insights of our research work to practical recommendations. This is not the purpose of research per se, but the field of space- and property management is inherently practical and we think that it is important for researchers to reach out to practice. A guide like this is a good example.

Furthermore; the guide as it is presented here is intended for use in a municipal building portfolio, but that does not mean that it is not applicable in the private sector. Public real-estate adds an additional layer of difficulty in the organisation and decision making process, but the main aspects of shared spaces and the use of these spaces will be the same. Equivalently will the themes territoriality, involvement and practicalities be equally relevant whether the organisational framework is private or municipal building portfolio. This means that with a relevant insignificant amount with work adapting the guide developed here; it will be usable within the private sector as well.

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Paper 5

Access over ownership: The case of meeting facilities in Lyngby Knowledge City (Nielsen & Brinkø, 2016)

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Access over ownership:
The case of meeting facilities in Lyngby Knowledge City

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Abstract

Background: *Collaborative Consumption*, *access economy* or the *sharing economy* are all terms describing the new fast growing business built on the sharing of resources and promoting access over ownership. It is a paradigm shift that has made it to the Times magazine list of the "10 ideas that will change the world". Within this overall paradigm, *shared space*, is also gaining grounds.

Purpose: The purpose of the study is to investigate the attitude towards shared space in an urban context with a particular focus on meeting facilities. To what degree is there an interest in sharing meeting facilities within a city or a municipality? The *Lyngby-Taarbæk City of Knowledge* is used as case, as this strategic collaboration on municipal level includes a vision of sharing facilities to stimulate regional development.

Methodology: The attitude towards shared space in the *Lyngby-Taarbæk City of Knowledge* is studied in a three-step qualitative research process. The first survey investigates the City of Knowledge's members attitude towards shared space in general with questions like, what are you most likely to share with others? And what would you like to gain access to? A workshop further explored motivations and practical needs. The second survey investigates in particular the attitude towards shared meeting facilities. The Brinkø Typology of Shared Use of Space and Facilities is used as the theoretical frame of the study (Brinkø et al 2015).

Results: This study show that the members of the *Lyngby-Taarbæk City of Knowledge* collaboration are very positive towards the concept of shared space, but more reluctant about sharing own facilities. A majority of the informants are often using externally owned facilities for meetings and events, and they prefer professional meeting facilities to schools, universities and sports facilities. This point to the need for buildings owners/operators to develop relevant service concepts, if a shared space strategy, should increase the use rate of existing buildings.

Conclusion and recommendations: The study show that in the *Lyngby-Taarbæk City of Knowledge* there is a positive attitude towards shared space as concept and as local strategy for gaining access to e.g. meeting facilities. The survey also demonstrates the member's experience of barriers, which suggest that there are practical barriers to overcome before access is more important than ownership, not only in theory, but also in practice.

Keywords: Facilities Management, property management, space management, shared space, sharing economy

Introduction

Collaborative Consumption, *access economy* or the *sharing economy* are all terms describing the new fast growing business built on the sharing of resources and promoting access over ownership. It is a paradigm shift that has made it to the Times magazine list of the "10 ideas that will change the world" (Walsh 2011). Within this overall paradigm, *shared space*, is also gaining grounds in real estate management and FM, as a way for individuals and organisations to gain access to facilities without owning them and without long term leasing contracts (e.g. Meel and Brinkø 2014; Brinkø et al 2015; Brinkø and Nielsen 2015; Kojo and Nenonen 2016; Rytkönen 2016).

Shared space is a concept that can lead to positive effects for multiple stakeholders. A user will be able to use a facility without owning the building or engaging in leasing contracts, but gain access to use a facility free of charge or for a fee for the access and use. From the perspective of a facilities manager, who has the task of ensuring a satisfactory use rate of a certain building or space, the shared space movement is a positive development which can help intensify the use of buildings that are perceived as underutilised. From a societal development perspective there is a deliberate agenda of creating lively and attractive urban environments which can stimulate cultural and economic innovation, and the increase of people using the facilities and the mix of user groups is a strategy for many innovation hubs.

From a sustainability perspective shared space holds a potential for a positive environmental effect. Especially if less new buildings are built because of shared space, then a significant environmental effect is avoided as building materials consumes resources, are energy demanding to produce and the building represents a potential waste problem once exceeding its operational phase (Cabeza et al 2014 and Nielsen et al 2016). Considering already existing buildings, the potential positive or negative effect of shared space, in relative and absolute terms, is more unclear. From a single-building perspective the environmental impact is likely to be greater due to intensified use, but this intensified use of one building should in theory be caused by less intensified use of several others, which then can be made available for other uses; leading to the possibility of fewer new buildings constructed. The effect will of course also be influenced by the condition of the buildings, meaning that if more use it moved from buildings with a poor environmental performance to buildings with a better one, this can push the effects in a positive direction, whereas the opposite is true if the use is moved from well-performing buildings to buildings with a lower environmental performance etc.

The purpose of the study is to investigate the attitude towards shared space in an urban context with a particular focus on meeting facilities. To what degree is there an interest in sharing otherwise private meeting facilities within a city or a municipality? The *Lyngby-Taarbæk City of Knowledge* in Greater Copenhagen, Denmark, is used as case, as this strategic collaboration on municipal level includes a vision of sharing facilities. The Lyngby-Taarbæk City of Knowledge being a private association and unique partnership between private companies, research and educational institutions, local authority, housing associations and citizens to ensure the city of Lyngby's continued growth through collaboration across traditional boundaries. Information about the Lyngby-Taarbæk City of Knowledge is available at www.vidensby.dk.

The Brinkø Typology of Shared Use of Space and Facilities is used as the theoretical background of this study (Brinkø et al 2015), and can be seen in Figure 1. It provides an overview of 4 types of shared space and a vocabulary for categorizing a case of shared space. Each type is characterised by *what* is shared, *when* (simultaneously or serial), *why*, by *who* and *how* is the sharing managed. 3 of

the 4 types are relevant with a focus on meeting facilities for events that are larger than a person or organisation can host at own premises. The type of sharing at the smallest scale, where you share specific facilities such as a desk or workspaces, are perceived not relevant in the case of this study. The three relevant types of shared space are:

- **Sharing several facilities in an open or semi-closed community**
  - Example: The facilities are a meeting room with reception, toilets, catering services etc. The space is open for the public to book and use, or if it is semi-closed, only to be used by certain members of certain organisations.
- **Sharing physical space in a building or a building in itself in a closed community**
  - Example: Two companies in the same building is sharing e.g. entrance, reception, cantina, and meeting rooms.
- **Sharing facilities between users in a network of buildings/organizations in an open, semi-closed or closed community**
  - Example: A network of companies in a city decided to open their meeting facilities for external users. If it in an open community, anybody can book the facilities. In a semi-closed it is only eg. members from the network or if it is in a closed community, it is only specific organisations and you cannot obtain the right to access e.g by becoming a member of the network.

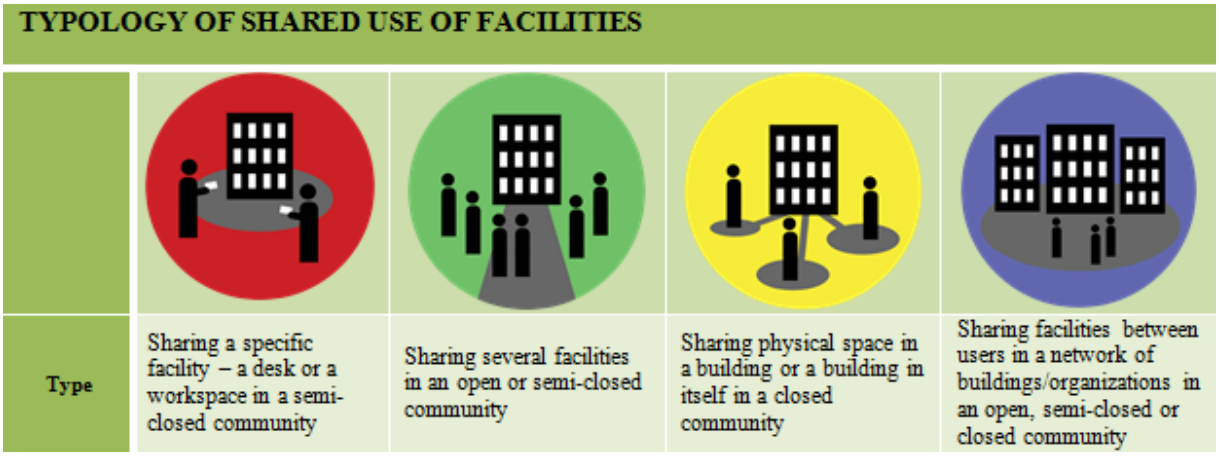

Figure 19: The Typology of shared use of facilities (Brinkø, Nielsen, & Meel, 2015)

Accommodation of space as well as monitoring and optimising use/vacancy is a classical task within Facilities Management as a management discipline (Alexander 1992 and CEN/TC348 2006). In contrast to researchers like (Kovacs 2012) and (May 2015) who perceives low use rates as an optimisation challenge which can be described and solved by mathematical means, we focus on the socio-technical conditions for changing the situation. In a change management perspective it is important to know the stakeholders needs and motivations, why stakeholders perceptions of needs, motivations, opportunities and needs are the focus of this paper.

In the following we centre the focus on sharing facilities, and in particular meeting and conference facilities, between member organisations of the strategic urban network collaboration the Lyngby-Taarbæk City of Knowledge. The purpose is to assess the potential for sharing space in the City of Knowledge by studying What is the members' motivation? What are eventual barriers? And how to organize the sharing?

Methodology

The current study is a part of the ph.d-study of "Shared Space in the City of Knowledge" by Rikke Brinkø, focusing on providing new knowledge on shared spaces and how space sharing can help achieve optimised use of the built environment and the resource our buildings constitute.

For the study presented in this paper, the attitude towards shared space in the Lyngby-Taarbæk City of Knowledge is studied in a three-step hermeneutical process, by use of surveys and a workshop. Questionnaires, or surveys, are as described by (Saunders, Lewis, & Thornhill, 2016) well suited for descriptive research, where the purpose is mapping attitudes, opinions and organisational practices, making it a well-suited method for the purpose of the study presented here. In addition to the information gathered via these surveys, a workshop, along the lines of focus groups as described in (Saunders et al., 2016), is used to acquire more in-depth knowledge about the participants views on a number of different aspects within the field of shared space, by "*encouraging interactions between participants as an effective means to articulate pre-held views"* (Saunders et al., 2016).

The three step process is structured as follows. The first step, survey 1, investigates the City of Knowledge's members attitude towards shared space in general with questions like, "what are you most likely to share with others?" and "what would you like to gain access to?" The survey was sent out in September 2014 to the 152 recipients of the Knowledge City's newsletter and 32 replies were received, giving a response rate of 21%. The survey consisted of a total of nine questions, six focusing on the subject of sharing and three on information regarding the respondents.

The second step, a workshop with the title "How can we become smarter at sharing?", was conducted as a part of a Lyngby-Taarbæk City of Knowledge members meeting in October 2014. 39 people from 21 different companies, municipalities and educational facilities participated in the workshop, where the findings from survey 1 was presented and used as a starting point to stimulate a discussion among the participants. The workshop was used to explore the circumstances around the results from the survey, to better understand how to overcome the barriers and utilise the motivational factors in order to improve the processes involved in establishing and working with a shared space. Questions such as "if only I knew …[?] about shared space" etc, was used to guide the discussion, and the results from the workshop was documented in a logbook, and later shared with the participants.

The third and final step is the second survey, survey 2, which was focused particular on the sharing of conference and meeting facilities. This survey was conducted in December 2015 and sent out to 64 recipients within the Lyngby-Taarbæk City of Knowledge and received a total of 44 replies, giving a response rate of 68%. It consisted of 10 questions in total, with eight focusing on meeting and conference facilities and two on information regarding the respondent.

Results

This paper presents the results of the before mentioned surveys and workshop. The main results from each of these data collection instances are presented, followed by a final summary of the key findings.

Survey 1: Shared space in Lyngby Knowledge City

The main results from survey 1 centre around four different aspects of sharing space;

- The overall attitude towards sharing in general?
- What facilities could be shared with others?
- What is the greatest obstacle for sharing?
- What is considered the greatest motivator?

What can be seen in Figure 2 is that while 73% are positive or very positive when asked how they feel about sharing space with others, only 10% are negative and none are very negative, 36% answer that they will not share anything when asked about specific possibilities for sharing.

The types of spaces/facilities that seem least problematic to share are support facilities such as bath-rooms, receptions etc.; the types of facilities that do not require any significant interaction between the different parties involved in the sharing, and still only 32% say that they would consider sharing these facilities. If we move to core spaces/facilities such as laboratories, offices, etc. the percentage of positive replies drop to between 24 and 28%, and if we look at support spaces such as storage etc. the positive replies drop even further to 20%.

When moving to motivators and barriers, 62% say that economy is the biggest motivator in sharing with others, and only 25% consider environmental considerations as an important motivator. 54% say that the limited availability following from shared space is the biggest obstacle, with the practical aspects involved; administration, access, security, cleaning and maintenance, following closely after.

Illustrations of the results can be found in Figure 2.

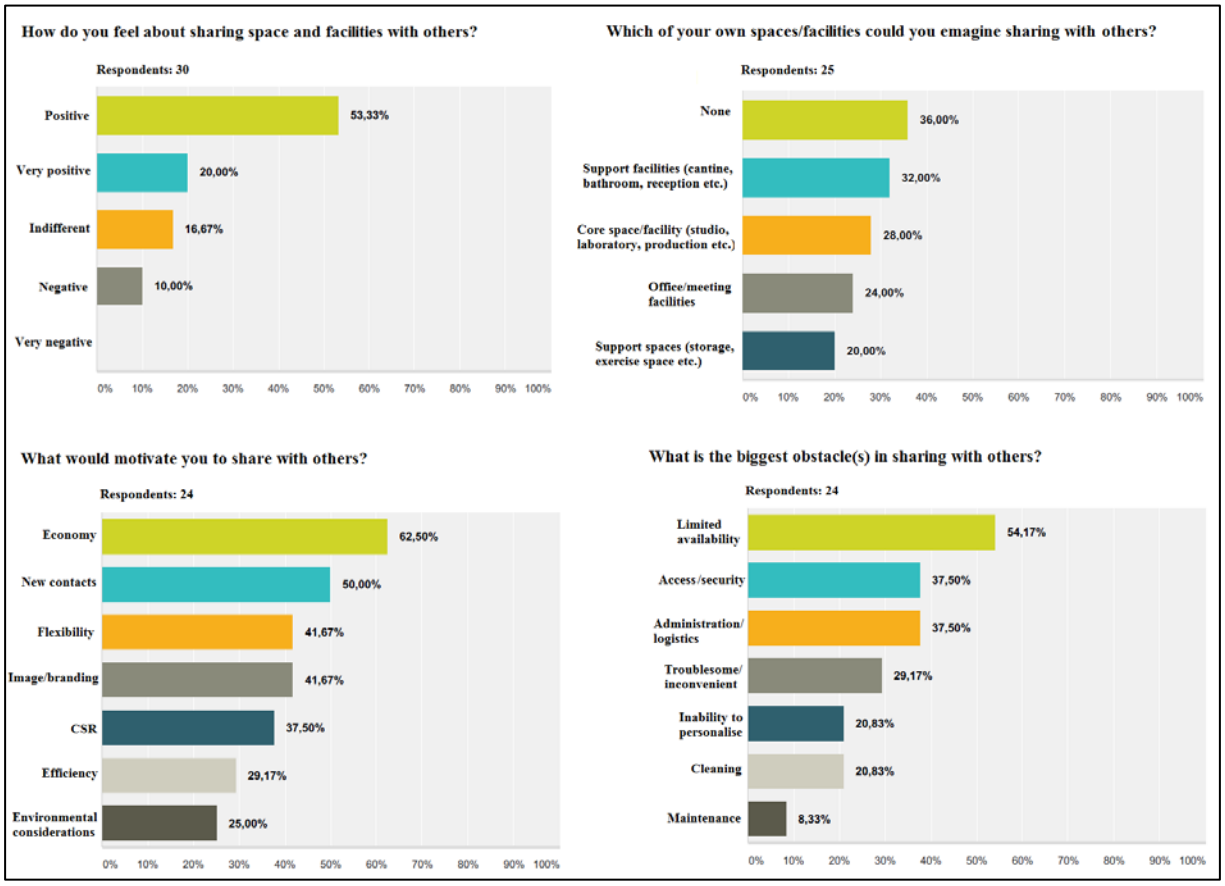

Figure 20: Four main results of survey 1: Shared space in Lyngby-Taarbæk City of Knowledge

Workshop: How can we become smarter at sharing?

The workshop, as mentioned, was conducted as part of a meeting for the Lyngby-Taarbæk City of Knowledge members with approximately 39 participants. The format was a poster containing the four main questions;

- **If only I could…?** To give the possibility to express visions and functions
- **If only I knew…?** To give the possibility to specify the need for information
- **If only I had…?** To give the possibility to identify means to facilitate the process of sharing
- **Shared space I don't believe in it.** To give the possibility to express critical concerns and scepticism

Participants were asked to discuss these in groups and write as many answers as possible to the questions on post-its and place them accordingly on the poster.

All posters and post-it's were collected in a large excel sheet, after which post-it's with similar answers were combined and the information condensed. From this a maximum of three main answers to each question were identified and collected in a single table summarising the main findings of the workshop. Among the results identified, clarity about the rules and regulations involved in sharing is singled out as one of the key problems with shared space in the current situation, and was mentioned in different variations under two of the four questions. The second issue identified as concerning actually finding possible shared spaces, and how to proceed with communications and facilitation of the sharing in practice.

Table 1 holds a summary of the collected answers to each question.

Nr.	If only I could…	If only I knew…	If only I had…	Shared space I don't believe in…
1	*If only I could…* merge city, university and companies at the local level … Then we would also get more people and knowledge	*If only I knew…* what spaces I already have and what is available 'out there'	*If only I had…* a system that could facilitate the sharing	*Shared space I don't believe in…* there is too much unknown regarding rules and regulations etc.
2	*If only I could…* Have access to an overview of the legislative and practical regulations involved - clear guidelines	*If only I knew…* where to find shared spaces	*If only I had…* help to achieve clarity concerning my actual needs and current situation	*Shared space I don't believe in…* will people be willing to compromise in the long run?
3	*If only I could…* have sufficient flexibility for a space to be adapted to many different uses		*If only we had…* better cooperation and communication across institutions	

Table 29: Summery from workshop: How can we become smarter at sharing?

Survey 2: Meeting and conference facilities in Lyngby Knowledge City

The second survey, Survey 2, was conducted by the Lyngby-Taarbæk City of Knowledge secretariat, and the main results centre on three different aspects of sharing external meeting and conference facilities;

- The need for external facilities
- The desire to use external facilities
- What type of external facilities are preferred when needed

What can be seen in Figure 3 is that 64% of the respondents are planning future events which they do not have they space to host themselves, meaning that they will have to go outside their own company to fulfil the spatial need. The second question builds on from this need, and when asked if they would use some form of external meeting/conference facilities in the city of Lyngby if offered, 47% replies with a positive response and only 22% replies no.

The last result presented is focused on the distribution of preferred and previously used facilities when planning events. What can be seen here is that using one's own facilities is by far the preferred choice with app. 45%, followed by external meeting/conference facilities with app. 35% and hotels with about 14%. At the other end of the spectrum schools/universities score a 0, and restaurants, sports facilities and other peoples/organisations facilities score 1-2%.

Illustrations of the results can be seen in Figure 3

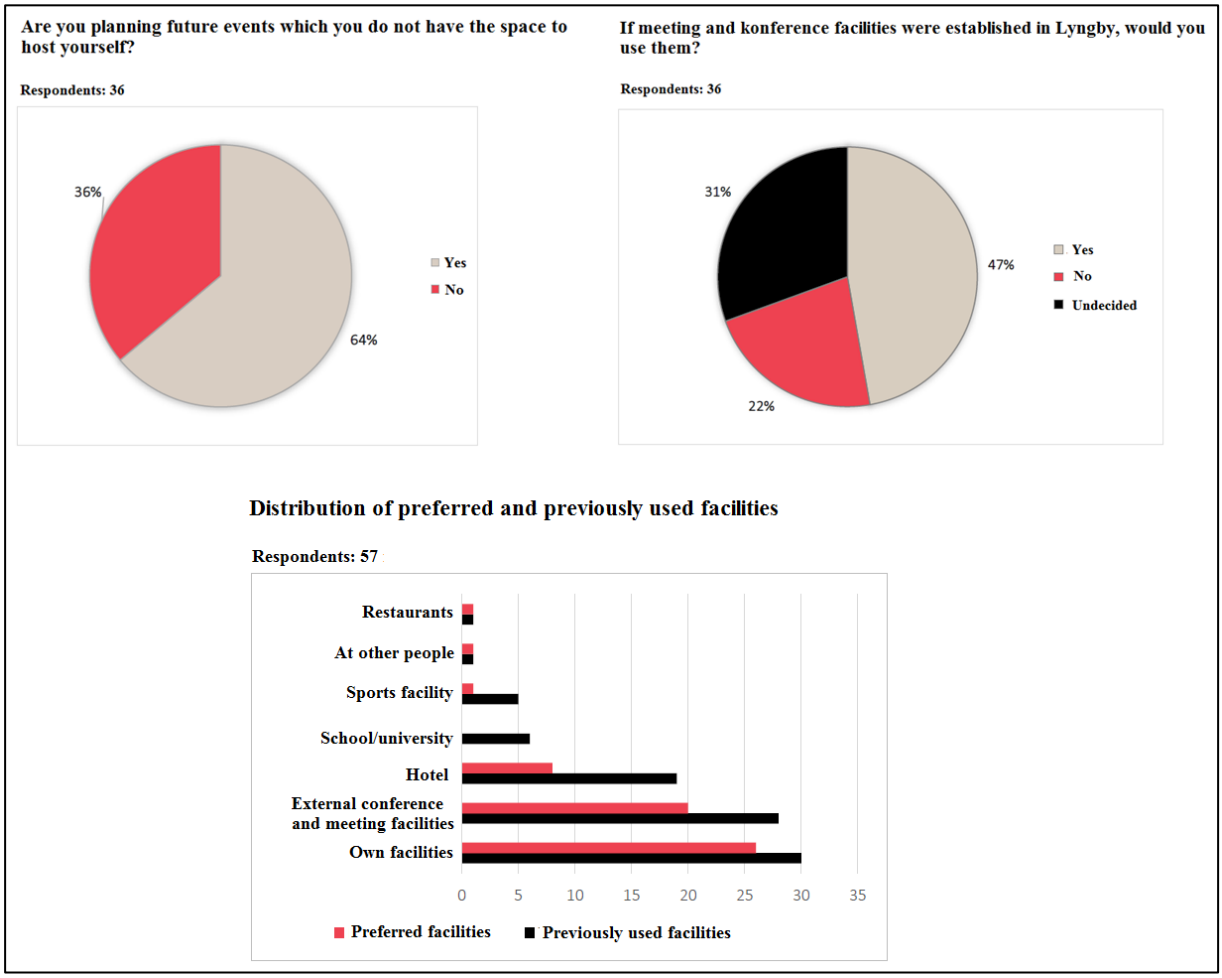

Figure 21: Three main results of survey 2: Meeting and conference facilities in Lyngby Knowledge City

Questions about service levels and specifications of quality or quantity were addressed in survey 2 only at the level presented above.

Discussion

The purpose of the study is to investigate the attitude towards shared space in an urban context with a particular focus on meeting and conference facilities, and the potential for sharing meeting and conference space in the City of Knowledge. Based on the three data collection initiatives and anal-

yses of these, a number of aspects concerning shared space and the sharing of meeting and conference facilities can be identified:

- The general overall result being that the members of the Lyngby-Taarbæk City of Knowledge initially are very positive towards the concept of shared space.
- There is a discrepancy between sharing in theory, where most are positive, and sharing in practice, where the informants become significantly more reserved.

This study is conducted in the Lyngby-Taarbæk City of Knowledge community which has collaboration and synergies as a common reference point. Compared to other cities and other contexts of building owners/event organizers we assume that if anything, our informants are more positive towards sharing space than others that have not engaged in a community like the City of Knowledge. However this has not been tested within the scope of this study. The economic context and the general access to space will also impact on the burning platform, where shared space can be seen as a strategy for intensifying the use of space, to stimulate innovation and to gain access to space without ownership or leasing contracts.

For other cities who, like Lyngby would like to stimulate collaboration and sharing in an urban context it is important to consider:

- What are the motivations for sharing?
- Are the practicalities in place or is there a need of systems and or organisations to facilitate information about available space and booking?
- How can the process grow from a need driven bottom up perspective, which is the spirit of the sharing economy?
- Building a collective vision of sharing might be a Sisyphus task, and is for sure an ongoing process. In Lyngby the knowledge city strategy is giving a shared vision, and sharing facilities is a step in realizing this vision.

During our studies we have found that it is the politicians in the municipality and the municipal FM organisations who are most keen on sharing their facilities to increase the use of the public buildings. In this respect our results are thought provoking as schools/universities/sports facilities are the least preferred space for organizing external meetings and conferences, compared to professional meeting and conference facilities or own space. Probably because the service level in the public buildings or at restaurants are perceived as too low and with insufficient standards regarding e.g. physical appearance, audio visual equipment, Wi-Fi, transparent costs and easy payment, catering, help at hand during an event, catering, and flexible rooms of various sizes.

One should also be aware that established commercial conference facilities providers are likely to fight against development like this as e.g. the established taxi companies sees Uber as a threat to their business. This has not yet been the case in Lyngby, but it is certainly a concern of some local stakeholders, and a concern that we understand in full.

Conclusion

The purpose of this study is to investigate the attitude towards shared space in an urban context with a particular focus on meeting facilities. The background was to intensify the use of buildings and in particular special facilities for larger meetings and conferences, as all buildings which are heated, cooled and maintained but remain largely underused over time are not environmentally or economi-

cally efficient and because giving others access to underutilised space can stimulate synergies, innovation and attractiveness of buildings and cities.

We found a positive attitude towards the concept of shared space. However, the survey particular on sharing of conference facilities showed a less positive attitude which leads us to conclude that the general attitude is positive towards sharing, but asked specifically about motivations and willingness to share, there is a less positive attitude.

This study show that the members of the Lyngby-Taarbæk City of Knowledge collaboration are very positive towards the concept of shared space, but more reluctant about sharing own facilities. A majority of the informants are often using externally owned facilities for meetings and events, and they prefer professional meeting facilities to schools, universities and sports facilities. This point to the need for buildings owners/operators to develop relevant service concepts, if a shared space strategy, should increase the use rate of existing buildings.

Acknowledgements

This paper could not be written without the professional collaboration with the Lyngby-Taarbæk City of Knowledge Secretariat and in particular CEO Caroline Arends and project coordinator Maya Yhman and the City of Knowledge members who organized the second survey and provided the setup for the workshop.

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Making more out of square meters. Shared space is a collective term for space and facilities that are shared between individuals or groups from different organisational contexts. This PhD thesis investigates the intricate processes concerning shared space in a facilities management context, and offers contributions to both academia and practice. With a base in literature and through thorough analysis of many different cases and other empirical data studied during the PhD project, the thesis offers a typology of shared use of space and facilities and a guide to developing shared space in municipalities.

The typology categorises shared spaces in three main categories according to degree of sharing, and lists a number of characteristics of shared spaces to provide a starting point for discussing, developing and working with shared space in both academia and practice. The guide on the other hand synthesises the theoretical knowledge resulting from the study in general, as well as the work having gone in to the development of the typology, and combines it with a number of practical steps to be taken to identify and realise the potential for making more out of square meters with a shared space strategy. The combined work shows that shared space at the same time can increase the utilisation rate of spaces and facilities and provide qualitative benefits for the users.

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