Stronger together

A study on increasing knowledge sharing between peers in business centres.

Anton Blomster

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Supervisor: Clint Heyer
Contact information

Author:
Anton Blomster
E-mail: anton.blomster@gmail.com

Supervisor:
Clint Heyer
E-mail: clint.heyer@mah.se
Malmö University, Faculty of Culture and Society (K3).

Examinator:
Anuradha Venugopal Reddy
E-mail: anuradha.reddy@mah.se
Malmö University, Faculty of Culture and Society (K3).
Abstract

This thesis investigates the knowledge sharing process between individuals working at companies located in business centres. Through literature review and user-centred approaches taken from interaction design methodologies, I find clear patterns indicating that knowledge sharing can create individual, organizational, communal and in the long-term also societal growth. Throughout this thesis project I examine knowledge sharing in the specific context of business centres and highlight motivations and barriers in this process. In doing so I find that motivations for inter-organizational knowledge sharing exists amongst the intended users, but that these motivations are seldom realised into action. This is shown to be greatly related to the lack of a digital presence that considers the barriers in knowledge sharing, which opens up for possible design solutions. The project concludes in a high fidelity prototype of a CSCW-platform with the goal of increasing the knowledge sharing culture by giving users a greater awareness over individuals in their near surroundings and new ways to connect with these individuals.

**Key search words:** Knowledge, knowledge sharing, knowledge management, knowledge sharing behaviours, business centres, CSCW.
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1 Introduction

Knowledge sharing is the process of individuals exchanging knowledge and in doing so creating new shared knowledge (Bock et al., 2005). This thesis explores the knowledge sharing process between individuals in business centres, and more specifically business centres located in Malmö, Sweden. The business centres in Malmö have a big impact on both Skåne’s (Veckans Affärer, 2017-04-11; Skåne Innovation system, 2017-04-11) and Sweden’s large innovation scene, which is considered to be one of the worlds top ecosystems for innovation (Business Insider, 2017-04-11). Efforts by administrators of business centres, in educational- and networking events like talks, lectures, workshops and get-togethers for people in the business centres make them good environments for companies and start-ups to grow alongside other businesses. The spaces themselves also create opportunities for both planned and serendipitous meetings between individuals and companies which in many ways can contribute to the growth of entities inside these communities but also create societal benefits, given the impact that these business centres have on Sweden’s innovation scene.

The already existing inclusiveness, innovation and will to share in these environments is what has inspired the exploration in investigating the possibilities of making the situation these business centres even better, from an interaction design point of view.

1.1 Background

An increasing amount of research is conducted towards knowledge sharing, but a limited quantity of this research is conducted from an inter-organizational perspective (Weijs-Perrée et al., 2016). Companies and organizations are on the other hand more commonly choosing to have their offices in business centres because of the opportunities and services the facilities offer (Weijs-Perrée et al., 2016). One of the most valued aspects for members of business centres (people who work in a business centre) is the opportunity for social interaction and knowledge sharing through shared services or facilities. (ibid., 2016). The benefits of knowledge sharing are many. Researchers say that it can “strengthen innovation, identify new business opportunities, obtain resources and strengthen the
competitive force in the market” (Weijs-Perrée et al. 2016). In addition, Ipe (2003) writes that there are connections between organizations with a knowledge sharing culture, better corporate result, shorter amount of time from idea to production. Since knowledge is strongly connected to the individual (Alavi & Leidner, 2001), in the end it comes down to the person’s motivation to share knowledge. Deci & Ryan (2000) writes that individual motivation can be into two categories, *intrinsic*- and *extrinsic* motivation. Intrinsic being the motivation to share knowledge because the act in itself is found interesting or gratifying, and extrinsic motivation referring to the incentive of sharing knowledge because of the outcomes in form of opportunities or values (ibid, 2000). These motivations vary and with them the outcomes of knowledge sharing actions (Van den Hooff & de Ridder, 2004). Bock et al. (2005) lists three levels of motivational forces particularly correlated to an individual’s extrinsic motivation; *individual benefit* – self-interest, personal gain; *organizational benefit* – organizational gain, organizational commitment; *group benefit* – reciprocal behaviours, relationships with others, community interest. With the importance of the individual in relation to a functioning knowledge sharing culture, the exploration conducted in this thesis has had a user-centred approach.

While there is extensive research on the importance of managing knowledge, the research conducted on how to do this is not that large (Ipe, 2003). There are existing platforms for sharing knowledge, although not explicitly with the purpose of inter-organizational knowledge sharing. Computer-Supported Cooperative Work or CSCW, is a term that often refers to digital software which aim to facilitate processes with outcomes that is best reached by working together with others (Grudin, 1994a). In this thesis I investigate how these types of software are used in business centres today and with grounding in literature and field studies, present a proposal for a software partially informed by CSCW, in combination with a public display.

### 1.2 Delimitations

My field work is limited to business centres in Malmö, Sweden, and more specifically Media Evolution City and STUDIO. This implies that further testing is needed to know
how well the design proposal in this thesis would be implemented in other business centres. The empirical research from Weijs-Perrée et al. (2016) conducted in 53 business centres in The Netherlands makes drawing connections between the contexts easier. But we can still assume the outcomes of this concept outside of the place specific context in question without additional evaluation.

1.3 Target group

The chosen target group for this thesis work consists of individuals working at companies located in business centres. To define the term business centre, I refer to Weijs-Perrée et al. (2016): “A business centre is a building where office space is offered to multiple organizations.”

1.4 Purpose

The purpose of this thesis is to, by using interaction design methods, investigate what the knowledge sharing process between individuals working in business centres looks like, and what the motivations and barriers for sharing knowledge are for these individuals. By doing so, the goal is to find gaps that open up for possible design solutions that encourages a knowledge sharing culture. With the use of a digital platform that takes both barriers in knowledge sharing and opportunities of business centre facilities into consideration, the outcome of the proposal in this thesis has the potential of creating individual, organizational, communal, societal value.

1.5 Research question

*What are the properties of a software, developed using interaction design methodologies, which aims to increase knowledge sharing between individuals working at companies inside business centres?*
2 Theory

2.1 Knowledge sharing

Davenport’s and Prusak defines knowledge as following (1998):

\[A \text{ fluid mix of framed experience, values, contextual information, and expert insight that provides a framework for evaluating and incorporating new experiences and information. It originates in and is applied in the minds of knowers (p. 5).}\]

Alavi and Leidner’s definition of knowledge further untwines the individual information (2001):

\[\text{Information possessed in the mind of individuals: it is personalized information (which may or may not be new, unique, useful, or accurate) related to facts, procedures, concepts, interpretations, ideas, observations, and judgments.}\]

Both of these definition refers to some sort of personalized information stored in the minds of the knowers and mentions that knowledge is closely connected to the individuals that holds it. Grant (1996) explains, that this is also the case with knowledge inside companies and organizations. The author claims that the knowledge is not possessed by the company itself but by it’s employees. It is therefor not surprising that there is a growing focus on knowledge from a business point of view (Weijs-Perrée et al, 2016; Ipe, 2003; Bock et al, 2005). Ipe (2003) states that knowledge has always been an important aspect to the successfullness of a company, but through the last decades has started to be seen as the most important resource for organizations and the key source for competitive advantage. The author further explains that the recognition of this fact makes it clear that a need to be able to share knowledge and thereby create a larger collective knowledge base is prominent.
Van den Hooff & de Ridder (2004) defines knowledge sharing as “…a process where individuals mutually exchange their […] knowledge and jointly create new knowledge”. In addition, they mention that this process is fundamentally important to be able to translate individual knowledge into collective knowledge. The knowledge sharing procedure is done through “knowledge donating”, which is the process of communicating one’s intellectual property and “knowledge collecting” which is done by consulting others with the goal of learning from them (ibid., 1998).

Several authors express the benefits of a knowledge sharing culture inside an organization. Weijs-Perrée et al. (2016) cites Stam et al., they write that it can “strengthen innovation, identify new business opportunities, obtain resources and strengthen the competitive force in the market.” Ipe (2003) states that there are also connections between organizations with a knowledge sharing culture, better corporate result and a shorter amount of time from idea to production.

The research about sharing knowledge from a business perspective is almost exclusively conducted in a setting with subjects being large organizations in single tenant buildings, apart from the research of Weijs-Perrée et al. (2016) that was focused towards business centres. Their research is reviewed in section 2.1.1. There is on the other hand a reoccurring notion that knowledge sharing outside organizations is beneficial for both the individuals and the organizations. Several authors also claim that inter-organizational (outside an organization) knowledge sharing plays an important roll in successful knowledge sharing structures (Weijs-Perrée et al., 2016; Ipe, 2003; Du et al., 2007).

2.1.1 Knowledge sharing in business centres

In late 2015 researchers Weijs-Perrée et al. (2016) collected data concerning networking behaviour and knowledge sharing from 268 members of 53 business centres in the Netherlands.
The result from their research showed that the amount of knowledge that was being shared, was strongly related to the networking behaviours of the individuals inside the business centres. The frequency of interactions with individuals had an impact of how much knowledge was shared and the characteristics also influenced who the knowledge was shared with. People that were more open towards sharing knowledge with colleagues inside the company was also proven to share more knowledge with other people in the business centre outside of the company they worked in. This correlates with their findings that people who identified themselves with personal traits like “extraversion” and “creativity” were also more common to have larger networks. In correlation with this they would also more often donate and collect knowledge with other individuals in the business centres (ibid., 2016).

Weijs-Perrée et al. (ibid., 2016) also mentions the pattern of limited information about knowledge sharing inside business centre communities, and how it does not reflect the amount of research conducted towards intra-organizational knowledge sharing. But they do see connected areas of importance for knowledge sharing in organizations inside and outside business centres. They also mention that a growing amount of organizations choose to work in business centres. This can be connected to the authors’ claim that “one of the most valued aspects for members of business centres is the opportunity for social interaction and knowledge sharing through shared services or facilities” (ibid., 2016). They explain this claim by mentioning the importance of inter-organizational networking (Weijs-Perrée et al, 2016):

*There is a growing body of evidence that demonstrates that a network of relationships and interactions enables individuals and organizations to find new information and solve problems. For organizations, it is not only important to share knowledge and network within the organization, but also to acquire knowledge from and develop ties with people from other organizations.*
In addition, they explain that knowledge sharing outside of an organization is a crucial part in getting access to new and unique knowledge. They go on to say that the most effective way to share knowledge is through “informal face-to-face interactions”, which also builds another critical aspect in knowledge sharing: trust. (ibid., 2016). Thus, the use of network ties and interactions with these connections are key aspects towards knowledge sharing between individuals or groups (ibid., 2016).

2.1.2 Motivations for sharing knowledge

Bock et al. (2005) claim that the knowledge sharing culture is greatly influenced by the individual’s motivation for sharing the knowledge they possess. The motivations for both knowledge donating and knowledge collecting can vary, which also affects the outcomes and effects of the knowledge sharing process (Van den Hooff & de Ridder, 2004). Deci & Ryan (2000) distinguish two separate forms of motivation based on the individual’s goals for the outcome of the knowledge sharing process. The authors make a distinction between intrinsic- and extrinsic motivation. Intrinsic being the motivation to share knowledge because the act in itself is interesting or gratifying, and extrinsic motivation referring to the incentive of sharing knowledge because of the outcomes in form of opportunities or values (ibid, 2000).

Bock et al. (2005) claim that we cannot force people to share knowledge, but only encourage and facilitate this culture by making the benefits clear, and thereby increasing their motivational incentives. The authors further list three levels of motivational forces (ibid, 2005):

- **Individual benefit** – self-interest, personal gain.
- **Organizational benefit** – organizational gain, organizational commitment.
- **Group benefit** – reciprocal behaviours, relationships with others, community interest.
2.1.3 Barriers for sharing knowledge

There are many dependencies for getting a knowledge sharing culture to work and there are even more barriers that has to be tackled to be able to solve these dependencies (Riege, 2005). Riege (2005) divide these barriers into three sections, *individual*, *organizational* and *technological*. The individual barriers are often seen as one of the most fundamental category of barriers for knowledge sharing (ibid, 2005), since the knowledge itself is stored at a personal level (Grant, 1996). Riege (2005) lists some of them being low awareness of the benefits of a knowledge sharing culture, lack of time to share and a lack of trust towards the recipient. Davenport & Prusak (1998) also mention that one of the biggest individual limitation in knowledge sharing cultures is not knowing who to ask. Nahapiet & Ghoshal (1998) also illuminates that a limited social network inside the work environment has a significant impact on not finding the right person in the knowledge sharing process.

Riege (2005) explains that some of the organizational limitations are lack of leadership communicating the benefits and values of the knowledge sharing culture, internal competitiveness inside business units, a limiting physical environment and layout of workspaces. In addition, Riege (2005) lists some of the technological barriers for knowledge sharing as a lack of integration of IT systems and processes, lack of compatibility between other systems, reluctance to use IT system due to lack of familiarity and experience with them, lack of communication and demonstration of the advantages of the system.

The context of this thesis is knowledge sharing within business centres, which means that theory from an intra-organizational perspective (knowledge sharing inside an organization) is in some cases not directly translatable. The field studies of this thesis is therefor meant as a method for overcoming this issue. In section 4.1.5 I list some resembling aspects between intra- and inter-organizational knowledge sharing.

2.2 Computer-Supported Cooperative Work

Computer-Supported Cooperative Work or CSCW, is a term inside the Human-Computer Interaction spectrum that was coined in the mid-eighties (Grudin, 1994a). It emerged as a
response to the need for collaborative work between employees or groups in multidisciplinary fields of organizations (ibid, 1994a). CSCW is a term that includes a range of digital solutions for work that in some way has a cooperative aspect, ranging from platforms and programs from an individual to an organizational perspective (ibid, 1994a). Labels of CSCW-platforms vary and the term Groupware is often used as an alternative (ibid, 1994b). Grudin (1994b) lists some key examples of CSCW/Groupware: desktop conferencing, videoconferencing, co-authoring features and applications, email, meeting support systems, voice applications, workflow systems, and group calendars.

One core dimension of CSCW is Awareness (Dourish & Bellotti, 1992). Dourish & Bellotti (1992) define awareness in the context of CSCW as “an understanding of the activities of others, which provides a context for your own activity”. They write that awareness is central in activities of sharing information and continues by highlighting the fact that awareness information is always required when organizing or participating in group activities, regardless of the task domain (ibid., 1992). The authors (ibid., 1992) point out that CSCW-systems have various ways of supporting awareness but that one of these mechanics is informational. The informational mechanics provide a digital space where users can inform each other of their roles or activities. They do also mention that it is up to the individual to supply the information to information systems supporting awareness and that the effort in doing so is repaid to the whole group, in contrast to only the individual (ibid., 1992).

The proposal in this thesis is a software accompanied by a public display partially informed by CSCW.

**2.3 Related design examples**

The CSCW-field includes a wide variety of concepts and products focused on building or increasing knowledge sharing culture in organizations and communities. In this section I list three related design examples that are either used by the business centres studied in this thesis or have inspired the final concept.
2.3.1 Pinpoint

Pinpoint is a concept of a computer based visualization tool made by Gunnar Forsén, Thomas Lundin and Jonas Löwgren, for individuals in large organizations. By using a tag system of the employee’s expertise and interests, the program shows the user a three step interactive 3D-visualization of 60 of the user’s colleagues, ranging from the most relevant to the least. The user can click through the employees to learn more about the people in the organization, see their contact information and save their contact cards for later use (Löwgren et al., 2009).

This concept offers a new way to visualize and find colleagues based on aspects that might be relevant to the user. It creates an awareness of a certain group of people that can later create a stronger social bond between the most closely related employees of a company, but does at the same time exclude other colleagues based on the way the program’s algorithm interprets the tags. This creates a filter bubble that is not left up to the user which in short term can spark new connections but might over time limit the spectrum of people employees interact with. Pinpoint represents colleagues in the platform as illustrations of figures (see figure 2.1) and only after the user clicks on a figure a picture of the colleague is shown. This visualisation creates both challenges and opportunities. It hides some of the
visual representation found in an actual physical equivalent of the organization, which might make the process of getting to know your colleagues more time consuming. On the other hand, this does put the focus on the capabilities of a person rather than their appearance.

The illustrations come in a variety of four male figures and four female figures, all rather thin and tall. In their paper about the project they explain that this design decision was made to not get an overwhelming visual complexity (Löwgren et al., 2009). This choice could create problems from an ethical standpoint in body generalization, having to choose a gender and being represented as a character that not necessarily relates to who you are. The developers do not seem to have taken this into consideration.

Pinpoint has inspired parts of the proposal in this thesis by opening up possibilities for visualization and connection between employees, which has been applied in the context of business centres.

2.3.2 Twitterspace

Twitterspace is project made by three students from Indiana, which aims to create an awareness of members and events in a community, using a non-interactive public display placed in a common area of the community. The display collects and displays messages from the community members Twitter-feeds to make people aware of what is going on in
the community. Their goal was to create a “community-at-a-glance” experience to enhance community awareness and engagement in their school environment (William et al., 2008).

This project has a non-intrusive way of enhancing community awareness with the help of the already existing social network Twitter. It creates a new and public way for people to reflect about their community. The use of Twitter does create an easier on-boarding phase for users already using the social network, but also brings challenges. Only people with Twitter can partake and anything can be posted disregarding of the falsity or explicit nature of the message. The way the display collects Twitter-messages makes it possible for anyone, including people from outside of the community, to get their message displayed on the screen. Since Twitter does not require you to use your own name or photo it also creates a distance between the digital to the physical community.

The thought of creating an awareness through this sort of “community-at-a-glance” as a way to make people reflect over their community has deeply inspired the use of a public display in the final design proposal of this thesis project.

2.3.3 Yammer

![Figure 2.3 Yammer]
In this thesis the communication platform Yammer is mentioned. It is a digital platform made for communication between employees of an organization, and gives the users the possibility to chat or share files in public-, private- or external groups, available for desktop and mobile (Yammer website, 2017-04-11). This software is used as an internal communications platform in one of the business centres studied in this project, where they have applied the technology developed for intra-organizational communication into the inter-organizational setting of a business centre. The platform makes it possible for people inside and across companies in the business centre to communicate via chat and through different sized and targeted forum-based groups. As the platform’s main functionality is digital communication it has a limited functionality in representing, listing and finding information about other members that might be of interest to the user. This could potentially limit the encouragement for knowledge sharing through physical meetings. A benefit of this platform is that it only focuses on the office setting, something that many other communication tools do not. Unlike Facebook, which is also used in some business centres to create groups for communication between all members, Yammer is not intended to be used in a private setting which is a good way of separating the users work and social life.

Yammer applies a freemium business model. This creates a good way for organizations to test the platform, but for further customization and administration features there is a monthly fee of 3$ per user per month. The ability to test out a product before investing a large amount of money in it is a clear benefit for many organizations. But as with all communication system it is critical to push people to adopt the usage of it after testing. Without motivating employees, it can be hard to have a successful implementation, as seen in the business centres studied in this thesis.
3 Methodology

The methods chosen in this project are taken from the field of interaction design. These methods have an exploratory and qualitative approach, to get a deep understanding of the context that the concept in this paper is designed for.

3.1 Design process model

The design process model that has led the work during this project has been greatly inspired by the IDEO Design process. IDEO is a global design company and they describe their work process as follows (IDEO website, 2017-04-01):

We’re mission-driven designers who are looking to have as much impact as possible in the lives of [our clients]. [The process] starts with getting to know the people we’re designing for. Without them, we wouldn’t know what to design, how it should work, or why it matters. From there we build, test, and iterate until we get it right.

Figure 3.1 IDEO Design process

The model consists of three key phases: Inspiration, Ideation and Implementation and also includes how the scope of one’s design space diverges and converges during these phases. The following description is my own interpretation of this model and how I have implemented it into this thesis project.
The *Inspiration* phase is directed towards gathering as much relevant information over the topic of interest as possible. This serves as a way to get a clear understanding of the context and target group that is being designed for and in this way finding problem areas or ways of improving how things are done today. In this thesis project this phase included literature review, benchmarking, interviews, observations and guided tours.

The *Ideation* phase is the iterative process of coming up with proposals for design solutions to improve the situation or solve the problems found when analysing the finds from the inspiration phase. This phase included brainstorming and exploratory sketching.

The *Implementation* phase is final stage in the design process, where the focus lays on realising the final design. This phase included flowcharting, wire-framing, prototyping and user tests.

### 3.2 Literature review

Muratovski writes that “the most important thing about literature reviews is that they are meant to provide yourself and the reader, with a picture of the state of knowledge in the field” (2016, p. 32). Which is why this is the initial method used to get an understanding of the field that this paper investigates. This method includes gathering and using data and information that previous researchers in the field has collected, recorded and analysed (ibid, 2016, p. 32) The collection of reviewed literature in this paper aims to acquaint not only myself but also the reader with how previous research connects, but also give grounding towards the continued research and design work conducted throughout the process of this thesis.

Muratovski claims that “a good time to stop reviewing is when you come across repetitive patterns of information” (2016, p. 32). I find this advice very general and highly dependent on the field in which the review is conducted. The field of knowledge sharing consists of research which often correlates and repetitive patterns can be seen after a limited amount
of literature review on the topic. This statement was therefore hard to apply to the literature review connected to this paper.

To help organize the literature I have collected I have made use of the reference manager program Mendeley.

### 3.3 Benchmarking

Much like literature review, benchmarking is a method used to gather information about what has previously been done in the chosen context and is therefore helpful in the process of finding gaps, problems and improvements. This method is a way to gather data by looking at other products or concepts, to find inspiration, consider other perspectives of designs and thereby also finding other solutions (Preece et al, 2011, p. 363).

### 3.4 Interviews

In this thesis, interviews have been a corner stone in getting insight into the target group that I am designing for. Different interview techniques, structures and focus areas have been applied in diverse settings to get the most relevant information out of the interviews conducted in this project.

Doing a dry run of the interviews before conducting them with the intended participant helped to illuminate problems and improvements in how the questions were phrased or structured. In many cases this had an impact in how the scripts were rewritten. This was done by holding the interviews with people outside of the planned context, for example friends or classmates and in doing so making it easier to see flaws in them (Goodman et al, 2012, p. 184).

*Unstructured* interviews were held in the early stages of the inspiration phase to get a sense of the situation this project was going to take place in. Exploratory interviews, structured more like conversations about broader topic of interest, were held in a social setting with
people connected to the intended context of the project. With open, more general questions complimented with requests of clarification (Muratovski, 2016, p. 60), this approach was intended to create a discussion with no particular expectation about the content of the answers (Preece et al. 2011, p. 228).

*Semi-structured* interviews were conducted with a basic script to guide the interview towards a topics of importance. After each question additional follow up questions were introduced to probe the interviewee to say more about the subject until no new relevant information appeared in the conversation (Preece et al, 2011. p. 230).

*Structured* interviewing techniques have been used during digital correspondence to gather specific information about a certain topic. The questions in these interview settings were straight forward and required little to no probing, as they took place in an almost questionnaire-like manner. In contrast to the other interview techniques, the use of closed questions can serve a purpose if the goal of these are clear (Preece et a, 2011, p. 229). Since this technique limits the possibility of further clarification and discussion (Muratovski, 2016, p. 61), the use of structured interviews was kept to a minimum.

In all of these interview settings, the phrasing and structure of the questioning has been made to lead to answers as non-biased as possible. This meaning that they were written in a way that would not influence the interviewee to answer in any specific way, without an intended outcome that would be preferable for this thesis. Goodman et al (2012, p. 130-132) argues that there are always previous assumptions about how the interviewee is going to answer the questions and being aware of these assumptions and expectations makes avoiding them easier. This can lead to more honest and better directed answers.

The data recording methods for these interviews consisted of audio recordings with an addition of taking digital or handwritten notes. While using methods like this for recording data, it is imperative to consider the interviewees privacy (Muratovski, 2016, p. 63). Permission to audio record the interviews was asked and the offer to participate anonymously was added to make the interviewees feel as comfortable as possible.
Recording, taking notes and transcribing the interviews was of great help while analysing the content and extracting quotes.

### 3.5 Observations

Observations (also called “Fly on the wall”) is a method where data is gathered by observing people within their context, without interfering with peoples’ activities (IDEO Method Cards). In doing this patterns and themes about the target group in question can arise. This kind of visual research can give wide variety of results concerning the people that inhabit a place and how they engage with a particular environment (Preece et al, 2011, p. 273; Muratovski, 2016, p. 64-65). Muratovski (2016, p. 64) writes that places often have the power to influence people’s behaviour, which is highly relevant when researching something so place specific as how people interact with each other in business centres. Using place specific observations has been very useful in identifying patterns on how employees interact with their environment and each other.

#### 3.5.1 Guided Tours

Accompanied by people from the administration teams of the project-relevant spaces, guided tours of these business centres have been made. This included walkthroughs of the facilities with added information about the spaces from the tour guide. In combination with observations this can provide a deep insight into the place specific context and how it influences the behaviour of the users (IDEO Method Cards).

### 3.6 Sketching

Preece writes (2011, p. 416) that sketching or writing down squiggles or words can help the designer to focus on what is going to be designed. Preece (2011, p. 416) further mentions that while doing this, the designer will be actively exploring the functions, interactions and details of the product and even if not thinking about it, making choices in the design taking it further. This method has been used continuously throughout the project,
not only as an explorative function but also as a way to communicate ideas and designs to evaluate them in an iterative manner.

3.7 Prototyping

Since interaction design is often a very iterative process, the best way for users to evaluate designs is to interact with them (Preece et al., 2015, p. 331). Prototypes are useful when conducting user tests since they don’t have to include a working software, especially with paper prototypes that are also cheap and often fast to produce (ibid., 2015, p. 331). Similar to sketching, paper prototyping can be used in an explorative way to quickly visualize interaction design concepts. By rapidly sketching layouts, design decisions can be tested and evaluated without the need for more time consuming ways of prototyping, which are in many cases also harder to iterate on (IDEO Method Cards). Prototypes can also be divided into groups of fidelity. A Low-fidelity (lo-fi) or High-fidelity (hi-fi) prototype has different advantages and disadvantages. Lo-fi often means cheaper and less time consuming to develop, while not having the feel or function of a hi-fi prototype (ibid., 2015, p. 395).

3.7.1 Flowchart

This visualization method is good for testing out nonlinear flows in for example interface designs. By mapping out different stages of a process and drawing paths between them, flowcharts can help in mapping out different scenarios in designs and highlight issues that the project must take into consideration (Goodman et al., 2012, p. 444).

3.7.2 Wireframes

Wireframes are lo-fi sketches or visualizations of interfaces. They are often used for testing functions, design decisions or flows. Much like sketches, wireframes are beneficial in an iterative design process (Preece et al., 2015, p. 450).
3.8 User testing

The goal of user testing is to develop a certainty about the usability of the product in relation to the intended target group. This is done by collecting data from users often asked to carry out a task using the prototype or product (Preece et al., 2015, p. 475). In addition, Goodman et al. (2012, p. 367) mentions that user tests can quickly reveal vast amounts of information, regardless if the prototype is hi-fi, lo-fi, functional, mock-up or just paper. Another benefit of user testing is to see if previous assumptions about how users will understand a prototype hold true (ibid, 2012, p. 367). A technique for generating more quantifiable data is to ask the participant to think aloud while carrying out task. In many cases this reveals underlying information that is often more tacit than by only observing the participant. This also makes the participant more prone to reflection about their own actions (Preece et al., 2015, p. 475). Goodman et al. (2012, p. 368) lists four main types of usability testing and when to use them:

- **Exploratory** - test preliminary concepts and evaluate their promise.
- **Assessment** - test features during implementation.
- **Comparison** - assess one design against another.
- **Validation** - certify that features meet certain standards and benchmarks late in the development process.

Exploratory-, assessment- and validation-tests have been conducted in this thesis.
4 Design process

The final concept is deeply connected in the gaps and findings seen while using the previously mentioned methods. During the literature review of this thesis I found a limited amount of research directed towards knowledge sharing within business centres, compared to literature from an intra-organizational perspective. Since we must assume that there are differences between the two, field studies have had a big part in investigating the differences and similarities among them.

4.1 Interviews

Since the emphasis of this thesis is the knowledge sharing behaviour of people in business centres, studying the actual context was crucial for making design decisions that would result in a justifiable outcome, in the form of relevant design proposals. As mentioned in section 3.4, interviews were conducted using several different techniques. These interviews were held with people who had different connections towards the environment of business centres. They were held on several occasions during the inspiration- and ideation phase to reach different goals for understanding the context.

4.1.1 First interview with employees in business centres

My initial interview had an unstructured approach and was conducted with two people interviewed simultaneously. They had previously been working at a company in the business centre MINC also located in Malmö, but after a little more than a year the company moved to the business centre STUDIO. This interview was structured more like a conversation, with the only topic of working in business centres and what comes with that. The interviewees quickly focused on the physical environment and started comparing how two business centres differed from each other. The bigger office at the new location was appreciated, but they still missed the activities that the first facility had to offer. They enjoyed spending their breaks playing mini-table tennis which was also a good place to meet new people in the office. At STUDIO they did not have any equivalent to this except a shared lunch room. This turned the focus of the interview from their own company to the
other companies also located in the business centres. The interviewees mentioned that they practically only interacted with people from their own company at STUDIO. While the interaction with people from other companies at their previous location was more common, it did not occur as often as they would have wanted. MINC is also an incubator for start-ups, with regular community breakfasts and following talks. These talks were open for any start-up in the building where they could talk about their company’s mission as a way to practice their pitch and collect feedback. This was according to the participants a good way to meet people who worked in the same building, but was not something that STUDIO offers which they considered as a big downside. The reason for the lack of these talks in STUDIO was thought to be the larger scale of the business centre and how new the business centre was. This also brought a lack of intimacy between the members.

This interview gave me an initial overview of the context and also provided some indication of how connections between companies look and are initiated. As a follow up to this interview I contacted one of the participants to ask if there were any ways of communicating digitally between companies in either MINC or STUDIO. According to the participant they did not use anything like that at MINC and that they at STUDIO use the platform Yammer (see section 2.3.3). After further investigation I found that MINC does have a Facebook group, but that this group is mainly used for posting events and not often used for communication between companies. Yammer platform was not used by the participant and the activity from other members was also very limited (this claim was later validated in an interview with the project leader and head of sales at STUDIO (see section 4.1.3)). If used, the participant mentioned that it was often general questions or information directed towards the whole building. Since it was hard to know who the message would be seen by, the participant also found it complicated to target the potential message correctly. An easier way of getting to know the people in the business centre would according to the participant personally be much more appreciated.
4.1.2 Interview at Media Evolution City

Media Evolution City is a business centre in Malmö that was started in 2012. It houses around 500 people in over a hundred different companies. Media Evolution City is run by the Media Evolution team, which is a collaboration of actors in the media sector of Skåne and Blekinge (Media Evolution City website, 2017-04-06). With regularly occurring talks, lectures, after works and conferences for both people working in the building and for outsiders, Media Evolution City acts as a social hub for people in the media industry. Out of the business centres I have visited during the course of this thesis project, Media Evolution City is the one where the administration is working most actively with implementing a knowledge sharing culture into the community. In the early stage of the inspiration phase I conducted an interview with the production leader of Media Evolution, Ulrika Hiertner. During the last year she has been leading a project with the goal to kick start the knowledge sharing culture between individuals and companies inside the building. This was the starting subject of the interview. She mentioned that they got a one-year sponsorship to develop the project and that they from the beginning were four people working actively on it. They held workshops with members where they together came up with ideas to get people together and share knowledge. These workshops came to collectively be named Sharing Club. The workshops created a lot of different ideas to spark physical meetings in a bunch of interesting contexts, which people from the groups that created the ideas later took over. Ulrika said that since they had so much to do it became impossible for the team to develop all the ideas and concepts that were generated themselves. This was the reason why they asked a few of the workshop participants to continue working on the ideas on their own. In September, she mentioned, they started working on the digital platform TheCommunity.se (The Community website, 2017-04-10). Initially the idea was to create a digital space with information collected from physical meetings, presentations and workshops taking place in the business centre. It would be a place to gather information for those who couldn’t attend, but still wanted to take part of what was said. As they were building it they realised that the website had more potential. The team started writing their own content, articles with tips or insights. They later started inviting members of the business centre to introduce content, but it was hard to get people involved, Ulrika mentioned. Since the struggle of getting people to use the platform was
the biggest problem, they informed new members of TheCommunity.se and that they could get access to it if they wanted to. New members would get a login for their room booking service and if they were interested in The Community-website they would get a separate login. By introducing the website in this way, they left it up to the users to reach out to the administrators if they wanted to use the platform. Ulrika realised that this might not have been the best way to go, since she said that they now only have about fifty active members on the site out of the approximate total of five hundred members. When conducting the interview, their yearly sponsorship had ended which made it hard to find the money to continue working on it, but new content was still regularly being posted.

I asked her what I should do if I was a member of the business centre and had a question that I thought someone in the office might have the answer to. She answered that I should email, call or go to the Media Evolution team and ask them. A few people were according to Ulrika already doing this and since they had reasonably good picture of their members, they could usually get people in contact with someone with relevant the competence. People also used the Facebook groups to put out news or info about relevant topics, but Ulrika said that it could be pretty unclear what audience the message would target, since there were a lot of different groups and no real supervision over most of them. At the moment of the interview they had five groups and pages surrounding the business centre, ranging from 1000-5000 members. A few of them were closed, meaning that you have to be accepted by another member, but since there was no real supervision most of the people in these groups did not work in the building. She said that the internal communication was pretty scattered and by narrowing down and specifying the use of the digital community, it could make it easier for people to share knowledge with each other. Ulrika expressed that we are “stronger together” and that she and her team wanted to get people together for the greater good of the community. She further explained that everyone benefits from sharing their competence with each other and it is always good to be seen in the community, both for the individual and the company. It should feel natural for their members to share their competence with each other, she said. In a creative environment it is crucial to have an active learning curve and stay on top of current trends and ways of working, while connecting with others, she mentioned. Ulrika went on to say that by doing this one cannot
only get new insights or perspectives, but also easier stay current with one’s working area while strengthening the community and connect with new people. But at the same time, Ulrika said, a lot of people didn’t know how or with whom to do that, and therefore missed out on the immense resource that people in their near surroundings are. Ulrika said that making people see this takes a huge amount of administrative work.

4.1.3 Interview at STUDIO

STUDIO is at the moment Malmö’s newest, and largest, business centre up to this date. It opened its doors in the summer of 2016 and acts as a hotel, office space and meeting point. The fourteen story high building accommodates a large number of people. At the moment not all of the offices are rented out but the plan is to have 700-800 people working there. The environment is built around meetings, with a lot of common areas and meeting rooms available to both in-house and external companies. Altitude Meetings is the communication team of STUDIO. They are eight employees working on, amongst other things, making people aware of their facilities. They do everything from renting out locales in the building, hosting workshops, developing concepts and methods for communication and education in the office environment. I held an interview with the project leader and head of sales at STUDIO and Altitude Meetings, Calle Håkansson, who was eager to share their vision of what the future of business centres looks like. We had the interview in the stairs of the entrance hall, which also had small glass framed meeting areas with couches and tables for meetings such as this one. Calle mentioned that these meeting points were just a small part of how the architecture of this building was built around the interaction between people. Almost a whole floor in STUDIO consists of meeting rooms for different purposes, with rooms for more playful workshop and larger lectures and conferences, he mentioned. Calle said that the Altitude team was working hard on introducing new concepts for getting people together in the building. Talks and lectures were according to Calle common practice in the work of making STUDIO a meeting point for both people inside and outside the building. I directed the focus of the interview towards the employees working in the companies stationed in the business centre by asking about the internal communication between the companies. Calle shrugged his shoulders a little and said that it was not really
working. At STUDIO they use the digital communications platform Yammer (see section 2.3.3) and Calle said that the conversation on the platform was not very active. It was according to Calle, hard to know who the messages targets when posting and therefor who would see it. He said that it in his opinion could just as well have been a Facebook group. I asked them how they work with getting people to use it and he answered that they send out an email with registration information to new employees, but that he hadn’t really thought much about what more to do. He also said that companies who were using Yammer since before they moved into STUDIO could have problems with the program not working as it should, which often made the barrier for using it actively even bigger. He further explained that their website Studiomalmo.se (STUDIO Malmö website, 2017-04-09) was built as an information page about the building to help rent out the office spaces. As more and more companies were coming into the building he said that they would need to upgrade it to be more relevant for their members.

He said that making people aware of everything that is going on and getting people together takes a lot of work. when I asked him what his vision of the business centre was for the future he answered that he would like people to interact with each other without the communication team pushing them to do so.

The team at STUDIO seemed to have a long way to go in their work towards getting a knowledge sharing culture going and much like Media Evolution City, their use of digital tools to help this process appeared to not have the intended effect.

### 4.1.4 Second interview with employees in business centres

After hearing the common pattern of people in business centres either not seeing the advantage of sharing competence with individuals in their near surroundings, or simply not acting on it, I wanted to hear what intended users had to say about it. I went out to Media Evolution City and STUDIO and initiated interviews with people working in the context. The interviews were conducted individually in a semi-structured manner with the goal of mapping out the motivations for people getting together in the office space to have a
dialogue about a specific topic of concern, how they were currently doing this and how this process could be better. I interviewed eight people, five from Media Evolution city and three from STUDIO. While conducting interviews, it became clear that there was a continuing dialogue between people in the business centres where they ask each other questions to conquer problems in their work. Even though a greater part of the people I interviewed mentioned that there was more often a dialogue with people inside the company, it was clear that all people agreed that it was or could be beneficial to speak with people outside the company. One participant from Media Evolution City mentioned:

*When you put a ball in motion (ask someone outside of the company about something in person) you can get conclusions and ideas out of the discussion that you wouldn’t have come up with on your own. I know that I will always get back what I give in some way or another. Interacting with new contacts can also lead to work, playing table tennis with someone, having lunch with someone, socializing and networking.*

Other motivations were that it was good to be seen and get your name out there, you got appreciated for helping out and that asking someone could make the work easier. When asking about who people would want to share knowledge with, it was of regular interest for the interviewees to get to know who were working in the same field as them. One participant from Media Evolution City mentioned: “Speaking to people working in the same field could make for a very beneficial exchange. Getting an insight and a greater perspective over other businesses, categories and areas.”

It seemed that the question itself was also important in the process of deciding who to ask. When the question was about a very specific part or task of the work, it was asked to people inside the company. Examples on these specific questions were often concerning technical work, like programming issues or doing a specific task inside a program. These questions were often short, concise and structured like something targeted towards a search engine. The questions could also concern creative work, but were in those cases intended to bring
some sort of reaction from the viewer to start a discussion. These questions were structured more openly, for example: "What do you think of this design?".

The amount of discussion conducted outside of a company seemed to be somewhat dependent on the size of the company. Were it a bigger companies with more employees, the discussion with other people in the working environment seemed to stay inside the company. In smaller companies, the outreach to people in other businesses was often a more common procedure. Focusing on the individual inside a company there also seemed to be a pattern in how a person reached out for help in their work. People who were newly employed by companies inside the business centres focused their questions towards people inside the company. It seemed like they had not exhausted the resources that their colleagues had to offer. A lot of companies at these business centres also tended to have an open office setting where people could easily ask each other questions across their tables, limiting the efforts of the process of starting discussion inside the company.

The knowledge sharing culture was extremely dependent on the business centres themselves. None of the people interviewed from STUDIO had shared knowledge with another person outside of their company in the business centre. The meetings that had happened were just a few casual conversations in the shared lunchroom. Reasons for this was as previous interviews indicated, thought to be dependent on how new the business centre was. The limited chances for interaction with people outside the companies and the lack of a working internal communication platform was also thought to have a negative impact. Even though intra-organizational knowledge sharing was more common, knowledge sharing between individuals from different companies did occur. One participant from Media Evolution City said that the amount of knowledge that is shared relies a lot on knowing who to contact, which is greatly dependent on one’s personal network in the building. According to the participant, getting a large network takes a long time and first meetings with these people often happened by chance. These meetings were also said to be very serendipitous. The participant further went on to explain that these unforeseen meetings often took place at “hubs” in the business centre, places like the café, ping pong table, printer, restaurant and especially at after works or lectures hosted by the
Media Evolution team. This was confirmed by my observations along with several other interviewees.

4.1.5 Insights from interviews

During my interviews I have gathered a qualitative understanding of the context I am designing for, both from an administrative and individual perspective. This has given me some certainty about the motivations that people have towards getting together with others from the business centre to discuss a specific topic of concern, and the problems that come with it. Both teams at Media Evolution City and STUDIO see the importance of a knowledge sharing culture and are working actively in encouraging this culture. It is a hard task that not only requires a lot of work but also a deep understanding of the individuals in these communities. While the two business centres have made big efforts in creating a strong physical community, where Media Evolution City seem to really have succeeded and STUDIO are on their way, there is a clear lack of digital a community. There also seems to be a lack of administrative push to get members to adopt the usage of the existing digital platforms and a supervision of the use of these platforms. In many cases it seems left up to the users themselves and when asked about it, the team at STUDIO seemed rather indifferent towards the issue. As mentioned by Riege (2005) when presenting barriers for intra-organizational knowledge sharing, the guidance from the administrative groups or individuals play a great role in sparking and facilitating a knowledge sharing culture.

With the lack of a digital presence that take knowledge sharing barriers into account, the physical meeting points and activities play an incredibly important role in how connections that open up for knowledge sharing are made. These connections often occur as happy accidents and if connections aren’t made (or even if they are) it can be very hard to know who to ask or get in contact with. As seen in the literature by Davenport and Prusak (1998), knowing who to ask is one of the most important aspects in creating a knowledge sharing culture. The large amount of companies focused on their own thing behind closed doors makes it even harder to focus on what actually makes a community: the individuals themselves. A lack of community awareness also makes it harder to see the benefits of
having a knowledge sharing culture. This creates a clear barrier between wanting to share or collect knowledge, seeing the benefits of talking to someone outside the company and actually doing it. This strongly correlates to the problem of low awareness of the benefits of a knowledge sharing culture that Reige (2005) lists as a prominent individual barrier for knowledge sharing in organizations.

Direct competitors in business centres could prove to have a problematic impact on what could be shared, as well as non disclosed information from companies. This is an issue that is non-existing in intra-organizational knowledge sharing. On the other hand, this was not a confirmed issue in my field work and the people I interviewed did not seem to feel very restricted in what to share and not. The field studies further indicate that the physical environment of business centres is absolutely critical for having an open knowledge sharing culture. To what extent the common areas are used, by whom and what activities the facilities offer seem to have a direct contact with how people interact, network, and therefore share knowledge.

Even though there was an initial lack of awareness in the benefits of knowledge sharing between members of business centres, when asked, the interviewees could instantly see a number of reasons why to share knowledge. In relation to theory from Bock et al (2005), both intrinsic- and extrinsic motivational incentives were brought up, although with the latter being more prominent. Intrinsic motivations were often said to be the joy of interacting with new people and the realisation that one is actually learning something new from others. The extrinsic motivations were more noticeable. Individual incentives were networking, getting your name out there and attaining new perspectives. Organizational incentives were said to be receiving more work or new clients. Group incentives included creating an open and enjoyable atmosphere in the community.

4.2 Conceptualization

Field work and literature review showed that the informal face-to-face meetings (Weijs-Perrée et al, 2016) with people in the business centres proved to be the leading way for
giving people new opportunities for sharing knowledge with individuals outside of their own company. Meetings like these were often serendipitous and apart from being proven to have a positive impact a person’s social network (Riege, 2005) they also increased the individuals’ ability to trust others in the knowledge sharing process (Nahapiet & Ghoshal, 1998). Business centres often provide members with unique services and opportunities (Weijs-Perrée et al, 2016) and the meetings often took place in relation to these services. For example, the physical hubs and activities hosted by the administration teams. This along with interviews proved that business centres invest both capital and time on administrative efforts to increase the knowledge sharing culture. A crucial aspect of a functioning knowledge sharing culture is knowing who to ask (Davenport & Prusak, 1998) and field work showed that this was often not the case, especially when having to ask someone outside of the company. There was some initial lack of awareness over the benefits of knowledge sharing, but when when asked, both intrinsic- and extrinsic motivation for intra-organizational knowledge sharing showed to be existing. They were on the other hand seldom translated into action due to limitations of current methods meant to aid this process. This seemed to be mainly due to the lack functioning digital presence which take individuals-, organizational- and technological knowledge sharing barriers into account.

When drawing patterns and conclusions from literature and field studies I was able to narrow down possible design solutions to what the properties in the research problem could be. With these insights in mind I mapped out around fifteen different concepts during an individual brainstorm session. Many of these concepts could quickly be ruled out due to feasibility issues and others due to irrelevance when comparing them to the previously found insights. I found that three of these concepts were stronger than the others in relation to findings in literature and field studies.

The first one was an interactive public display where people could ask questions to others in the building, with the outcome of having a meeting about that topic with people interested in it. The second one was an interactive photo wall in one of the common areas of the business centre. The photos showed people in the business centre doing what they
love, accompanied with their name, the company they work at and their title at that company. People could scan a QR-code to get in contact with the chosen person in the photo.

![Figure 4.1 Sketch of second concept](image)

When listing all findings and realisations seen during the inspiration phase, I found that one of the three concepts address these issues to an extent that none of the other concepts did. I therefore decided to continue working on the third concept.

### 4.2.1 WE ARE

WE ARE is a concept developed for business centres and the individuals working there. It consists of a web platform accompanied by a public display with the purpose of increasing the knowledge sharing culture between individuals in business centres. This is done by raising awareness towards the people inside the community and making the opportunities for new connections with them visible. We can not force people to share knowledge with each other (Bock et al., 2005), but we can illuminate the individuals inside the community
and in that way make people reflect over the fact that they can utilize the competence that people in their near surroundings posses.

![Figure 4.2 Early sketch of final concept](image)

The web platform acts as a digital hub for information about all employees in the business centre. The users of the platform are able to search and filter employees by the company where they work, title at the company, skills and interests. It also offers new ways of connecting with these individuals in a way that is strongly encouraging the physical meeting between people in the business centre. This relates back to the literature findings claiming that informal face-to-face meeting allows for the building of trust (Weijs et al. 2016), which is critical to sharing knowledge (Nahapiet & Ghoshal, 1998). This was later also validated in the field studies, where several interviewees said that they get more out of a discussion in person.

The non-interactive public display is a digital translation of the serendipitous meetings that was during field studies found to be the main source for new connections and opportunities for knowledge sharing inside the business centres. The display(s) is placed in on or more
of the physical “hubs” where these connections are often made. For example: café, restaurant, ping pong table or an equivalent in the the business centre in question. It randomly slides through employees of the business centre, showing a picture and information about them and in that way giving people walking by an insight into the people working in their near surroundings.

The web platform is available only for employees working at companies in the business centre and registration info is given to all new employees. It consists of three main pages, the front page, profile cards and user profile:

After registering and logging in, the user is greeted with the front page. It consists of a header and a grid of members. The header includes the WE ARE-logo, an icon to get to the user’s profile and a search button. The grid of members contains pictures of employees in the business centre and additional information in the form of name, title and company. When clicking on the search button the the search bar is revealed and the grid of members moves down to show the four filter categories, company, title, skills and interests. Clicking one of the categories opens a list of filters that the user can combine to find relevant people. When adding or removing filters, the grid of members updates accordingly.

The profile cards are seen by clicking on an employee in the grid of members. Profile cards consists of a picture of the employee, the name of the company they work at and their title at that company. It also includes contact information in the form of email, phone number and links to various social networks like LinkedIn, Facebook, Yammer, Instagram, Spotify, etc. In the profile cards you can also read a short individual note about the person in the About-section and see their interests and skills. The main interaction in the profile cards are the “Business Centre-connect” buttons or BC-connect for short. They are individually chosen buttons that represents activities that the facilities offer, as a way to initiate a meeting with a person while doing something that they enjoy. This could for example be a game of table tennis, having coffee or lunch. When clicking one of these buttons a popup appears where the user can send a message with the invitation. The person get’s a notification about this in their email and can then confirm or deny this invitation. The user
also has the ability to save the contact for later, the saved contacts can be seen in the user profile.

The *user profile* is similar to the profile cards in the way that the users can see their own information. But the user is also able to change this information and the privacy settings concerning if the user wants to be visible on the site or public display. This is also where the saved profile cards are found.

### 4.2.2 Paper prototype

The first prototype of WE ARE was made of wireframes of the interface drawn on white sheets of papers. This was to test out the core functions of the concept on people relevant to the design context, while being able to have a rapid, iterative design process.

![Figure 4.4 Paper prototype – Front page with open filter list](image)
The functions of the platform that was implemented into the first prototype were the front page, search and filters functions and a profile card of a member in the business centre. The front page included the logo, icons for the user’s profile and search function and the grid of members. The grid of members consisted of illustrations of business centre employees with their name, title and company written on top of them in the down left corner. The search page included a search bar with the four underlying filter categories and the exit icon to close the search bar. The paper was folded to only show the filter list when the user tester actually interacted with it. When doing so I unfolded the paper to reveal the filter list while at the same time showing the similar animation as intended for the digital prototype. When pressing on a filter I placed a tiny rectangular peace of paper under the chosen filter category to illustrate how the chosen filters are stored, the chosen filter also had a tiny “x” to show that the user is able to remove chosen filters.

Figure 4.5 Paper prototype – Profile card

The profile card of an employee showed an illustration of the person in the upper left corner. On the right side of the picture was the contact info, including the employees name, title and company. Under the contact info the BC-connect buttons were placed, they
illustrated that the employee in question was interested in meeting people while: playing table tennis, drinking coffee or having lunch. When clicking a connect button I place a connect popup on top of the profile, where the user is asked to invite the person to a ping pong game and can choose to type in a message in the invite. Under the connect buttons was a button for saving the contact, this function was inspired by the user tests of PinPoint (see section 2.3.1) where they found that users would like to be able to save contacts they viewed and did not want to forget about. Under the profile picture, the social network-buttons were placed. They included: LinkedIn, Facebook, Instagram and Yammer. On the upper right side of the “screen” was the About-section, where the personally written information about the employee was illustrated by horizontal lines. On the bottom of the page the section for skills and interests was placed. The skills and interests was in both sections illustrated with dots followed by lines.

4.2.3 Initial user tests

My initial test was of an exploratory nature aiming to test the preliminary concepts and evaluate its promise (Goodman et al., 2012, p. 368) conducted with a communication manager at Media Evolution. This test was made before the paper prototype had been developed and was therefor held with the flowchart as a way to explain the concept as a whole.

Figure 4.3 Flowchart of interface sketches
The participant was very excited about the concept and expressed that it was a very good concept which is needed at Media Evolution City. The participant felt that the BC Connect buttons was an interesting way of interaction and would like to be able to use this function. I asked about the ethical implications showing information and pictures of employees in the public space of business centres, but the participant did not see this as a big problem personally. The participant mentions, “Most people like to be seen in their working context, with LinkedIn and similar platforms. So it wouldn’t be that big of a step, just more connected to the community. It’s like a searchable business card, but way more fun” And goes on to say, “The ones who doesn’t want to be on it shouldn’t have to, that includes the public display.”

After getting initial input and indications of the need for this concept from a person closely connected to the context, I extended the flow chart into the paper prototype shown in section 4.2.2. With a more exhaustive interface design, the following assessment-tests (Goodman et al., 2012, p. 368) had the goal of examining the concept’s core mechanics but also go more in depth towards functionality of features and design choices. My first test with the paper prototype was conducted with a graphic designer working at a company located in STUDIO, who also participated in my first interview. The rather comprehensive test was held in a shared lunch room at STUDIO to make the participant feel comfortable and to connect the test of the prototype to the context that the concept was intended to be used in. I started by briefly explaining the purpose of the concept and initially let the participant use the platform without restrictions. The participant scrolled around the list of members to get an overview of the people in the building, mentioning how interesting it would be to see who actually worked in the near surrounding. I asked the participant to find an employee that worked in the same field as him while saying what and why he was doing. Most functions seemed clear to the participant who used the search and filter functions as intended to find the profile card of interest. The participant mentioned that the “WE ARE” logo being a part of the search bar, could influence what the user search for which could potentially create some confusion. The participant also expressed some concern towards the filter function and wondered if the user would notice the possibility to add several filters without loosing the previously chosen ones, to narrow down a search.
The participant further expressed that the search function should give suggestions as the user writes, to see what was searchable on the site and not and that it would be nice to be able to search for people who use a specific software. Since STUDIO is a very large building separated into different spaces the participant mentioned that it would be interesting to see the people or companies that are sitting close to the user’s office. When going into the profile card the participant mentioned that the flow seemed very nice and that it is really handy to see a quick overview with the contact info. Initially the participant did not realise that the BC Connect-buttons were actually buttons and thought that they were just favourite interests. After explaining that they were clickable the participant instantly understood that they were a way to connect with the person and really enjoyed the playful way to connect in relation to activities in the building that the person enjoys doing. The user tester did on the other hand say that the buttons should be more strategically placed and indicate that they are buttons. The participant expressed that there could be buttons for sketching, after work, yoga, smoke break and watching TV, but at the same time thought there should be a limit to how many buttons one can choose. A maximum of five buttons maximum were proposed to not take away the power of the interaction. The social buttons could also distract the user from the purpose of quickly being able to meet the person in question, according to the tester. The participant mentioned that it was great that there was no chat function on the site, since it should be more about the meeting between people. The participant doubted if the user should even be able to send a short message and just suggest a time instead. But wasn’t sure if that was the right way to go. The participant suggested that the platform could know when there is a time for yoga in the building, and then suggest that time for the user when inviting someone with that BC Connect-button. To conclude the test, the participant expressed a strong belief in the potential of the concept and that the tester would like to see it realised. It is according to the participant, “A great way to evoke a spontaneous interaction between people in a playful and appealing way”.

A shorter test was later conducted with a social media manager at Altitude Meetings, STUDIO. This participant also mentioned that suggestions should appear when searching in the platform, to see if the search word is actually in the system. The tester further said
that the title and company in the profile card of a person should be clickable and take you to a list of all the people working at the same company or having the same title. The participant also expressed a confusion in the fact that the logo “WE ARE” changes into “I AM” when looking at someone’s profile card. While the participant understood that it was a single person she still thought that “I AM” should only be visible when in my own profile to make a distinction between the to.

4.2.4 Digital prototype

From the insights made when user testing the paper prototype I made a few changes in the concept before translating my wireframes into a digital prototype. I realised that I had to keep the interactions of the platform closer to it’s core functions and values. I therefore removed the buttons for social platforms and added the rule to limit the BC-connect buttons to five. I also decided to remove the messaging function when sending an invitation and to replace it with an option to suggest a specific time for the meeting. To connect it further to the physical meeting between people with the outcome of sharing knowledge, I incorporated a function were the user can select the skills and interests from the profile card that he or she would like to talk about. This function also relates to findings in field studies indicating that an initial for the meeting can be beneficial, even though the plan is to have an informal meeting. “I AM” will only be shown in the header of the user’s own profile and keywords in the profile cards will be linked to show a list of people with the same tags.

The accent colour in this digital prototype is inspired by Media Evolution City’s graphical profile. This accent colour is meant to be change according to the specific graphical profile of the business centre in question as a way to change its characteristics for specific client needs. Sketch App has been used to design the digital interface and Principle was used to make the interface interactive, add functionality and animate transitions.

Link to video of the digital prototype of the web platform in the context of Media Evolutions City: http://antonblomster.com/we-are/
Figure 4.6 Digital prototype – Front page

Figure 4.7 Digital prototype – Front page with open filter list
Figure 4.8 Digital prototype – Profile card

Figure 4.9 Photo rendering of Public display
4.2.5 User testing with digital prototype

The final tests were conducted for validation purposes (Goodman et al., 2012, p. 368) to certify that features assessed in previous testing meet the expected standards after being translated into digital designs. The tests were conducted on separate occasions with two people working at companies in Media Evolution City. The specific goals of these tests were to see evaluate the usability of the filter system and BC Connect-buttons while following how the users performed a task. After being presented with the digital prototype of WE ARE on a laptop they were told to find a person working as an Account Coordinator and invite this person to a ping pong-game.

The participants had no trouble finding the Account Coordinator through the filter system and could with ease understand and use the BC Connect-buttons to invite the person to a game of ping pong. They did not express any issues in using the features and could in a short time perform their given goal. When speaking about the general user experience a concern was raised over the placement of the buttons in the header since the flow of the platform in some cases did not feel natural for the participants. The button for the user profile in this prototype placed to the left in the header, was proposed to be placed on the right next to the search button. This would also make it possible to implement a back button on the left side of the header when in a profile card, instead of the X-button that was considered to be misleading in some cases. One of the participants thought it could be handy to be able to connect with a person without having to go in to their profile card and proposed a function were the user hovers over a person in the list of members and a list of the BC Connect-buttons are then revealed.

4.2.6 Results from user testing

With several iterations tested with exploratory-, assessment- and validation goals, the functions of the concept have been changed to reflect the needs of the intended users. The concept was well received from people in my target group. The user testers saw the need for this type of solution and wanted this service to be available in their business centres. My initial worry about people being hesitant towards being publicly shown on the public
display or the website, was decreased by what the user testers said. The credibility of this potential issue still has to be tested with a larger amount of people to be greater relevance to the context. The testers were very pleased that the way to connect with people was so closely related to what they liked to do in the building and saw it as a good ice breaker.
5 Discussion

5.1 Value

All things considered, there is the pressing issue that has to be acknowledged. The people I have met during this project are very capable of doing their job without such a service and are already, to some degree, using knowledge sharing behaviours into their workflow. So do the people in the context of this project actually have a need for a service like this? With a user-centred approach like the one taken in this project, patterns arise that hint towards potentials that are often not yet seen by the users themselves. When opening up for a discussion about knowledge sharing with the intended target group of this project, the need, motivation and benefits become increasingly visible for them and a will to share and collect new knowledge is exposed. The purpose of a service that the users have long been doing fine without, or even found own ways of managing (such as networking and asking the administration teams for help), now becomes clearer. With the growing notion of knowledge as a key competitive advantage for businesses (Ipe, 2003), the need for services that take advantage of the benefits of a collective inter-organizational knowledge base by connecting people with each other also becomes increasingly important. So to answer the question: the findings in this project indicate that there is a need for a service like WE ARE, even though the intended target group might not initially see it, if not presented with the thought.

Studies by Weijns-Perrée et al. (ibid., 2016) showed that people with traits like “extraversion” more often share knowledge. The activities currently taking place in the business centres visited seem to draw people with these traits, since they already feel comfortable in social settings. Even though one of the main mechanics of ‘WE ARE is to initiate informal meetings with people, it could also act as helping factor for people not identifying themselves with these traits when initiating talks with new people. By having to deal with the sometimes discomforting aspect of not knowing anything about the person, information about a person found on WE ARE could prove to be a conversation starter.
5.2 Challenges

I see the implementation phase as one of the more challenging aspects in realising this concept. As seen both in literature and field studies new software has to be well implemented from the start. Riege (2005) writes that knowledge sharing always requires an administrator of some sort to work, someone to take action towards implementing and facilitating the platforms. As seen in the visited business centres, platforms that have not had an administrative focus in structure and purpose, seldom work as intended. Getting existing members of the business centres to accept the on-boarding phase will therefor be crucial. WE ARE is only intended show information about, and be used by current members of the business centres. The initial introduction into the system for new members and the deleting or archiving of members no longer working in the facilities will thereby also be of great importance for the functionality of the concept. The public display will potentially help with making people aware of the service but the implementation of WE ARE will require some work from the teams running the business centres. On the other hand, the current initiative showed by the business centre-teams towards increasing the knowledge sharing culture indicates that there are possibilities for putting both manpower and funding into projects like WE ARE.

People do not always know what sort of knowledge they possess that might be useful to others, since this is often found out by chance when interacting with people in their near surroundings. These scenarios are troublesome to translate into a digital solution and makes the use of a filter system using tags questionable for this specific goal of knowledge sharing. However, both literature and field studies show that increased interaction and social networking between people in the communities also drastically increases the possibility of knowing who to ask or serendipitously collecting knowledge that you were looking for. It could also be hard for people (especially in small companies or start-ups) to exactly specify what they do in the company. Many start-ups require employees to use competences in a lot of different fields, which could potentially create problems while mapping competences and make titles less relevant.
These previously listed challenges not only have to be considered in my design decisions and in the efforts made by individuals in the administrative entities, but also the users. With information made public and introducing new ways to connect with people, some responsibilities are left up to the individual using the platform. It is primarily implied that the user actually puts information in his or her profile and that this information is truthful, since the outcome of adding the information is to have a dialogue with others about it. There is also a need for respect between users. Email and phone numbers are meant to help people connect with each other and a responsibility is left up to the individuals not to misuse this information in a harassing or spamming manner. How the physical meetings created by the BC Connect buttons are conducted is fully left up to the users as well, showing up on time and treating the other individual with respect are key factors for these meetings to be rewarding.

### 5.3 Ethical implications

With publicising information, even in relatively closed groups like in this context, ethical implications arise. The public display of WE ARE will be seen by people other than members of the business centre in question. This can of course create new opportunities for extending the social network outside the intended target group, but may also create an unwanted discomfort to the people who do not want to share certain information with the public or other members of the business centres. While the example Pinpoint (shown in section 2.3.1) in their concept visualized the individuals as generic illustrations, there was an active choice in emphasising the importance of pictures of the employees in WE ARE. Getting to know new people in a physical context has a lot to do with recognizing them by their appearances. The potential issues revealed by showing personal information and pictures of employees is something that has been present through the whole process of developing the final concept. In all user tests the participants were asked about their personal opinion on this and so far it has not been considered as an issue for them. How WE ARE is currently considering this issue is to let the users choose what information to share and where. Be it only on the platform or not at all, it is up to the users to select their
level of privacy. To further critically evaluate this concern, more quantitative studies are needed to get a broader empirical understanding in the matter.

Publicising information such as personal interests also brings up the question if people might want to distance their work and social life. By including information such as interests, the gap between the user’s personal space outside work and the office setting decreases. Facts about a person that might not otherwise have been shared with colleagues are now available to other people in the business centre. It is again up the user to decide what he or she shares with the platform, but this could be a factor in people hypothetically not using WE ARE to the extent intended.

Even if most people might not consider the information shared in the platform as very sensitive, it is always a matter of trust when storing other people’s information. Especially since the information is only meant to be available for a certain group of people. Secure solutions for storing information online is something not researched in the span of this project but will need to be addressed in further development.

5.4 Future direction

There are several steps to be taken in the future of this project and ideas that have not been implemented in the final concept of this project that could be worth evaluating. The development of a minimal viable product for testing would be a first step. I propose a beta test with a limited amount of users to further test functions, possible implications and evaluate if the platform increases social interaction and knowledge sharing. The limited amount of testers could potentially also generate an interest from others, creating a fear of missing out and laying ground for the initial implementation to the public.

The importance of a well structured tag system cannot be undervalued and is also a critical aspect of this concept working as intended. Research has to be done on how to make the registration phase and on-boarding phase as clear and easy as possible by creating rules and categories for how to tag interests, skills and titles. The use of tag systems could
potentially create risks of individuals and businesses having multiple different definitions for similar skills information. Future research towards implementing an artificial intelligence like Watson, that could analyse similarities between tags and to a deeper level draw connections between users’ searches and indexed information. This could possibly lower risks of multiple definitions for tags in different contexts and give the users more relevant results.

If the tag and categorisation system has the desired effect in finding people that the users are looking for, future iterations could include a function that, much like the one in PinPoint, suggests people with similar characteristics to you. The sole purpose of WE ARE is not to connect individuals with other people who have similar characteristics, but to connect them with relevant people with whom they can donate and collect relevant knowledge. But since interviewees expressed that they would like to be able to find and talk to others who do similar work, there could be a value in testing the results of such a feature.

Due to the fact that interviewees saw it as beneficial to share knowledge in a group setting, the ability to invite several people at a time via BC Connect-buttons could prove to be a valuable feature. When new services are available in the facilities that could be translated to BC Connect-buttons (for example a gaming console), there could also be a function for notifying users of this. In this way they would be able to update their BC Connect-buttons to precisely represent how they would like to be contacted.

Two other functions were mentioned in user tests that could be of interest to implement in future iterations. The ability for the platform to know when an activity is taking place in the building and give this information to the user when sending an invite for that activity, for example with yoga or after works. In addition, the ability to see the location in the business centre where a person works was expressed by user testers.
5.5 Self critique

There are many ways to interpret literature and findings from field studies and with them an almost endless amount of possible design solutions. The final design proposal in this thesis was well received by intended users, but there are some parts of the process in this thesis that could have been done differently. The ideation phase in this project was focused towards how I interpreted the insights found in the inspiration phase, which in hindsight could have been done in a more participatory fashion. Workshops or focus groups surrounding insights and possible design solutions could have had a positive impact on the pace of the ideation phase and the outcome of the final design proposal. In addition, interviews with people working in business centres (section 4.1.1 & 4.1.4) were only conducted with men, this could have influenced the findings in field studies and furthermore the outcome of my design decisions and would have to be investigated further.

A digital design of the user profile page was due to timing issues not developed and the final design of the public display was developed late in the process. This meant that the functions of these elements were only tested with early sketches and the final aesthetics were not tested by users. In further development, testing and evaluating of these elements is needed.
6 Conclusion

With the hypothesis that software could have a positive influence on the knowledge sharing process between individuals in business centres, I have in this thesis presented and in the process aimed to answer the following question:

What are the properties of a software, developed using interaction design methodologies, which aims to increase knowledge sharing between individuals working at companies inside business centres?

While the barriers for sharing knowledge are many and the potential solutions for tackling these barriers extend even further, I have set my focus on a few of the more prominent aspects that has arisen during this project. Insights from both literature and field studies has throughout this project indicated that larger social networks, community awareness and connectedness between individuals, can increase the knowledge sharing culture in business centres. WE ARE is a response to these indications with properties giving the users the possibility to get an overview of members of a business centre, find and explore members further and finally create meetings with these members connected to both the facility and personal topics.

My design proposal has from early concept to hi-fi prototype gotten good critique from people strongly connected to my context both from an administrative and user perspective. The feedback from these people has been crucial in making design decisions during the different iterations of the project. Having a user-centred approach with a focus on the individual has made it possible to explore the process of sharing knowledge from the ground up, investigating motivations and barriers in a qualitative manner.

The properties implemented in my proposal include only a selection of elements that could potentially increase inter-organizational knowledge sharing and are not as my research questions implies the properties. WE ARE tries to answer the research question by focusing on community awareness and networking behaviour between people, but there are
naturally many other approaches into the field of knowledge sharing. This thesis and the
design proposal in it is meant to be seen as a potential guide for future design work in the
field. Further evaluation and testing during a longer timeframe is needed to prove its value.
But if WE ARE could prove to increase the knowledge sharing culture in these business
centres, I believe that it could create individual (users), organizational (companies),
communal (business centres) and societal (Skåne/Sweden) growth.
Appendix

1. Interviews with business centre administrations

What is it?
- What does the word knowledge sharing mean to you?
- What opportunities/problems do you see with knowledge sharing?
- Pros & cons?

Your work?
- Tell me about how you work with the communication between companies in the business centre.
- What was the entry point into knowledge sharing?
- What do you want to get out of a sharing work environment?
- What methods have you tried for inter-organizational knowledge sharing?
  o What has worked best/worst - why?
- How do you develop new concepts for communication?
  o Do you take inspiration from similar community environments?
- If I have a question that I think the community can answer, what do I do?
- If I want to share knowledge with others in the community, what do I do?
- What means of communication are used in the business centre?
  o What were the motivations for using that/those platforms?
  o How are they received by the users?
  o What more would you like to get out of the platform/s?
- What are your future goals for community building and knowledge sharing?
- What does the perfect community look like?

You!
- How do you collect new knowledge?
- What would you want the process to look like, when you want to donate and share knowledge with people in your near surroundings?
- What would you like/not like to share?
2. Interviews with people working in business centres

Name?
Company?
Title?
Time working in business centre?

When was the last time you asked for help in your work?
- What?
- Who did you ask?
- Why that person?
- What makes this person good to ask?

Mention an occurrence where you did/didn’t get what you wanted from such a discussion.

What is the reason for you actively asking someone for help?

When was the last time someone asked you for help?
- Who?
- What?
- Why you?

What motivates you to share knowledge with someone in your near surroundings?

What could you get out of talking to someone outside of your own company?

What would a constructive meeting like that look like?
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