Design researchers' information sharing –
The enactment of a discipline

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Table of contents

ABSTRACT ........................................................................................................................ 5
SVENSK SAMMANFATTNING ....................................................................................... 7
ACKNOWLEDGMENTS ................................................................................................... 9
1. INTRODUCTION ......................................................................................................... 11
  1.1 Aim and research questions .................................................................................... 14
2. LITERATURE REVIEW .............................................................................................. 16
  2.1 The thesis’ location in LIS ....................................................................................... 16
  2.2 Important concepts in research on information sharing ........................................... 17
    2.2.1 The area of information behaviour and the theoretical notion of information practices ......................................................................................... 18
    2.2.2 The concept of information ............................................................................... 20
    2.2.3 Information needs .............................................................................................. 21
    2.2.4 Seeking, searching, encountering, avoiding and withholding information ....... 22
    2.2.5 Using and evaluating information ..................................................................... 23
    2.2.6 Summary of concept review .............................................................................. 25
  2.3 Scholarly information practices ............................................................................... 25
3. THE FIELD OF DESIGN RESEARCH ....................................................................... 28
  3.1 Field and discipline .................................................................................................. 28
  3.2 Dependence and uncertainty .................................................................................... 29
    3.2.1 Mutual dependence ........................................................................................... 29
    3.2.2 Task uncertainty ................................................................................................ 29
    3.2.3 Dependence and uncertainty combined ............................................................. 29
  3.3 Interdisciplinary research ......................................................................................... 30
    3.3.1 Types of interdisciplinarity ............................................................................... 31
  3.4 The interdisciplinary field of design research .......................................................... 32
    3.4.1 Central concepts ................................................................................................ 33
    3.4.2 A design research perspective on the issue of discipline or field ...................... 34
    3.4.3 Methods ............................................................................................................. 35
    3.4.4 Journals in design research ................................................................................ 35
  3.5 Nordcode .................................................................................................................. 36
    3.5.1 The origin and activities of Nordcode ............................................................... 37
4. PRACTICE THEORY ................................................................................................... 39
  4.1 What theory does and allows ................................................................................... 39
  4.2 Practice theory overview .......................................................................................... 40
# Table of contents

ABSTRACT ........................................................................................................................ 5  
SVENSK SAMMANFATTNING ................................................................. 7  
ACKNOWLEDGMENTS ................................................................................... 9  
1. INTRODUCTION ................................................................................................... 11  
   1.1 Aim and research questions ............................................................................. 14  
2. LITERATURE REVIEW .................................................................................... 16  
   2.1 The thesis’ location in LIS ................................................................................. 16  
   2.2 Important concepts in research on information sharing ..................................... 17  
      2.2.1 The area of information behaviour and the theoretical notion of  
          information practices ................................................................................. 18  
      2.2.2 The concept of information ..................................................................... 20  
      2.2.3 Information needs .................................................................................... 21  
      2.2.4 Seeking, searching, encountering, avoiding and withholding information ..... 22  
      2.2.5 Using and evaluating information ............................................................ 23  
      2.2.6 Summary of concept review ..................................................................... 25  
   2.3 Scholarly information practices ..................................................................... 25  
3. THE FIELD OF DESIGN RESEARCH ....................................................... 28  
   3.1 Field and discipline ......................................................................................... 28  
   3.2 Dependence and uncertainty ........................................................................... 29  
      3.2.1 Mutual dependence .................................................................................. 29  
      3.2.2 Task uncertainty ....................................................................................... 29  
      3.2.3 Dependence and uncertainty combined .................................................... 29  
   3.3 Interdisciplinary research ............................................................................... 30  
      3.3.1 Types of interdisciplinarity ...................................................................... 31  
   3.4 The interdisciplinary field of design research ............................................... 32  
      3.4.1 Central concepts ....................................................................................... 33  
      3.4.2 A design research perspective on the issue of discipline or field ................. 34  
      3.4.3 Methods ................................................................................................... 35  
      3.4.4 Journals in design research ...................................................................... 35  
   3.5 Nordcode ....................................................................................................... 36  
      3.5.1 The origin and activities of Nordcode ....................................................... 37  
4. PRACTICE THEORY .................................................................................... 39  
   4.1 What theory does and allows .......................................................................... 39  
   4.2 Practice theory overview .............................................................................. 40
4.3 The practice theoretical framework ............................................................................ 42
  4.3.1 Five guiding principles ....................................................................................... 43
4.4 Information sharing in a practice perspective ............................................................. 44
  4.4.1 Activities, power, materiality, agency, and knowledge ....................................... 45
4.5 Enactment .................................................................................................................. 46
5. METHOD ......................................................................................................................... 48
  5.1 General premises – methodology ............................................................................ 48
    5.1.1 Bricolage ........................................................................................................... 49
    5.1.2 Methods from a practice perspective ................................................................. 50
    5.1.3 The role of the reflexive researcher ................................................................. 51
  5.2 Development of studies ........................................................................................... 52
  5.3 Methods for production of data and empirical material ......................................... 56
  5.4 Selection of participants ......................................................................................... 58
    5.4.1 Ethical considerations ....................................................................................... 58
  5.5 The process of analysis ......................................................................................... 59
6. THE FOUR STUDIES SUMMARIZED ......................................................................... 61
  6.1 Study I – A review of the LIS literature on information sharing ........................... 61
  6.2 Study II – A qualitative study of design scholars’ information practices ............... 62
  6.3 Study III – Information sharing and trust ............................................................... 63
  6.4 Study IV – Material dimensions of information sharing ........................................ 64
7. DISCUSSION AND CONCLUSIONS ......................................................................... 66
  7.1 Activities as access to practice .............................................................................. 66
  7.2 Knowing how to act ............................................................................................... 68
  7.3 Shaping identity ..................................................................................................... 69
  7.4 Interactions with things ......................................................................................... 69
  7.5 Information sharing in the process of disciplining ................................................. 70
  7.6 Conclusions ............................................................................................................ 71
  7.7 Final reflections ..................................................................................................... 71
REFERENCES .................................................................................................................. 73
Appendix 1 – Example of an e-mail to potential participants ........................................ 86
Appendix 2 – Example of an initial contact letter ........................................................... 87
Appendix 3 – Example of an offer to participants to read and review transcripts .......... 89
Appendix 4 – Example of message to participants about publication ............................ 90
8. THE FOUR STUDIES ................................................................................................. 91
ABSTRACT

Research collaboration is increasing in general and interdisciplinarity has gained a prominent position in contemporary research. It is against this background that the overall aim of this thesis is to increase understanding of information sharing in interdisciplinary practices. The study object of information sharing is explored in the interdisciplinary field of design research. One conceptual and three empirical studies are reported in the thesis. The empirical studies are all focused on the specific case of a Nordic network of design researchers.

In accordance with the thesis’ practice-based approach and in order to acknowledge the mobile and contingent character of the study object, the exploration oscillates between three nested and interconnected frames. It is shown how information sharing works as a contributor to the development, maintenance and shaping of practices in 1) design research as it is conducted in the Nordic network; 2) in the field of design research; and 3) within interdisciplinary research.

Study I presents a review of the Library and Information Science literature on information sharing. It is shown that previous studies have tended to focus either on people, information or context for sharing. The present project has explored these aspects in concert. On the basis of study I, the following empirical studies have resulted in the identification of not only interests, discourse, histories, and futures, but also trust dimensions and material objects as fundamental aspects to consider in the understanding of scholarly information sharing.

In study II, the focus is on how information sharing facilitates a collective understanding which underpins not only information practice but also the wider practice of design research. The study demonstrates how information sharing-activities are intrinsically intertwined with other information related activities such as information seeking and use. It is further established that information and communication technologies can be seen as parts of the arrangements that, together with practices, form the social site in which the scholars are active.

Study III focuses on trust issues in relation to information sharing. Here, it is demonstrated that strategies for creating and assessing trust encompass conscious collective efforts to establish an open and permissive atmosphere within the network, which is beneficial not only for information practice but also for the practice of design research. The creation of this atmosphere includes careful selection of suitable locations for seminars and conferences and the shaping of the material dimensions of workplaces.

Through the explicit inclusion of material dimensions of practice, introduced in study III, a beginning of a shift of focus took place. Study IV is fully concentrated on the role of materiality in sociality. Thereby, trajectories of sharing reaching across time and space are identified by studying how scholars interact with multidimensional objects, such as documents. It is thus demonstrated in study IV how material objects used in information sharing activities are contributing to the coordination and shaping of the social practice under study.
Through analysis and discussion of the four studies as a whole, the reciprocal relationship between information sharing and the area of design research has been elucidated. It is illustrated that information sharing, as it emerges in an interdisciplinary practice such as in the investigated network, functions as a unifying force towards the probable goal of establishing a discipline. Without losing sight of the empirical material, the theoretical analysis has made it possible to illuminate the connection between activities of sharing and the enactment of a discipline.
SVENSK SAMMANFATTNING

Forskningsamarbete ökar generellt och i dagens forskning har tvärvetenskapen intagit en central position. Mot denna bakgrund har föreliggande avhandlings övergripande syfte formulerats, vilket är att öka förståelsen av tvärvetenskapliga forskares sätt att dela med sig av och samarbeta kring information. Detta studieobjekt undersöks i ett tvärvetenskapligt fält i utveckling, nämligen designforskning. Avhandlingen rapporterar en begreppsutredande och tre empiriska studier. De sistnämnda utforskar samtliga ett nordiskt nätverk av designforskare.

I enlighet med avhandlingens praktikteoretiska ansats och i syfte att framhålla studieobjektets rörliga och flyktiga karaktär pendlar analysen mellan tre överlappande ramar. I avhandlingen visas därmed hur forskarnas samarbete kring information bidrar till att utveckla, underhålla och forma praktiker inom 1) designforskningen såsom den bedrivs inom det nordiska nätverket; inom 2) det internationella designforskningsfältet; och i 3) tvärvetenskaplig forskning.

Studie I presenterar en översikt av biblioteks- och informationsvetenskaplig forskning om hur forskare delar med sig av information sinsemellan. Översikten visar att den tidigare forskningen inom området har tenderat att inriktar sig mot antingen människor, information eller kontext. Föreliggande avhandlingsprojekt belyser samtliga dessa aspekter och deras inbördes relationer. Mot bakgrund av studie I har avhandlingens tre empiriska studier kunnat identifiera att såväl intressen, diskurser, gemensamma erfarenheter och visioner, som tillit och materiella objekt måste beaktas när vi försöker förstå vad som spelar roll för hur och varför forskare delar med sig av information.

Studie II fokuserar på hur det faktum att forskare delar med sig av information möjliggör ett slags kollektiv förståelse som dels underbygger forskarnas informationspraktik men även den vidare designforskningspraktiken. Av studien framgår hur aktiviteter kring informationsutbyte är sammenflätade med andra informationsrelaterade aktiviteter såsom informationssökning och informationsanvändning. Dessutom visar studien hur informations- och kommunikationsteknologier utgör en integrerad del av de socio-materiella praktiker forskarna är verksamma inom.

Studie III behandlar tillit och förtroende i relation till forskarnas samarbete kring och utbyte av information. Här visas hur forskarnas strategier för att skapa och värdera tillit och förtroende kommer till uttryck i medvetna kollektiva ansträngningar för att etablera en öppen och tillåtande atmosfär i nätverket. En sådan atmosfär, visar det sig, är till gagn inte bara för nätverkets informationspraktik utan också för designforskningspraktiken. En sådan atmosfär skapas bland annat genom de noggranna valen av lämpliga platser för konferenser och seminarier, liksom i utformningen av arbetsplatsernas materiella dimensioner.

Genom att explicit inkludera materiella dimensioner i analysen i studie III, kom ett fokus på tillit och förtroende i relation till forskarnas samarbete kring och utbyte av information. Här visas hur forskarnas strategier för att skapa och värdera tillit och förtroende kommer till uttryck i medvetna kollektiva ansträngningar för att etablera en öppen och tillåtande atmosfär i nätverket. En sådan atmosfär, visar det sig, är till gagn inte bara för nätverkets informationspraktik utan också för designforskningspraktiken. En sådan atmosfär skapas bland annat genom de noggranna valen av lämpliga platser för konferenser och seminarier, liksom i utformningen av arbetsplatsernas materiella dimensioner.

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tid och rum. Studien visar hur materiella objekt, till exempel dokument som används i sammanhang där information utbyts, bidrar till att koordinera och forma den sociala praktiken.


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The work presented in this thesis is conducted within the Linnaeus Centre for Research on Learning, Interaction and Mediated Communication in Contemporary Society (LinCS) at Gothenburg University and University of Borås. Along the way, I have received a lot of help and support so I take this opportunity to express my gratitude:

Jan Nolin and Olof Sundin, my supervisors, have patiently endured my eagerness to get on. By providing me with constructive critique, and by indicating alternative fruitful paths, they have slowed me down in a very healthy way and made me think further and better than I would have done on my own.

The project would not have been possible without my friends in Nordcode. Thanks to you all for allowing me to interview you and for letting me hang out with you. It is sincerely appreciated.

The Swedish School of Library and Information Science in Borås is indeed a good place for a thesis to grow. I have thoroughly enjoyed the seminars in which I have had the opportunity to present and ventilate my work. My fellow PhD students have read and commented on parts of my writing, for which I am grateful. Many of my other colleagues have also generously spent their time on reading my manuscript and attending my seminars. Therefore, a big thank you to my readers and commentators: Anna Lundh, Helena Francke, Katriina Byström, Louise Limberg, Mats Dahlström and Sanna Talja.

For her assistance on issues concerning the English language, I would like to thank Frances Hultgren.

Finally, for being a good reader and a wise commentator, but most of all for being a friend and companion through thick and thin – thank you, dear Jenny.

It gives me great joy to dedicate this book to my beloved boys Samuel, Noah and Calle, and our fluffy four-legged best friend, Cinnamon.
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The following four articles are included in the thesis:


The articles are referred to in the text by their Roman numerals (Studies I–IV).
No man is an island, entire of itself; every man is a piece of the continent, a part of the main. (John Donne, 1623)

1. INTRODUCTION

Brilliant ideas, solutions to difficult problems, important research contributions – they can all be traced to collaborative efforts of some sort. Even though books and articles produced within academia often only have one individual’s name stated as the author, arguably most of the work carried out in order to achieve these ideas and solutions is more or less the result of common efforts. Researchers do not work in isolation, but are rather embedded in a multitude of social practices. “[I]t is these webs of peer-to-peer connections that provide us with much of the stimulation and support essential for the development of our ideas and, ultimately, for the furtherance of our academic careers” (Cronin, 2005, p vii). The present thesis, for instance, is a good example of this.

Hardly a day has passed during the years I have been occupied with this project when I have not received or given, say, a reference to a paper or a book or a link to a web site to a colleague, a student or a friend. We tend to become reminded of each other when we read or use information, and usually we just go ahead and send an e-mail with a link or reference to a document, or we may knock on someone’s door in order to share the information in question.

However, even though information sharing tends to be going on almost constantly, it is a mundane, low-profile activity which is easily “relegated to a background of expectation” (Star & Strauss, 1999, p. 15). The low-profile character of the activity may have something to do with the fact that information sharing, like other information-related activities, can be described as an instrumental activity, that is, an activity carried out in order to achieve a goal beyond the activity in itself (cf. Sundin & Johannisson, 2005). For researchers, such as those who have participated in the present study, the main thing is not to deal with information, but rather to produce and disseminate information about the insights they have developed; as aptly put by Montgomery (2003): “There are no boundaries, no walls, between the doing of science and the communication of it: communication is the doing of science” (p. 1). In order to develop knowledge, however, researchers need to consider what fellow researchers do as well as the results of their endeavours, and in this respect information-related activities play a crucial role. So, despite it being a commonplace activity, one can reasonably claim that information sharing constitutes an important part of the fundament for research work.

Through previous research on information-related activities, it is well established and generally accepted that these activities are shaped by the contexts in which they are taking place; i.e. that the organization of the actions are considered “as emerging in situ from the dynamic of the interactions” (Gherardi, 2012, p. 18). Even though it might be possible to identify certain generic traits regarding, for instance, information seeking and use, an abundance of research within Library and Information Science (LIS) confirms the claim that specific communities, groups or categories of people have developed their specific
ways of seeking, using, and interacting with information\textsuperscript{1}. Why something gets done in a certain way can be explained with reference to a range of different reasons and which vary from context to context.

This thesis is about information sharing in interdisciplinary scholarly practices. An interdisciplinary field is here seen as an area of knowledge production which crosses or bridges disciplinary boundaries (cf. Frodeman, 2010, p. xxx). The study object of information sharing is explored in a specific case of interdisciplinary research, namely that of design research. Design research has been presented as interdisciplinary “by nature” in that it encompasses several domains such as natural sciences, humanities and liberal arts, social and behavioural sciences, and technology and engineering (Friedman, 2003, p. 508). The studies that are presented in the thesis are accordingly based upon the assumption that design research provides an opportunity to study information sharing in a complex academic setting.

In my previous position as librarian at a university that offers a study program for design engineering, I had the opportunity to familiarize myself with the knowledge area of design. The case, which is explored in this thesis, was thus partly selected on the basis of my previous knowledge about the field of design research, and on the fact that I had already identified possible entry points through which access to the field could be gained before starting this project.

In the light of the situated nature of information-related activities, it seems particularly suitable to explore an epistemologically and socio-culturally amalgamated network of scholars, in which there exists a variety of historically and socio-culturally shaped traditions and conventions guiding how information is produced, searched for, used and shared. The explorative efforts accounted for in this thesis are thus concentrated within a specific arena and on a specific community of people. The empirical studies presented are all focused on information sharing in a Nordic network of design scholars. The Norcode network, established in about 2000, is geographically dispersed over four Nordic countries and gathers approximately 100 researchers and doctoral students within the multifaceted area of communicative product design research. Moreover, Norcode constitutes a collaborative network with real working connections that are taking place both face-to-face and over a distance within the emergent interdisciplinary field of design. A further reason for conducting this project within the realm of interdisciplinary research is that this type of collaboration is gaining momentum (e.g. Sonnenwald, 2007). The Swedish Research Council, for instance, asserts that interdisciplinary has gained a prominent position in contemporary research (e.g. Sandström, 2005, p. 8).

The approach applied comprises analytical work within three frames: within 1) a specific network of researchers; 2) in the field of design research; and 3) within interdisciplinary research practices. The approach entails that I zoom in and out of the empirical case (cf. Nicolini, 2009) in order to trace and identify connections between the frames.

\textsuperscript{1} For several examples of accounts of situated information-related activities, see for example the long-standing conference ISIC – Information Seeking in Context.
In a general sense, the question of what matters regarding information sharing in scholarly interdisciplinary practices has guided me towards the aims and questions that are addressed in this thesis. A prominent issue is also how information sharing is interlinked with the wider project of design research.

A tentative line of reasoning about this general question could result in the assumption that it is information that matters the most in information sharing. Aspects such as relevance, timeliness and medium would then be investigated. An alternative focus might be on the people sharing information. Here, issues such as trust and credibility probably deserve attention. Through engaging in aspects of cognitive authority (Wilson, 1983), interest could be devoted to answering questions such as whether it matters who the sharers are, where they work, what positions and titles they have. It would probably also be fruitful to investigate the incentives and reasons people have for sharing information. In relation to reasons and incentives for sharing, it might also become interesting to find out if people are sometimes unwilling to share information, and if so, why. Other potential aspects towards which attention could be turned in order to understand information sharing activities include situated aspects such as time and place and the ways in which they interplay with information sharing activities.

There are presumably no clear-cut answers to these tentative questions. However, on the basis of the studies carried out within this thesis project, I suggest that all these aspects contribute in shaping the ways in which information is shared, for whatever reasons. It also seems reasonable to assume that information sharing activities cannot be understood without regard to the social practices in which information is being shared. Likewise, however, and importantly, it should also be acknowledged that social practices are shaped by the activities going on. It therefore seems wise to explore what information sharing activities do to the interdisciplinary field of design studies.

Research on information sharing has increased considerably during the last decades, and within LIS, the need to explore information sharing in future studies is emphasized (e.g. Limberg & Alexandersson, 2010; Wilson, 2010). A search in the Scopus database for documents with titles containing the phrase “information sharing” shows that the number of papers published during the 90s seldom exceeded 20 papers per year, whereas from year 2000 onwards, there is a steady increase: roughly 200 papers per year were published in 2010 and 2011 respectively. Of the 201 papers that were published in 2011, slightly more than half were produced within the areas of engineering and computer science; areas in which the term is predominantly used in order to denote the “transfer of information from one system to another” (Wilson, 2010, no pag). The terminology itself indicates a prevalent technological perspective on information sharing, and is also characteristic of the relatively numerous contributions on information sharing that refer to supply-chain management. As noted in previous research (e.g. Cronin, 2006, Kling & McKim, 2000), even when a more sociologically oriented perspective on information sharing is applied, a tendency towards technological determinism can be identified. It has thus been assumed that if a system intended for information sharing is implemented people will act in accordance with it and its expectations. Even though there are authors...
who conceive of information sharing as part of “the full spectrum of information behavior, which also includes information use, information avoidance” (Jaeger & Burnett, 2005, p. 466) and information seeking, it has been put forth that information sharing in academic communities, which is the study object of this thesis, has “rarely been taken as objects of analysis in their own right” (Talja, 2002, p. 143). Against this background, the work at hand has the potential to offer a substantial contribution.

To briefly recapitulate the research problem, it can be stated that interdisciplinary research is increasing and needs to be further explored. Even though information sharing constantly seems to be going on, and in this respect is part of the backbone of research, relatively little is known about its character and role in scholarly practices. Furthermore, even if there are an increasing number of Library and Information Science studies on information sharing, this relatively small sub-area of LIS is rather scattered. The studies that focus on information sharing in scholarly work practices are few. If we widen our perspective and approach areas or disciplines adjacent to LIS, the contributions that are to be found are, to a great extent, focused on technological solutions for sharing. In sum, the dearth of studies on information sharing in academia, and an imbalance favouring a technological perspective on information sharing, motivate the present project. It can also be added that the network under study expresses an explicit wish to enhance and improve their routines for information sharing.

1. 1 Aim and research questions

In this thesis, information sharing is conceived as embedded in the wider social practice of design research. The activity of information sharing, which can be carried out in various ways, is seen as one of several inter-connected and often intertwined information-related activities that taken together constitute the studied design scholars’ information practice. With a particular focus on information sharing, the aim of the thesis will be achieved through describing and analysing the scholars’ information practices. The overall aim is to deepen our understanding of the specific activity of interdisciplinary scholars’ information sharing. By reaching the aim, the thesis will contribute to explicate information sharing in scholarly interdisciplinary practices, here represented by the field of design research.

In order to fulfil the aim, one conceptual study and three individual but inter-connected empirical studies that focus on various aspects of information sharing in the Nordcode network were conducted. The overarching, multi-facetted research questions are: How, where, when, and why do interdisciplinary researchers share (or not share) work-related information? And how do information sharing activities interplay with the research field in which they are taking place? The overarching questions relate to varying extents to all of the empirical studies, which were designed in order to explore the selected case. However, each study has also been guided by a set of more detailed research questions, which are summarized as follows:

1. In what ways do LIS researchers define the concept of information sharing and in doing so connect it with theory, empirical material and other supporting concepts?
2. How do design scholars share information with each other and other people?
3. Where do trust issues emerge in relation to design scholars’ information sharing and what strategies for assessing and creating trust can be identified?
4. What are the socio-material dimensions of design scholars’ information sharing activities and how can information sharing be described from a temporal perspective?

The decision to present the project in the shape of a thesis by publication (rather than as a monograph) was to a certain extent made because this form offers more opportunities to explore a study object from a number of different, but still interconnected perspectives. The perspectives that are represented in the research questions should therefore be perceived as mirroring the ambition to approach an object taken as a whole but through a pluralistic approach.

A PhD project such as the one reported in this thesis is also open for a temporal perspective, which would not otherwise have been possible in a study carried out within a more limited time period. It has allowed me to observe changes in practice over time. An important feature related to this opportunity is mirrored in the thesis’ subtitle – the enactment of a discipline – and regards the reciprocal relationship between information sharing and the area of design research. I will argue that the interdisciplinary field of design research, as it appears in this project, is striving towards the status of a discipline, and that information sharing plays a crucial part in this process of “disciplining”.

The thesis contains eight chapters. The present chapter, which introduces the research problem and the questions that have guided the study, is followed by a chapter that aims to contextualize the study within the research traditions that the thesis builds upon. In chapter three, the empirical setting of design research is presented and the concept of interdisciplinarity is introduced. Through their emphasis on concepts, both chapter two and three are theoretical in character, but it is chapter four that outlines the thesis’ theoretical framework. The theoretical account provides a starting point for, and is closely related to, chapter five in which the methods applied in the studies are described with reference to the empirical setting and the theoretical framework. The method chapter also discusses some methodological issues that have emerged during the process of conducting the four studies. In chapter six, the four studies are summarized in order to prepare for the concluding discussion, which takes place in chapter seven. The last chapter constitutes the second part of the thesis and contains the four articles in which the studies are reported.
2. LITERATURE REVIEW

This chapter serves the purpose of demonstrating the thesis’ location in the discipline of Library and Information Science. This is done through an explication of concepts that are of importance for the understanding of the subsequent chapters, and through a brief and selective review of literature pertaining to the area of scholarly information practices.

2.1 The thesis’ location in LIS

Through its effort to describe and analyse how and why researchers share information, this thesis is located in the discipline of Library and Information Science (LIS). The discipline has been described as an interdisciplinary domain with connections to fields such as computer science, communication, and education (e.g. Larivière et al, 2012; Estabrook, 2010; Palmer, 2010). With Becher and Trowler (2001) LIS can be described as divergent and characterized by indistinct boundaries (cf. Nolin & Åström, 2010; Wilson, 2002) in so far as researchers tend to draw on other disciplines such as sociology, education and psychology. It is also noticeable that LIS embraces an area that spans and brings together a range of theoretical approaches and methods of inquiry (Cronin, 2012; Leckie, Given & Buschman, 2010; Wildemuth, 2009).

There is more than one example of brief accounts of LIS where the discipline is divided into two or three main strands with various foci (e.g. Bawden & Robinson, 2012; Buckland, 2011). Patrick Wilson (1996) describes it as divided into two main areas. One, which is often referred to as information science, is primarily concerned with the design, organization, implementation and evaluation of information storage and retrieval systems, the theory of information retrieval and search strategies, and the practices of indexing. The second area, in which the present thesis is located, has a clearer connection to social, behavioral and humanistic studies and relates to the sociology of knowledge, the sociology of scientific practice, as well as to knowledge formation and learning theories. This latter area is not as compact and well-defined as the first mentioned area and can be described as multi-faceted and with a more scattered literature. It is often referred to as information studies, which, according to Cronin (2008, p. 469) is “a more expansive territory than information science”.

The studies presented in the thesis do all clearly adhere to the second area outlined by Wilson (1996) since they are based on the assumption that in order to develop knowledge about people’s doings and sayings, the researcher needs to take a stance that embraces not only the activities of the people studied but also the place where they are, the tools used for their activities, and the prevailing discourses.

Information behaviour\(^3\) is the most established term for labelling the sub-area of LIS to which the thesis primarily relates. It is well explored and through a multitude of contributions it can be said to have matured over the years, both empirically and theoretically (Fisher & Julien, 2009, p. 38). At this date, there are a number of fairly substantial reviews of the area (e.g. Dervin & Nilan, 1986; Case, 2002, 2006, 2012;

\(^3\) Information behaviour is a contested term (see for example “The behaviour/practice debate”, 2009). Here, though, it is enough to establish that the field in which the thesis is located often is named information behaviour.
Fisher & Julien, 2009). Another label which is not as widespread is that of Information, needs, seeking and use (INSU)\(^4\). An emerging alternative is to describe the area as research on information practices\(^5\). To label a research field is not only a matter of giving it a suitable name; by explicitly adhering to a particular label, the speaker also communicates a certain meta-theoretical\(^6\) standpoint. For this dissertation, for instance, it is important to declare that the thesis presents a contribution to the research area of information practices. In chapter four, I will return to and elaborate on the reasons why this is of importance.

In this thesis, the activity of information sharing is understood as one of several kinds of activities that taken together constitute an information practice. Information sharing is viewed as embedded in and intertwined with a range of other activities. There are numerous examples of previous research that have investigated specific ‘facets’ of the complex of information practices, for instance; information seeking, information searching and information use (e.g. Wilson, 1999; Ellis & Haugan, 1997; Kuhlthau, 1991; Bates, 2002), information needs (e.g. Taylor, 1968), information avoidance (e.g. Chatman, 1996; 1999), information encountering (e.g. Erdelez, 1997; Foster & Ford, 2003), and the establishment of credibility in information and information resources (e.g. Francke & Sundin, 2012). These information-related activities have been explored in a variety of social settings, often categorized in accordance with some overarching description, such as work-related information activities (e.g. Lloyd, 2009), everyday-life information activities (e.g. Savolainen, 2008), information activities in educational contexts (e.g. Alexandersson & Limberg, 2012), and the information activities of scholars and scientists (e.g. Talja, 2002, Palmer & Cragin, 2008). The last mentioned setting is explored in this thesis.

2.2 Important concepts in research on information sharing
In order to explicate the empirical and theoretical research traditions that the present work builds on, the following sections of the chapter review a selection of studies that in various ways relate to the thesis. The account is structured around a set of concepts that need to be explained and discussed so that they become meaningful and useful in the final chapters of the thesis.

\(^4\) It can for example be noted that there is a special interest group under the American Association for Information Science and Technology that goes under the name SIG USE, which stands for the special interest group of Information Needs, Seeking and Use.

\(^5\) When I state that “information practices” is an emerging alternative to the dominating concept of “information behaviour”, it should not be understood as if I thereby claim that the concepts convey exactly the same meaning, or refer to one and the same referent. As I will argue further on in this chapter, concepts can be used for various reasons. What I am discussing here mainly refers to the use of a concept as a label for a research area.

\(^6\) Talja, Touminen and Savolainen (2005) present a distinct literature-based account that explicates the notion of metatheory: ”In short, a metatheory is as a set of assumptions about the nature of reality and human beings (ontology), the nature of knowing (epistemology), the purposes of theory and research (teleology); values and ethics (axiology); and the nature of power (ideology) /…/. A metatheory enables researchers to determine what kinds of entities, for example, information, knowledge, users and information retrieval systems are. Metatheories serve as orientation strategies and are broader and less specific than unit theories /…/. In essence, they are “systems of mutual dependencies” /…/ bringing into researchers’ view a specific object of study and a way of studying this object” (p. 93, note 1).
The area of information behaviour is conceptually rich and many of the key concepts are quite theoretically loaded and open to a multitude of interpretations. They can also be used for several reasons and one and the same concept can serve different purposes depending on how it is used. In the subsequent account, three major functions of concepts are discussed. There are concepts whose prime function is to be part of a theoretical frame; the concept of “information practice” is a prominent example. An important aspect of “information practice” as a theoretical concept in this thesis is its ability to guide the researcher regarding what to look for and take into consideration in the analysis. In this respect one can talk about the concept as something that focuses the theoretical lens, but since concepts can have different functions simultaneously, the concept of “information practice” can also be used empirically. One of the prime aspects of an empirical concept is to support the design of a study, for example to guide the selection of unit of analysis. Another aspect is the empirical concept’s capacity as a tool for identifying and describing phenomena and activities in the field. Empirical concepts can but must not necessarily emanate from the empirical material. They can just as well be the result of a tacit and gradual agreement of a group of researchers in a field. Finally, there are also those concepts that serve primarily as markers of contrast, i.e. concepts that are not theoretically or empirically relevant but still need to be taken into consideration as demarcation points. An example of the latter for this thesis is the concept of “information needs”.

The basic idea with the following account is to start on a rather general conceptual level, by first reasoning about the overarching concept of information behaviour, which is contrasted to that of information practices. In the following subsection, the concept of information, as it is used in the thesis, is briefly accounted for. Thereafter, a set of studies that pertain to the concept of information needs is discussed. The chapter then continues by briefly accounting for the activities of searching, seeking, encountering and avoiding information. A selection of studies dealing with information use and the establishment of credibility in information and information resources are then presented. Since the concept of information sharing is thoroughly explored in study I, there is no specific section aimed at the concept in the review in this chapter. However, as may have been noted, the concept is referred to and explicated throughout this chapter.

2.2.1 The area of information behaviour and the theoretical notion of information practices

The concept of “information behaviour” has (at least) two connotations. Bates (2010, p. 2381) makes the following distinction:

[Information behaviour is a] term used to describe the many ways in which human beings interact with information, in particular the ways in which people seek and utilize information. [It] is also the term of art used in library and information science (LIS) to refer to a subdiscipline that engages in a wide range of types of research conducted in order to understand the human relationship to information.

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7 In chapter four, I will return to the concept of “practice” and discuss its capacity as an empirical, as well as a theoretical, concept.
For the present work, it is the second of these connotations that is in focus; hence the term “information behaviour” is mainly used in order to name the subfield of LIS that the thesis is located in.

The theoretical foundation on which the thesis rests is influenced by practice theory (e.g. Schatzki, Knorr Cetina & de Sevigny, 2001). As will be clarified in chapter four, reasons for the chosen theoretical framework primarily reside in the nature of the study object but, in part, the choice is also due to a specific strand in previous research that has contributed in strengthening my theoretical position. One common denominator for these studies is that they in various ways take their points of departure in the concept of information practice. The practice approach to the study of information-related activities represents a “sociologically and contextually oriented line of research” (Talja, 2005, p. 123). Tuominen, Talja and Savolainen (2005), for example, point out that in contrast to studies that adhere to the concept of information behaviour, information practice-oriented studies assume “that the processes of information seeking and use are constituted socially and dialogically, rather than based on the ideas and motives of individual actors” (p. 328). Cox (2012, p. 184) follows a similar line of reasoning when he notes that in the field of information behaviour, “the implicit norm is the individual rational actor actively pursuing a pre-given cognitive need”. In a review of the “umbrella concepts” of information behaviour and information practice, Savolainen (2007) asserts that both concepts “seem to refer to the ways in which people ‘deal with information’. The major difference is that within the discourse on information behavior, the ‘dealing with information’ is primarily seen to be triggered by needs and motives, while the discourse on information practice accentuates the continuity and habitualization of activities affected and shaped by social and cultural factors” (p. 126). As can be seen in the quote, Savolainen, like the other authors mentioned here, highlights that in contrast to the proponents of the concept of information behaviour, those that advocate the concept of information practice give prominence to social and cultural factors when investigating information-related activities. He also particularly emphasizes that the practice-approach “devotes attention to the processes of information sharing” (p. 125), which is an area that is not as emphasized by the proponents of the theoretical concept of information behaviour.

Apart from the focus on social and cultural factors and the acknowledgement of continuity and habitualization, another recurring feature in practice-based studies is that of materiality (e.g. Reckwitz, 2002b). Hitherto, there are relatively few studies within the area of information behaviour that have paid attention to the role of material objects in information-related activities; those that have tend to have taken a practice approach. Cavanagh (2012, p. 222), for instance, in her study of face-to-face reference transactions in a public library, observes that “[v]irtually all of the individual staff-patron interactions /…/ illustrated tight connections with at least one or more of the library’s information ‘things’”; most notably the “library computer” , but also “the physical space and arrangement of the furnishing, reference-specific and other library collections /…/ are among the many actors participating in the performance of reference work” (Ibid., p. 218). Haider (2011) explored the information practices of holidaymakers from an environmental perspective. She concludes that “[o]bjects like cars, compost heaps, waste
bins, low energy light bulbs, and the practices tied to them seem to have become carriers of environmental information in themselves” (p. 836). Lloyd (2010) accounts for a series of studies in which she has explored the enactment of information literacies among emergency services workers. With a particular focus on corporeality as one of several information modalities, she draws the conclusion that “[w]ithin an information environment, knowing is not just produced when people engage with encoded knowledge //...// [but also] when people engage with objects, artefacts, symbols, other people and practices” (no pag.). All of the three aforementioned authors demonstrate that for the study of information-related activities, it is fruitful to encompass seemingly mundane material objects when analyses are carried out. However, the object of information, which tends to be taken for granted in studies within the field of information behaviour, also needs to be considered in accordance with this line of thinking. It has, for instance, been suggested that “[b]y considering the material properties of information, a better understanding of the interplay between information artefacts and practices could be created” (Sundin, 2008, p. 17). Sundin’s suggestion evokes an issue that has been extensively discussed within LIS over the years, i.e. how we should treat and define the concept of information (e.g. Capurro & Hjørland, 2003).

2.2.2 The concept of information

Regarding the issue of how to approach the concept of information, Buckland’s (1991) distinction between three ways of understanding “information” is useful for explaining the concept as it is used in this thesis. He separates between:

1) Information-as-process – where “information” is that which changes what someone knows (i.e. the act of informing)
2) Information-as-knowledge – where “information” is “used to denote that which is perceived in information-as-process”
3) Information-as-thing – where “information” is “used attributively for objects, such as data and documents //...// [which] are regarded as being informative”. (Buckland, 1991, p. 351)

Even though information-as-process underlies a number of influential theories of information behaviour (Bawden & Robinson, 2012, p. 71), it is information-as-thing that most clearly correlates with how information is conceived in this thesis.

In study I, three explicit stances towards information are identified in the LIS literature on information sharing: 1) information as that which makes sense. This is a stance that to a high degree corresponds with Buckland’s notion of information-as-process. The second stance is described as 2) the essence of information. The illustration of this stance used in study I comes from a paper by Haythornthwaite (2010) in which “information” refers “to the intangibles of data, information, or knowledge” (p. 4837). This notion resembles Buckland’s information-as-knowledge. The third identified stance emphasizes 3) the materiality of information. This view of information has governed how information sharing, the central object of study in the thesis, is theoretically and empirically conceptualized. Information sharing is conceived as an activity comprising the giving and receiving of informative objects such as texts, images and other representations, as well as the exchange of information about various informative objects (cf. Bates, 2009). This
take on information corresponds with the practice-theoretical stance which emphasizes the material aspects of practice.

2.2.3 Information needs

“Information needs” is an example of a concept that is not theoretically or empirically relevant for the present thesis, but still needs to be taken into consideration as a demarcation point. As emphasized by Cox (2012, p. 184), the concept does not function well with a practice theoretical approach. However, even though the concept is contested (Bawden & Robinson, 2012, p. 189) it is well established in the information behaviour-discourse. Therefore a thesis such as this, which is occupied with the issue of how and why people deal with information, must at least comment on the concept.

An influential typology of information needs was developed by Taylor (1968). According to Case (2012, chapter 4) it is the most cited work in the area of information needs, and its visibility in the LIS literature continues to increase (Chang, 2013). According to Taylor, an information need is something that starts viscerally. The need is then formalized before it finally gets compromised in relation to an interaction with some kind of information source. The idea of a need as something that originates from within a person is recognizable in several influential model-makers that have appeared after Taylor within the area of information behaviour. Three noteworthy examples are Belkin’s idea of an “Anomalous States of Knowledge” (the ASK model); Dervin’s “gap metaphor” (Belkin, 2005, p. 45); and Kuhlthau’s “uncertainty principle” where “[u]ncertainty is a cognitive state that commonly causes affective symptoms of anxiety and lack of confidence” (Kuhlthau, 1999, no pag.).

A different take on information needs, which conforms to the theoretical approach taken in this thesis, can be found in contributions that emphasize the co-constructive and dialogical aspects of information needs. According to such an approach information needs are “formed through linguistically communicated processes of negotiations” (Sundin & Johannisson, 2005, p. 112); they are not “fixed entities residing in the head of the information seeker [but rather] collaboratively negotiated and constructed” (McKenzie, 2004, p. 685; cf. Lundh, 2010). Sundin and Johannisson apply a neo-pragmatist stance in order to elaborate their idea of the situated nature of information needs and how they are socially shaped in interaction. They view the negotiation and the shaping of information needs as a social practice, which they define as “an institutionalized activity that consists of more or less formal sets of rules concerning, among other things, what should be considered ‘proper’ information seeking” (p. 112). These activities take place in different communities of justification “where the rules are negotiated and become formalized” (Ibid.). This is a view that clearly corresponds with the description that transpires in this thesis of how design researchers deal with and judge the information they encounter. In sum, it can be posited that people do experience information needs, but with reference to

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8 It is not only among practice-theoretical scholars that the concept is problematic: Bawden and Robinson (2012) establish with general reference to the area of information behaviour that "[t]he whole idea of an ‘information need’ is a contested concept, some writers arguing that there is no such thing. Some scholars argue either that information needs are ‘really’ other kinds of need – so that a need for information on the location of the nearest pizza restaurant is ‘really’ an expression of a need for food – or that information needs are ‘only’ an expression of a psychological state of mind” (p. 189).
the literature that has inspired the thesis, it seems reasonable to assume that they arise through contextually bound negotiations about what is worth knowing in specific practices, rather than as visceral needs.

2.2.4 Seeking, searching, encountering, avoiding and withholding information

Information seeking is a concept in the field of information behaviour that is frequently used, but primarily on an empirical level. There is some variation regarding the meaning of the concept. In a much quoted passage, Tom Wilson defines “information seeking behaviour” as “the purposive seeking for information as a consequence of a need to satisfy some goal” (Wilson, 2000, p. 49). Reijo Savolainen presents a somewhat broader and more theoretical definition. He conceives information seeking as “a major constituent of information behavior or information practices, that is, the entirety of ways in which people seek, use, and share information in different contexts” (Savolainen, 2009a). In the numerous models of information behaviour that exist (e.g. Wilson, 2009) information seeking tends to be described as a discrete part of the overarching concept of information behaviour. However, from a practice-based perspective on the study of information-related activities according to which the seeking of information is inextricably intertwined with and embedded in other activities, it is problematic to distinctively separate one activity from another; for example information seeking from information use. Therefore, for this thesis, Savolainen’s definition stands out as preferable to Wilsons’ narrower definition. It should not be denied, however, that for analytical reasons it can be illuminating to speak in terms of information seeking as an activity in itself. Or, as stated by Palmer and Cragin (2008), even though “[a]ny given activity is best studied and understood as part of a larger field of disciplinary practice […] there is also a need for a more thorough synthesis of results on what we have learned about specific activities” (p. 185). This is also the reason why I have decided to present the concepts in this section of the chapter as separable units. Information sharing, for instance, is unlikely to be undertaken without it to some extent being related to information seeking and use.

A review of the literature within the field of information behaviour indicates that information seeking is often approached on the basis of a categorization of either specific roles or groups (e.g. information seeking of scientists, parents, students, insurance agents etc.); on the demographics of information seekers (e.g. tweens, the elderly, rural people etc.); or on the context in which the information seeking takes place (e.g. in schools, in the workplace, in everyday life etc.). (cf. Savolainen, 2009a) The main focus for the studies presented in this thesis is on information practices taking place in a research work-context. Worth pointing out, however, is that it is a delicate matter to draw an exact line between work and non-work (e.g. Given, 2002). There is, for instance, more than one example in the empirical studies included in the thesis where the participants refer to aspects they regard as important to their information practices and which are not usually included in the general perception of what constitutes work. For example, they refer to locations and places outside the regular workplace and they point at friendship as an example of something that matters in decisions to share information with someone. In addition, according to some practice theorists (e.g. Gherardi, 2006) practices are always

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9 It should be acknowledged that Wilson in other texts than the one quoted here (e.g. 1999) does present information seeking as an integrated part of an overarching “problem-solving process”. 22
related to other practices, which indicates that it is hardly possible to clearly delineate, for instance, a work context from a non-work context. Nor is it fully possible to separate an information practice from the wider practices of design research, which I will discuss further in the thesis’ concluding chapter.

In Wilsons (1999) nested model of information behaviour, the activity of information searching is empirically conceived as a “sub-set of information-seeking, particularly concerned with the interactions between information user (with or without an intermediary) and computer-based information systems” (p. 263). Even though Wilson primarily discusses the three levels in his model as a series of nested fields for investigation that have attracted researchers in the field, the model can also be used in order to conceptualize the various activities that are discernible in an information practice. For this thesis, for instance, it is useful to have an analytical concept that can be applied to a specific kind of activity that needs to be identified and discussed. For the same analytical reason, information encountering or serendipity can be pinpointed (e.g. Erdelez, 1997; Foster & Ford, 2003; Makri & Blandford, 2012a & b). To find information serendipitously implies that beneficial information is stumbled over by chance; it is about discovering something that can be used without seeking for it, which is a phenomenon that has been identified as an important part of research work (e.g. Foster & Ford, 2003).

In the data produced for the studies presented here, there are a number of instances that can be described as information encountering. Of specific interest for the present investigation are those instances where people encounter information that makes them think of others, such as peers, to which they alert them (cf. Erdelez & Rioux, 2000). Although not as prominent in the data, even the concept of information avoidance (e.g. Narayan, Edwards & Case, 2011) is useful for the present thesis. Narayan et al (2011) have identified two aspects of the phenomenon – passive avoidance and active avoidance. The former kind is described as a “long-term avoidance of abstract information relating to one's long-held and deeply-held beliefs of self and identity” (p. 5), whereas active information avoidance is depicted as “a short-term rejection of information that was more of a stress-coping mechanism in response to some concrete information avoidance” (Ibid.). In the empirical material of the studies presented here, there are instances of active information avoidance, for example to prevent distraction from the planned direction of research. Related to the activity of avoiding information is that of withholding information – i.e. “the intentional failure to share potentially useful information with others” (Haas & Park, 2010, p. 873) – which is an element that is not particularly prominent but does exist in the empirical material.

2.2.5 Using and evaluating information
Of all the concepts discussed in this chapter, “information use” is probably the vaguest and that which gives rise to the greatest variation of definitions. At least partly, this “porosity” is probably due to the concept’s dual potential capacity both as an empirical and a theoretical concept. A general, albeit tentative, conclusion that can be drawn from reviews of the concept of information use (e.g. Kari, 2010; Savolainen, 2009b) is that its conceptual vagueness also depends on the concept’s vicinity to other core concepts such as “knowledge” and “understanding”, and to the related activities of, for instance,
“analysing”, “processing” and “constructing”. In an analysis of the LIS research literature, Kari (2010) discovered seven major approaches to the conceptualization of information use. A widespread empirically oriented approach is to conceive information use as the interaction with information sources where use implicitly is considered as a “subconcept of information search” (Ibid., no pag.). Meaning-making (e.g. Kuhltau, 2004) and sense-making (Dervin, 1983) are influential metaphors that are closely related to the activity of information use. These are in turn related to the idea of knowledge construction, for example, through discursive action (Tuominen & Savolainen, 1997). The various definitional approaches to information use that can be found in the literature mirrors Wilson’s (2000) definition of “information use behaviour” in the respect that it is an activity that is described, understood and discussed from both a cognitive and a physical perspective:

Information Use Behavior consists of the physical and mental acts involved in incorporating the information found into the person's existing knowledge base. It may involve, therefore, physical acts such as marking sections in a text to note their importance or significance, as well as mental acts that involve, for example, comparison of new information with existing knowledge (Wilson, 2000, p. 50).

The conceptualization of information use that is applied in this thesis acknowledges both these acts as interrelated aspects, but a fundamental dimension of the understanding of information use concerns its situational and context-bound character. In line with Savolainen’s (2009b) analysis of Cook and Brown’s (1999), and Orlikowski’s (2002) concepts of epistemic work and knowing in practice, the approach taken here is that information use is an activity, which becomes meaningful when “conceived of as an integral component of action or practice” (Savolainen, 2009b, no pag.), even though a result of this perspective is that “it may be difficult to identify phenomena that are specifically characteristic of” (Ibid.) information use. A crucial issue is what the participants in the studies do with information. In order to present a fine-grained description and analysis of people’s doings with information more specific concepts need to be employed.

One such specific facet of information use is that of credibility assessment. The assessment of credibility of information and people is a ubiquitous activity (Rieh, 2009) which is carried out on several grounds and where a multitude of dimensions are evaluated simultaneously. Rieh, (2009) presents a typology of credibility with three different foci for credibility assessment: sources, messages and media. Somewhat simplified (a) source credibility concerns the assessment of people or groups of people; (b) message credibility pertains to aspects such as content, structure, language and the presentation of a message; (c) media credibility, finally, is concerned with the various media channels a message can be sent through. For the present study, it is mainly issues related to the credibility of sources and messages that are of interest. In her typology, Rieh (p. 1339) also mentions a number of variants of credibility which have been suggested by researchers that focus on social endorsement. Some of these are relevant for the analysis and discussion of credibility aspects in relation to information sharing; for instance conferred credibility which relates to a source’s or a persons’ positive reputation. Another type of credibility which is especially relevant in a scholarly context is that of
Another type of credibility which is especially relevant in a scholarly context is that of instance the analysis and discussion of credibility aspects in relation to information sharing; for suggested by researchers that focus on social endorsement. Some of these are relevant for Rieh (p. 1339) also mentions a number of variants of credibility which have been related to the credibility of sources and messages that are of interest. In her typology, media channels a message can be sent through. For the present study, it is mainly issues simplified which is carried out on several grounds and where a multitude of dimensions are assessment of credibility of information and people is a ubiquitous activity (Rieh, 2009) to be employed. description and analysis of people's doings with information more specific concepts need participants in the studies do with information. In order to present a fine-grained result of this perspective is that “it may be difficult to identify phenomena that are integral component of action or practice” (Savolainen, 2009b, no pag.), even though a information use is an activity, which becomes meaningful when “conceived of as an epistemic work and concepts of Savolainen’s (2009b) analysis of Cook and Brown’s (1999), and Orlikowski’s (2002) information use concerns its situational and context-bound character. In line with these acts as interrelated aspects, but a fundamental dimension of the understanding of information use behavior in the respect that it is mirrors Wilson’s (2000) definition of “information use behaviour” in the physical perspective: an activity that is described, understood and discussed from both a cognitive and a physical perspective:

2.2.6 Summary of concept review
In order to summarize the conceptual exposition, I return to the specific case of design research. It can be posited that it is possible to explicate several pertinent activities taking place in design researchers’ information practice. They are contingently exposed to and have reasons to engage in all of these activities. They are involved in information seeking processes that are more or less planned, structured and extended and which encompass features of information searching. From time to time they encounter information by chance. They are constantly using information which often entails a focus on the assessment of its credibility and of the people that supply them with information. Occasionally and for various reasons they perceive the need to avoid and also withhold information. Together with information sharing, these activities make up the backbone of the design researchers’ information practice. It is, however, important to point out that a practice is more than all the activities it encompasses taken together. As will be accounted for in chapter four, in order to describe, analyse and understand a practice it is crucial to also consider the societal and the material aspects surrounding and infusing practices, as well as individuals’ and collectives’ interests and ideas.

2.3 Scholarly information practices
Scholarly communication is an area in which all conceivable professional activities that scholars and scientists engage in are described and discussed. Thorin (2006) identifies three distinct aspects of scholarly communication:

1. the process of conducting research, developing ideas and communicating informally with other scholars and scientists; (2) the process of preparing, shaping and communicating to a group of colleagues what will become formal research results; and (3) the ultimate formal product that is distributed to libraries and others in print or electronically (Thorin, 2006, p. 221).

The above quote is represented here since it encapsulates central aspects of scholarly communication. It is important to note, however, that “[t]he cycle of scholarly activities is blending into a continuous, looping flow, as people discuss, write, share, and seek information” (Borgman & Furner, 2002, p. 4).

There is a longstanding interest within LIS in both formal and informal scholarly communication. It is often claimed (e.g. Dervin & Nilan, 1986) that it was not until the seventies that a shift in perspectives took place regarding use and user studies; a shift which is said to have indicated a move from a system-centered approach to a user-centered approach. However, in a paper from 2007, Talja and Hartel argue that the “narrative of the user-centered turn” (no pag.) needs to be revisited. By reviewing original contributions and previous reviews of literature from the 40s to the 80s mainly pertaining to the area of scholarly communication, they convincingly show that there were several

25
examples of studies that advocated a sensitive and context-related view of users and systems in concert, which is an interpretation that clearly differs from the one presented by Dervin and Nilan (1986) and many others (e.g. Vakkari, 1997, Case, 2002, Wilson, 2002). Talja and Hartel (2007) mention a number of authors who conducted studies where “the focus was placed on scholarly communication conceived very broadly, incorporating /.../ the full arc of communication and information practices” (no pag.), e.g. Menzel (1960, 1966); Parker and Paisley (1966); and Swanson (1966). If we add to this tradition of scholarly communication studies, contributions located in what nowadays is recognized as Science and Technology Studies (STS), a strand with a multitude of important works appears. One can, for example, point at de Solla Price’s works on citation networks (e.g. 1963; 1965), and Crane’s (1972) exploration of invisible colleges, i.e. informal social groups of scientists where research work is discussed.

STS is indeed an important source of knowledge and inspiration for the area of scholarly communication in general (van House, 2004; Talja, 2009) and for this thesis in particular. In a bibliometric study, Van den Besselaar (2001) identified a set of subfields of STS which he grouped in three main strands: policy oriented STS, quantitative STS (including scientometrics), and qualitative STS (cf. Van House, 2005). It is primarily the third of these strands that informs the present thesis. A characteristic trait of the qualitative strand of STS is the view of scholarly practices and knowledge production as collective processes in which “knowledge is embedded in streams of practical activity” (Shapin, 1994, p. xxvi). In accordance with such a stance, the key to the further understanding of scholarly work and knowledge production, including information sharing activities, lies in empirical investigations of what researchers actually do and say, of how they negotiate claims and interact with artifacts and each other when they carry out their work. It is a matter of exploring what Knorr Cetina (1999) terms epistemic cultures: “amalgams of arrangements and mechanisms – bonded through affinity, necessity, and historical coincidence – which, in a given field, make up how we know what we know” (p. 1). This tendency towards an approach that is dominated by the conviction that human interaction cannot be studied in isolation, but must be considered in concert with work practices and material objects, also appears clearly in Talja’s (2009) brief overview of science and technology studies. The structure of Talja’s account is based upon a range of theoretical perspectives that can be traced to STS: the social shaping of technology; actor-network-theory; the social construction of technology; gender and technology studies; and the practice theory of technology. Common to these perspectives “is the idea that the social and the technical interact and mutually shape one another, leading to the notion that human-information interaction cannot be meaningfully studied as disconnected from technological systems” (Talja, 2009, p. 4611). This idea also permeates the present thesis.

As previously indicated in the chapter, there is a specific strand of user studies that concentrates on the information related activities of scholars and scientists. The remaining part of the chapter aims to account for a small selection of studies that deal with scholarly information practices. Palmer and Cragin’s (2008) review of literature on scholarship and disciplinary practices, published in the Annual Review of Information Science and Technology, makes a suitable starting-point for the account since it shares the information practices-approach that characterizes the work at hand. They assert that “[t]he holistic and
materialist practice approach is well suited to research aimed at understanding the diversity of resources and activities involved in the scholarly process” (p. 170). However, they also note that “studies of scholars have often examined information sources, channels, and technologies with the associated practices remaining implicit in the analysis” (Ibid., p. 171). For this thesis, it is of particular interest to mention those studies that have striven to explicate information-related activities with regards to the broader notion of social practice (e.g. Kling, McKim & King, 2003; Talja & Hansen, 2005; Fry, 2006). That is, studies that approach scholarly information practices as embedded within and shaped by the social practices that they are part of. Whether this is the case is related to the issue of choice of unit of analysis.

The units of analysis in studies of scholarly information-practices tend to vary and there are numerous examples of studies that have investigated specific disciplines’ information-related activities (e.g. Duff & Johnson, 2002; Palmer & Neumann, 2002; Niu & Hemminger, 2012). However, as stated by Palmer and Cragin (2008, p. 173), “[r]eal world research problems and solutions rarely arise within orderly disciplinary categories”. Furthermore, also comparisons of disciplines are frequent (e.g. Ellis, Cox & Hall, 1993; Talja, 2002; Fry & Talja, 2007; Matzat, 2009). Another common point of departure is the somewhat broader notion of a specific field (e.g. Talja, Savolainen & Maula, 2004), as well as the more epistemologically oriented idea of domains (Hjørland & Albrechtsen, 1995; Palmer, 1999). Studies that concentrate on interdisciplinary work are also relatively frequent (e.g. Bates, 1996; Qin et al, 1997; Palmer, 1999; Pierce, 1999; Spanner, 2001; Haythornthwaite, 2006). However,

[t]he most valid units of study and analysis for a practices approach would reflect communities of scholars and scientists with real working connections in their research activities, which could take the form of a well established disciplinary culture, an emergent interdisciplinary domain, or a collaborative work group (Palmer & Cragin, 2008, p. 173).

With reference to the above quote, it can be asserted that the Nordcode network constitutes a valid unit of analysis since it represents a collaborative network with real working connections situated within the emergent interdisciplinary field of design.

To sum up this brief review of studies that in various ways relate to the area of scholarly information practices, it can first be pointed out that the area is of longstanding interest for LIS researchers, as well as for researchers in the adjacent field of science and technology studies. Secondly, a large portion of literature has been omitted from the above account, i.e. quantitative studies emanating from the sub-area of scientometrics. Since the studies conducted for this dissertation fully encompass a qualitative approach to the study of scholarly information practices, it is this type of studies that have also been seen as most relevant to relate to. Thirdly, it has been demonstrated that the unit of analysis has varied in previous research. For the project reported in this thesis, the unit of analysis is the Nordcode network, which here functions as an example of interdisciplinary research.
3. THE FIELD OF DESIGN RESEARCH

The aim of this chapter is to outline the character of the heterogeneous field of design research. For doing that, there is a need for a slightly different set of concepts compared to those that were emphasized in the individual studies. Accordingly, the focus in this chapter on concepts such as interdisciplinarity, task uncertainty and mutual dependency serves to bring the analysis beyond the individual studies.

The organization and control of research is often discussed in terms such as fields and disciplines. These are, however, abstract and elusive terms open to interpretations, which are not generally agreed upon. The first part of this chapter will therefore be used for establishing how these terms are applied and understood in this thesis. Moreover, Richard Whitley’s (2000) theoretical concepts of mutual dependence and task uncertainty are also introduced and applied in order to discuss and describe the character of design research from a general perspective. Since design research can be characterized as interdisciplinary by nature (e.g. Friedman, 2003, p. 508), the chapter continues with an account of interdisciplinary research. The bulk of the chapter is then devoted to describing the interdisciplinary field of design research in more detail and is completed by introducing the research network under study.

Whitley, who is a professor of organizational sociology, has developed a theory, which serves to account for the epistemological and social organization of intellectual fields. The theory encompasses the idea that academic fields are unique since they rely on reputational evaluation by peers and are built around the production of novel facts in ways which can generate future research. Although Whitley’s book offers a highly sophisticated and detailed theoretical structure, it is the book’s key analytical concepts that are drawn on in the thesis and which are applied in a pragmatic way.

Before embarking on the conceptual explication, however, the difference between the notions of field and discipline will be briefly commented upon.

3.1 Field and discipline

Whitley (2000) distinguishes between a field and a discipline by asserting that the former is an intellectual conglomerate of people and activities gathered around shared research interests, whereas a discipline is “seen as the institutionalization of scientific fields in training and employment units” (p. 113). Three major components are identified that contribute in laying the foundation of a discipline: 1) educational programs that provide opportunities for advancement throughout the academic system; 2) facilities such as buildings and equipment needed for knowledge production as well as a labour market for academic positions; and 3) a communication system including publication outlets such as journals, university presses, and conferences. In this respect it is possible to roughly separate the administrative unit of the discipline from the field as the epistemic area of knowledge production, but Whitley’s theory also contains an overarching social dimension including reputation building, reward systems, and institutional organization.
3.2 Dependence and uncertainty
At the core of Whitley’s theory are the interlinked dimensions of “mutual dependence” and “task uncertainty”. When used together, they lay the ground for a combined analysis of the social and epistemological dimensions of academic fields. They also offer an opportunity to explore the multidimensionality of research activities and to identify differences in practices across academic fields.

3.2.1 Mutual dependence
The dimension of “mutual dependence” is related to the extent to which a field is dependent on other fields for being able to produce knowledge that is perceived as well-founded and credible. In addition, it can be asserted that for a researcher to be seen as a reputable producer of useful knowledge in a field with a high degree of mutual dependence, it must be possible to incorporate his or her results in the works of colleagues. Briefly described, there are two kinds of mutual dependence, high and low. Characteristic for fields such as design research, which demonstrates a low degree of mutual dependence, is that they subscribe to a varied terminology that does not necessarily differ from everyday language. Furthermore, there is a wide range of research problems to address in relation to design and researchers do not necessarily apply methods and techniques similar to those of other researchers in the field. Compared to fields with a high degree of mutual dependence, design researchers are not particularly competitive and prone to debates regarding which problems to address, but can rather work on a range of problems without much systematic consideration of the results of other researchers. Likewise, their publications are aimed at a broad and mixed audience, and they publish a mixture of journal articles, conference papers, book chapters and monographs.

3.2.2 Task uncertainty
Since research activities are assumed to result in novelties, there is necessarily a certain degree of uncertainty involved in them. Unlike other areas of production, research results are difficult to predict, but the degree of novelty varies from one field to another. Whitley (2000) introduces the concept of task uncertainty for describing and discussing these differences. In a field where knowledge is perceived as systematized, general and precise, research results are easier to predict, and novelty and significance for the field’s common understanding are clearer. Such a field exhibits a low degree of task uncertainty. A field such as design research, which is characterized by a multitude of different views about task outcomes and by conflicting interests and problems, demonstrates a high degree of task uncertainty. It is a field in which technical procedures are “highly tacit, personal, and fluid /…/ and subject to a variety of conflicting interpretations” (Whitley, 2000, p. 121). Moreover, it houses a multitude of different sorts of research problems with a range of differently legitimized strategies formulated for exploring them. It is also characterized by a certain instability since ways of evaluating which problems are legitimate and important are subject to rapid change.

3.2.3 Dependence and uncertainty combined
A view of a field from a dual perspective where both concepts are combined enables extended analysis. Whitley (2000) identifies seven plausible combinations, which can be
used for describing types of fields. Of these, there is one in particular that corresponds with how the field of design research appears in the literature and in the empirical material. Such fields, where task uncertainty is high and mutual dependence low, are termed fragmented adhocracies and are characterized by their intellectual variety and fluidity. As will be seen further on in the thesis, this is a description well-suited for design research. Coordination mechanisms within the field are weak which leads to a multitude of strategies for addressing the wide range of research problems that exist. There is also a relative lack of generally accepted communication systems and publication outlets. A dominant feature is rather that there is a great variety of publications and conferences that might be of interest, of which also follows that there are many potential audiences to attend to. Potentially relevant literature may be found in several areas and is distributed over a range of sub-units. These sub-units often pursue separate concerns related to specific organizations or networks rather than to the overarching coordination structure of the field. Efforts to develop academic reputation within sub-units are often complemented by attempts to get published in more wide-reaching journals, which is a means of gaining the approval of researchers in other areas.

3.3 Interdisciplinary research

There is little conceptual or definitional clarity regarding the concept of interdisciplinarity (Salter & Hearn, 1997, p. 26). The general definition applied in this thesis is to describe it as an area of knowledge production that crosses or bridges disciplinary boundaries (cf. Frodeman, 2010). In order to further anchor the concept as it is used in the thesis, this section outlines a brief definitional account that aims to highlight various facets of the concept and the ways these facets can be related to design research. The account draws substantially upon a taxonomy of interdisciplinarity presented by Klein (2010). By way of introduction, the section begins with a brief review of LIS studies on interdisciplinarity. The conceptualization of interdisciplinarity that emerges in this review is then contrasted with how interdisciplinarity is conceptualized in this thesis.

As indicated in chapter two, LIS based studies concentrating on interdisciplinarity are relatively numerous. For example, Haythornthwaite (2006) explored information sharing and learning in three interdisciplinary teams. In contrast to the present study, however, which explores people engaged in one and the same interdisciplinary field, the teams in her study consisted of people from different disciplines working together. The participants in one team came from disciplines such as chemistry, physics, biology and engineering, and from management, information science and education in another. In a similar vein, with regard to views on interdisciplinarity, Pierce (1999) presents a bibliometric study on “interdisciplinary information transfer”. As in Haythornthwaite’s (2006) study, the starting point is a set of disciplines such as history, anthropology, mathematics, and business/management. Pierce (1999) investigates the extent to which authors in these fields cross disciplinary borders through citations. The author’s conclusion is that “disciplinary boundaries are less restrictive than the literature suggests, and that boundary-crossing publications are involved in complex patterns of interdisciplinary information transfer” (Pierce, 1999, p. 271).
Yet another example is provided by Bates (1996). With a strong emphasis on the notions of core and scatter (Chubin, 1976), according to which literatures are more or less concentrated to one discipline or distributed over a number of disciplines, she reviewed a handful of studies. Her conclusion is that “there may be dramatic differences in the kinds of strategies needed and the amount of effort needed to seek information, depending on the degree of coherence of the bibliographic resources of a field” (Bates, 1996, p. 158).

An impressive contribution to the research on information practices in interdisciplinary research is presented by Palmer (2001). Drawing upon studies of scientific communication (e.g. Price, 1961; Crane, 1969; and Bradford, 1953) as well as science and technology studies (e.g. Latour, 1987; Knorr Cetina, 1981), her book provides an empirically based and substantial account of interdisciplinary research taking place in a research center at a large university. Unlike the present project, however, Palmer’s study focused on one geographical site occupied by researchers from several different disciplines and who were expected to do interdisciplinary research work.

It can be asserted that most of the studies within LIS that focus on interdisciplinarity, including the examples presented above, have a common denominator. They all seem to present interdisciplinary research work as being carried out by researchers from different disciplines doing work together in connection to temporary or specific (albeit long-term) ventures. Studies concentrating on evolving research fields like design research, which appear to be striving towards the status of a discipline, seem to be non-existent. In other words, the kind of studies that have been carried out on interdisciplinarity within LIS suggest “a stable universe of disciplines that can be combined or integrated in different ways” (Salter & Hearn, 1997, p. 16).

According to the general definition of interdisciplinarity as knowledge production that crosses or bridges disciplinary boundaries, the studies referred to above are studies on interdisciplinarity. However, Klein’s (2010) taxonomy shows that there are different types of interdisciplinarity. The subsequent account aims to highlight some of these.

### 3.3.1 Types of interdisciplinarity

On a general level it can be stated that interdisciplinarity involves several perspectives in order to address one problem, or to address problems that cut across disciplines. The traditional system of disciplines has given rise to an increasing fragmentation of knowledge, to which interdisciplinarity can be seen as a response. The notions of integration and interaction are prominent when describing interdisciplinarity and they are often used in order to describe degrees of, and differences in, interdisciplinarity. Klein (2010) distinguishes disciplines that are aligned in a parallel fashion, which she terms sequenced, from those that are intentionally aligned so that they appear in a coordinating mode. She asserts, however, that both these cases lack in integration and interaction. It is rather a case of multidisciplinarity, “an approach that juxtaposes disciplines” (Klein, 2010, p. 17), which is similar to the approach applied in the LIS studies referred to in the previous section.

Interdisciplinarity can be described as narrow, that is, encompassing compatible methods, paradigms, and epistemologies. The studies presented in this thesis indicate that narrow
interdisciplinarity is not necessarily the case in Nordcode. Interdisciplinarity can also be described as *methodological*, which involves shared research methods but also shared “focal concepts” such as “design”, “design process”, and “user”. In contrast to the methodological type, *theoretical* interdisciplinarity implies a more comprehensive epistemological view. In keeping with the theoretical type, some authors adhere to the notion of *conceptual* interdisciplinarity, which “includes issues and questions without a compelling disciplinary basis; these can only be answered by using a variety of disciplines” (Latucca, 2003, no pag.). Again, returning to Nordcode and the area of design research, several of the design researchers that have delved into the nature of the field would probably agree that design research constitutes an instance of conceptual interdisciplinarity.

A distinction presented by Klein (2010), which is useful for distinguishing between the interdisciplinary character of design research and the kind of interdisciplinarity that emerges through the LIS studies reviewed above, is that between *bridge building* and *restructuring*. I would claim that the type of interdisciplinarity that is described in the LIS studies reflects the bridge building-metaphor since these studies portray connections between “complete and firm disciplines” (Klein, 2010, p. 21), whereas the area of design research can be seen as an instance when parts of several disciplines are detached “to form a new coherent whole” (p. 21) through the process of restructuring. This process of restructuring also indicates the movement toward the perceived status of discipline, which can be discerned in several of the contributions to the design research literature.

Topics, hybrids, and professional preparation are categories that have been identified as pertinent in the process of restructuring. Examples of *topics* that Klein (2010) suggests, and that may appear in a range of disciplines, are “crime”, “environment” and “labor”. In the present context, “design” could be seen as a topic. *Hybrids* have been described as “interstitial cross-disciplines” (Klein, 2010, p. 21) and include, for example, social psychology and economic history. The category of *professional preparation* is connected to fields with a vocational focus such as organization and management, social work, nursing, and library and information science. Even within design research, there is a vocational focus. An example of how such a focus can be manifested is found in the fourth of the studies presented in this thesis, where the study participants are gathered in a seminar concentrating on the issue of how to bridge the gap between design research and design practice.

In the light of the multi-facetted concept of interdisciplinarity that has been outlined here, the next section turns toward the specifics of the interdisciplinary field of design research.

### 3.4 The interdisciplinary field of design research

The opening sections of this chapter were aimed at introducing Whitley’s (2000) key concepts of *dependence* and *uncertainty* and at rendering a general view of the field of design research. This section, however, strives to get closer to the activities taking place in the field. A fragmented adhocracy like design research is occupied with a range of different problems that are addressed in a variety of ways. So what are the problems? And what are the methods applied? By addressing these questions, the ambition is to give the reader an idea of what constitutes the field. This is something that can be done on many
levels and by turning attention to several issues. In the subsequent account, the history of the field and various terms that have been assigned in order to describe it are briefly touched upon. It also outlines the main areas of study and indicates something about the methods applied in these studies. The section also aims to explicate what and where researchers in the field publish. The section ends with a presentation of the Nordcode network.

3.4 Central concepts
The area under study constitutes a field with a certain ambiguity regarding its name. In this thesis it is primarily described as design research. The reason for this is simply to convey the general idea that the activities that take place in the field concern design (in the broadest sense) and research. However, since a name not only describes but also communicates values and perspectives it should be acknowledged that there are alternative terms. For instance, design studies implies a somewhat broader scope for some. The term design studies may well have emerged earlier but was established among researchers and practitioners within the area of design interests towards the end of the seventies when the journal Design Studies was launched (i.e. 1979). According to a widespread conception, design studies encompass, for example, design history, which is said to have “begun as an academic discipline in Britain in the 1970s” (Clark & Broady, 2009, p. 2). Even design methods can be placed under the heading of design studies. It has been suggested that the “Conference on design methods” held in London in 1962 initiated the “design methods movement”, which gradually led to the establishment of design methodology as a subject in its own right (Cross, 2002, no pag.). Apart from history and methods, design studies also emphasize design practice and use. A substantial, but concentrated, description of the scope of the field has been presented by Margolin who describes design studies as

the field of inquiry that addresses questions of how we make and use products in our daily lives and how we have done so in the past. /.../ Design studies address issues of product conception and planning, production, form, distribution, and use. It considers these topics in the present as well as in the past. Along with products, it also embraces the web of discourse in which production and use are embedded. Its subject matter includes visual and material culture, as well as the design of processes and systems (Margolin, 2002, p. 229).

Another often mentioned feature of design studies that does not explicitly come through in Margolin’s description above is that of design thinking or design cognition. These are concepts that, in general terms, emphasize the designer’s ability to solve problems. However, as Cross (2011) points out, it is not necessarily “a search for the optimum solution to the given problem, but [rather] an exploratory process” (p. 8). From a design researcher’s perspective, the task here is about developing an understanding for how designers think and work, for what they do when they design.

In stark contrast to the concept of design thinking, which acknowledges the complexity of the design process, stands the concept of design science. According to Cross (2007), the term design science established its position in the design research discourse in the context of the 1965 conference on “The Design Method” (Cross, 2007, p. 122). Even if it is widely acknowledged that design can be the subject of scientific inquiry, there seem to be
a general agreement on the opinion that the activity of designing in itself is not a scientific activity. Cross (Ibid.) concludes that design science is a contested concept.

3.4.2 A design research perspective on the issue of discipline or field

Many influential design research authors describe their field as fragmented, multifaceted or even elusive (e.g. Margolin, 2010; Cross, 2007; Buchanan, 2010). Accordingly, they also often emphasize the importance of, and discuss the need for, people engaged in the area of design getting together and communicating their ideas and thereby laying the ground for a unified discipline. In his highly influential work, The sciences of the artificial from 1969, Herbert Simon outlines what he terms a science of design. It is a science that concentrates on the artificial but not only from the perspective of the science disciplines. Simon asserts that “[t]he peculiar properties of the artifact lie on the thin interface between the natural laws within it and the natural laws without. /…/ The proper study of those who are concerned with the artificial is the way in which that adaptation of means to environments is brought about – and central to that is the process of design itself” (p. 113). In order to accomplish such a study, Simon suggests, for example, that “[f]ew engineers and composers /…/ can carry on a mutually rewarding conversation about the content of each other’s professional work [but] that they can carry on such a conversation about design, can begin to perceive the common creative activity in which they are both engaged, can begin to share their experiences of the creative, professional design process” (p. 137). This call for communication and exchanges that spans different strands of interests within the field of design recurs throughout the literature. Margolin, for instance, emphasizes the importance of the constitution of “a common heritage to reinforce the idea that design researchers are engaged in a shared enterprise, no matter how diverse their interests” (Margolin, 2010, p. 77). In a similar manner and with clear references to Simon’s Sciences of the artificial, Buchanan describes the multifaceted character of the field, i.e. how conference participants, who increasingly come from diverse professions and academic disciplines, are not drawn together because they share a common definition of design; a common methodology, a common philosophy, or even a common set of objects to which everyone agrees that the term "design" should be applied. They are drawn together because they share a mutual interest in a common theme: the conception and planning of the artificial. Different definitions of design and different specifications of the methodology of design are variations of this broad theme, each a concrete exploration of what is possible in the development of its meanings and implications. Communication is possible at such meetings because the results of research and discussion, despite wide differences in intellectual and practical perspectives, are always connected by this theme and, therefore, supplemental (Buchanan, 1992, p. 14).

In the quote above, design research is not described as one discipline. Instead, the author writes about participants from “diverse professions and academic disciplines”, which, again, is a line of reasoning similar to that of Simon (1969). Whether design research is characterized as a discipline or not varies throughout the literature. Cross (2007), on the one hand, asserts that “there is still a long way to go before we can begin to have much sense of having achieved a real understanding of design as a discipline – we have only
begun to make rough maps of the territory” (p. 30) – whereas Friedman states that “design is by nature an interdisciplinary, integrative discipline” (2003, p. 508). Chakrabarti (2011), on the other hand, treats design as one discipline among others.

Often with reference to Simon (1969), art, science and technology have historically been seen as the three “primary dimensions of design” (Boradkar, 2010, p. 284), but these dimensions have gradually, over the years, extended to other disciplines. Friedman, for instance, (2003) presents a model of the interdisciplinary field of design research as encompassing six general domains: natural sciences; humanities and liberal arts; social and behavioral sciences; human professions and services; creative and applied arts; and technology and engineering (p. 508). Friedman’s model resonates with the four orders of design presented by Buchanan (2001): Symbols (represented by graphic design); Things (represented by industrial design); Action (represented by interaction design); and Thought (represented by environmental design). These orders apply to the work of designers but they also indicate foci for research investigations of design activities.

3.4.3 Methods
The multitude of research methods within the field reflects the interdisciplinary character of design research. Cross (2011, p. 5) presents a list of general approaches that have been of particular use in the study of design processes and the nature of the ability to design. He refers to observations as well as case studies of one or several design projects. These may also include interviews with designers. Another approach is to carry out experimental studies, for example, including participants who think aloud when responding to a given task. Simulation through the means of artificial intelligence also appears on the list. In addition to empirical research methods, Cross (Ibid.) also mentions reflection and theorizing as a significant part of design research. The field also embraces interpretations of products on various levels as well as explorations of users’ and other stakeholders’ activities, views and perceptions through ethnographies, observations and interviews.

3.4.4 Journals in design research
Knowledge and understanding of a field or a discipline can also be developed by looking at the field’s literature. As indicated earlier in this chapter, design research is a field characterized by a low degree of mutual dependence. As such it has a wide audience and there are several possible publication outlets including genres like journal articles, conference papers, books, and book chapters.

Throughout the 1980s and 1990s several journals of design research, theory and methodology saw the light of the day, for example Design Studies (1979), Design Issues (1984) and Design Journal (1997), all frequently referred to by the participants interviewed in the present project. In a recent study (Gemser, de Bont, Hekkert, & Friedman, 2012) journal quality was assessed through the use of a perception-based approach. 129 editorial board members and editors of journals publishing regularly on design research were invited to select and suggest “journals they perceived to be top tier based on their academic contribution to the design discipline” (p. 9). Among the 14 selected top journals six journals were identified as general design journals, the other eight journals were described as journals with a specific focus on a certain sub-field of
design. It is also of interest to note the outstanding positions of the two journals *Design Studies* and *Design Issues*, which are perceived to be the best journals regardless of the respondents’ geographic location or possible affiliations to the journals.

A quantitative study (Chai & Xiao, 2012) that applied bibliometrics, co-citation analysis and network analysis to the prominent journal of *Design Studies*, in order to investigate the core themes of design research, identified the design process and design thinking (cognition) as the most investigated subjects. By analysing more than 12,000 citations in the 459 articles published in *Design Studies* from 1996 to 2010 the authors also discovered that articles are increasingly co-authored and that the journal has become more international; during the investigated time period the level of international collaboration in the journal increased to about 15%. However, it is also shown in the article that the majority (more than 50%) of the authors are from North America and the UK. The number of articles published by Scandinavian authors increased during the time period, which is interesting from a Nordic perspective.

### 3.5 Nordcode

The research activities going on in the Nordcode network can be related to most, if not all, of the general domains represented in Friedman’s (2003) model mentioned above. Even if the dominating research strand relates to the social and behavioral sciences, research relating to the humanities and the arts, including creative and applied arts, also figures prominently. Among the present and past projects carried out within Nordcode it is also possible to find connections to technology and engineering, as well as to the natural sciences, even if this is less frequent.

In order to describe the distribution of the field’s sub-units as they are represented in the Nordcode network, the interview transcripts were scanned for passages in which the participants describe their own intellectual home of abode (see fig. 1). These passages contain information on both educational background and current research interests. It should be noted that the notion of design, which all of the participants associate themselves with, is not included and thus not represented in the figure. The larger the word in the figure, the larger the number of participants who assigned it to their specific area of interest.

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10 For this purpose 25 interview transcripts were scanned. 29 distinctive terms were identified. Occurrences across the transcripts ranged from 1 (represented as a small term) to 7 (big term).
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In order to describe the distribution of the field’s sub-units as they are represented in the Nordcode network, the interview transcripts were scanned for passages in which the participants describe their own intellectual home of abode (see fig. 1). These passages contain information on both educational background and current research interests. It should be noted that the notion of design, which all of the participants associate themselves with, is not included and thus not represented in the figure. The larger the word in the figure, the larger the number of participants who assigned it to their specific area of interest.

Figure 1: Indicative map of distribution of sub-units in the Nordcode network.

The terrain of the intellectual landscape of Nordcode encompasses a range of more or less interrelated representations of subjects. The prominent position of industrial design is likely to depend on the fact that in Scandinavia there is a well-established academic study program, called industrial design, that several of the participants referred to when accounting for their educational backgrounds. Mechanical engineering and international business also primarily relate to accounts of educational backgrounds. The empirical material indicates that the conglomerate of engineering, aesthetics, product development, and semiotics well describes the multifaceted approach which is prominent in Nordcode. In addition to these salient sub-units, a number of less frequent references appear. These can be seen as an illustration of the number of epistemic directions that characterizes the network’s many interest areas. For example, biomimetics points towards science, which, perhaps in a less obvious way, also ecology can be said to do, whereas art, art history, and philosophy clearly relate to the humanities.

In summary, it can be stated that the figure above well illustrates how the Nordcode network fits in with the description of the field of design research as a fragmented adhocracy characterized by intellectual variety.

3.5.1 The origin and activities of Nordcode

Nordcode was formed by a group of people at the University of Art and Design in Helsinki. When the network began to take form, at the end of the 90s, they fostered an interest in the semantic aspects of design (e.g. Vihma, 1995; Krippendorff, 2006); an area of interest which is also mirrored in the description of the network found on the Nordcode website:

Nordcode network gathers together active researchers and doctoral students who work on:

- the communicative aspects of artifacts,

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11 Since then, the name has changed to Aalto University of Arts, Design and Architecture.
- aesthetic qualities of physical products and objects, and
- design processes related to the above.

The network aims to support research based on theoretical approaches and developments within specific fields of design. These include areas such as design semiotics/semantics, form design, design syntax, design aesthetics, design research methodology, design processes, tools and methods, identity aspects of product form, form perception, form experience and pleasure, cultural signification of design, and points of contact with visual arts (Norcode, N.D.).

The interest in semiotics/semantics is also reflected in the name of the network, which refers to Nordic, but also to the activities of coding, encoding and decoding (Nielsen, Vihma, Gulden & Berg, 2012, p. 1). Even though the research interests that are represented in the network have become more diverse over the years, it is pointed out in a recent description of the network (Nielsen et al., 2012.) that aspects of design semantics still [need] special emphasis, because of the current heavy design research orientation toward technology and marketing in business contexts. Several studies have shown that questions concerning meaning production, signification, symbolic content, style and aesthetic evaluation cannot be avoided or disregarded in creating and implementing successful design strategies (Nielsen et al., p. 2).

An important aspect and reason for the formation of the network was that many of the Nordic design researchers, to a significant extent, worked on their own at the time. Cooperation was rare and “small scattered groups of devotees continued to struggle with design research issues as more or less solitary researchers” (Ibid.).

With funding from Nordforsk12, the network was established in 2004. Even though Norcode primarily attracts researchers and doctoral students from the Nordic countries, the conferences and seminars they organize often involve participants and presenters from a range of other countries, including the United States. It is however emphasized that “[a]tive research is […] an important criterion for participation” (Ibid., p. 2). Apart from annual seminars, Norcode also arranges courses for doctoral students. Seminars and courses usually take place at the various university departments associated with Norcode.

This chapter has laid the ground for the subsequent analysis by outlining the character of the heterogeneous field of design research in which the network under study is active. The project is theoretically framed by a practice perspective, which will be introduced in the following chapter.

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12 “NordForsk is an organisation under the Nordic Council of Ministers that provides funding for Nordic research cooperation as well as advice and input on Nordic research policy” (www.nordforsk.org).
4. PRACTICE THEORY

In this chapter the project’s theoretical frame and approach will be broached. It starts by discussing theory and analysis in general terms through addressing the question of what theory can do for the present project. It then continues with an account of the overarching perspective applied in the thesis, i.e. practice theory. The chapter ends by outlining five features pertaining to the specific practice-based approach developed for the thesis, and by relating them to the specific case of exploring information sharing in Nordcode.

4.1 What theory does and allows

The view of theory that characterizes the present project is that it offers ways of seeing and understanding that which is under study. The metaphor “theoretical lens” suits this standpoint well. What the researcher is able to see and study depends on the theoretical lens applied. This line of reasoning indicates that the theoretical framework should be constructed with reference to what the researcher is hoping to be able to see and is therefore tightly connected to the project’s aim and research questions, and, in extension, to the methods for gathering empirical material.

However, the construction of a theoretical framework is not only a choice directed by the aim of the study. To some extent it is also a matter of the researchers’ worldview, his or her assumptions about how the world is constituted and about what matters when one is trying to explore and understand the world. For example, there is a widespread view of social arrangements as the result of a multitude of individuals’ decisions about how to act in the best way possible. This is an idea that corresponds with the assumption that human beings predominantly act in accordance with rational choice (Shove, et al, 2012). Most practice theorizing, such as that carried out in this thesis, would contest this idea and rather refer to some kind of practical (including bodily) sense, or a “feel for the game” to use Bourdieu’s terms (1990, p. 103), which does not necessarily rest on what is generally considered to be rational. Assumptions and ideas such as these, concerning the fundamentals of social life, are necessarily involved when a theoretical framework is developed and elaborated.

Even if the metaphor “theoretical lens” is found useful here, it should be pointed out that the theoretical framework is not only something that is located between the researcher and the study object. Theory should rather be described as integrated in the studies, and in the researcher through his or her assumptions and pre-understanding of the subject. Since theory influences what the researcher is studying, through allowing certain things to be seen and others not to be seen, theory guides the inquiry and in that sense shapes it. A practice perspective, for example, would not be ideal for focused explorations of mental states or psychological dimensions, whereas it serves well for studies into sociality and activities.

An example of how theories can be traced back to foundational assumptions is provided by Gherardi (2009, p. 115) who refers to a distinction discerned by Cohen (1996) between theories of action and theories of practice:

We may say that while the former theories [i.e. theories of action] privilege the intentionality of actors, from which derives meaningful action /.../, the latter [theories of
practice] locate the source of significant patterns in how conduct is enacted, performed or produced /…/. Hence theories of practice assume an ecological model in which agency is distributed between humans and non-humans and in which the relationality between the social world and materiality can be subjected to inquiry. While theories of action start from individuals and from their intentionality in pursuing courses of action, theories of practice view actions as ‘taking place’ or ‘happening’, as being performed through a network of connections-in-action, as life-world and dwelling.

The present project rests on an idea that is concurrent with the assumption underlying theories of practice as described in the above quote. The statement that practices take place relates to an ontological aspect of the study object. It indicates that a practice approach aspires to say something about the constitution of that which is. The idea that practices happen is related to a temporal aspect which corresponds with the view of practices as unfolding and being in flux. In this sense, “social life is an ongoing production [that] emerges through people’s recurrent actions” (Feldman & Orlikowski, 2011, p. 1240). For the present project, a practice-theoretical stance has been valued as having great potential for elucidating and revealing important aspects of the study object.

4.2 Practice theory overview

A primary underlying assumption for practice theories is that social life is in flux and constantly and contingently transformed through establishments and dissolutions of connections. In a sense, therefore, everything hangs together through a fluid field of more or less interrelated practices. Hence, the ambition to systematically explain and account for practice is necessarily a task that risks falling “prey to the scientific urge to build simplifying, diagrammatic models of social life” (Schatzki, 2002, p. xii). However, since an analytical tool and a theoretical lens are needed, the subsequent account strives to outline the theoretical framework applied in this thesis.

Without going into details it can be asserted that the historical roots of practice theories can be traced back to Aristotle, who introduced the concept of phronesis – often translated as practical wisdom – which can be seen as the beginning of a foundation for practice theories. The ideas associated with the concept, however, were for centuries overshadowed by the writings of Plato, who cherished the notion that knowledge “would be based on eternal and non-context-dependent universals” (Nicolini, 2013, p. 24). This stance, which gave prominence to thinking rather than doing, mind rather than body, and theory rather than practice, continued to dominate and shape the Western rationalist and mentalist tradition of philosophy and science. As often pointed out in historical overviews on practice theories (e.g. Gherardi, 2006; Nicolini, 2013), it was not until the second half of the twentieth century that Aristotle’s ideas regarding practical wisdom were rediscovered.

Fundamental thinkers often mentioned in connection to the return to practice are Heidegger, Wittgenstein and Marx (e.g. Schatzki, 1996; Gherardi, 2006; Nicolini, 2013; Shove et al, 2012). Heidegger’s account of Dasein, or being in the world, and its relation to a web of socio-material practices resonates with contemporary practice theories. So does Wittgenstein’s fundamental idea that activities are rendered meaning through the social practices in which they are carried out. Marx also challenged previous thinking by
introducing a bottom-up-perspective which entailed a focus on people’s everyday life-activities in their social and historical contexts.

The actual term practice theory was not introduced until the early 1970s even though there were various theoretical streams of earlier date that have been of importance for the development of practice theories. The most renowned predecessors to what has been termed the contemporary practice turn (Schatzki et al, 2001), which I will relate to further on in the chapter, are Pierre Bourdieu, who published his Outline of a practice theory in 1972 (translated into English in 1977), and Anthony Giddens (1979; 1984).

As a theoretical concept, practice can be explicated through accounting for its integrated epistemological and ontological dimensions. By focusing on doings and sayings, and by including materiality as a key to identifying and understanding practice, I will endeavour to elucidate the ontological dimensions of practice. The view of knowledge as collective and constituted in practice aspires to explicate the epistemological dimensions of practice. In addition, practice must also be approached from a perspective of time and space since it is seen as located in and shaped by history.

Another widespread way of explaining the general idea of practice theories is to relate them to two two overarching strands that have, for some time, dominated social theorizing, and which are often presented in terms of one or the other of the following dualisms: mind and body, cognition and action, objective and subjective, structure and agency, individual and institutional, etc. Simplified, it is possible to roughly identify three camps regarding how to approach these dualisms (Layder, 2006): there are those who emphasize what Layder (Ibid.) terms a view-from-on-high (e.g. Parsons, Durkheim, Lévi-Strauss) according to which a system or macro structures constitute the prime unit of analysis; those that favor a where-the-action-is-perspective (e.g. Mead, Blumer), which adheres to a micro focus on activities; and those who aspire to reject the dualisms or try to go between, i.e. what Layder (Ibid.) labels a breaking-free-and-burning-bridges-perspective (e.g. Foucault, Giddens, Bourdieu, Schatzki). A prominent trait of practice theories identified by many authors (e.g. Shove, Pantzar & Watson, 2012; Feldman & Orlikowski, 2011; Schatzki, 2012) is that practice approaches “counters the subject-object split that defined much philosophical thought in the modern era” (Schatzki, 2012, p. 2). Rather, it aspires to “steer a path between individualism and societism” (Schatzki, 2005, p. 469).

There are a number of relatively recent contributions to the literature that offer introductions and overviews of practice theories (e.g. Schatzki, 2001, 2012; Reckwitz, 2002a; Gherardi; 2006; Corradi et al, 2010; Feldman & Orlikowski, 2011; Schatzki, 2012; Shove, Pantzar & Watson, 2012; Nicolini, 2013). The name applied to this field of theorizing varies between these authors. Some speak of practice theories, and some of theories of practice, while others prefer to speak about practice-based studies or practice-based approaches. Other terms that are used interchangeably with the aforementioned are practice theorizing and practice thinking, or a practice idiom. Most authors seem to have one thing in common, however, and that is that they emphasize that there is not one unified practice theory, but rather a “domain of practice theory” (Schatzki, 2012, p. 2) that houses several variants. From reading these texts, it is possible to discern that some salient traits or principles are identified by most authors. Feldman and Orlikowski (2011) posit, for

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instance, that “the relationship between specific instances of situated action and the social world in which the action takes place” (p. 1241) is of critical importance to practice theory. The same authors also present what they term “a key set of theorizing moves” (p. 1241). Apart from the rejection of dualisms, they also highlight that “situated actions are consequential in the production of social life”, and “that relations are mutually constitutive” (p. 1241). These are very abstract principles that have been formulated in different ways by various authors. Even though the majority of authors seems to agree that practices produce social order, prominent contributors to the field have formulated the idea in various ways and with different sets of key concepts: when Giddens (1984) theorizes around structures and resources that enable and constrain actions, Schatzki (e.g. 2002) prefers to speak of bundles of human activities that enact social order. Bourdieu (1990) introduced the concept of habitus, which he explains as a “generative principle of regulated improvisations [that] is a practical sense which reactivates the sense objectified in institutions” (1990, p. 57). Apart from aiming to explicate the concept of habitus, the last example also illustrates how practice theorists may reason in order to break free from dualisms.

4.3 The practice theoretical framework

After this general introduction to practice theory, this section presents the tenets that theoretically underpin the thesis. This presentation may seem overly eclectic and pragmatic, but it should be understood in the light of two specific conditions.

Firstly, the thesis is the result of work carried out over a period of time. During this time, under which I more or less constantly have enjoyed and struggled with various facets of practice theories, a process has unfolded. I have, so to speak, become ingrained by theories of practice and developed a certain taste for specific flavours of practice theories. As can be seen through reading the articles in part two of the thesis, at certain stages of this process I have specialized in, and made use of, specific versions of practice theories in the individual studies. Study I, for example, which is based on an analysis of the literature on information sharing, leans heavily towards a Wittgensteinian perspective. Study II adopted a perspective almost exclusively built upon Schatzki (2002) even though it also applied a discursive approach. Study III was not as theoretically pure since it applied a frame that was developed from the writings of two rather different scholars, Kemmis (2010) and Schatzki (2002), and also involved the theoretical concept of intersubjectivity (Crossley, 1996), which is not commonly applied in practice-based studies. In study IV, the theoretical perspective was quite radically changed in the sense that it was influenced by a post-humanist stance inspired by Knorr Cetina (1997; 2001), Suchman (2005) and Barad (2003; 2007).

What is presented in the context of this particular framework, however, is a constellation of features that are deemed important in order to carry out the overall analysis and to meet the aim of the thesis.

The second condition is that I adhere to the assertion presented by Nicolini (2013), namely that it is fruitful to approach practice theories as a plurality and turn the differences into a strength.
As already noted, I have incorporated this plurality approach into the ways in which I have applied practice theory in the respective studies. Another such difference has to do with a variation in engagement with practice theory. For some authors practice is “a way of seeing” whereas others conceive of practice “as an empirical object” (Corradi et al, 2010, p. 268). In a similar way, Feldman and Orlikowski (2011, p. 1240-1241) distinguish between an empirical, a theoretical, and a philosophical approach to practice. For this thesis, practice is both an empirical object and a way of seeing. On the one hand, practice serves as a functional unit of analysis, and, on the other hand, it constitutes an effectual framework for exploring the practice under study. Practice is accordingly conceived both as a phenomenon to be explored and as an analytical concept that can be used for this exploration.

As an empirical phenomenon, practice can be defined as “an organized, open-ended spatial-temporal manifold of actions” (Schatzki, 2007, p. 98) entangled in materiality. This conception of practice necessarily entails an analytical focus on what the people under study are doing (and saying), both in terms of activities carried out and in terms of the material objects used when carrying out activities. The theoretical approach applied is thus concentrated on the intertwined phenomenon of doings, sayings, material objects, and the social site (Schatzki, 2002) where practice unfolds.

4.3.1 Five guiding principles
Throughout the project and during the ongoing analyses, the following principles, which are derived from the plurality approach to practice theories, have been developed and contributed in guiding the theorizing:

1) Activities are viewed as central in the production and reproduction of social life, which is seen as ongoing and recursive. Since practices are dynamic in the way they are made up of activities, it is of importance to pay attention also to mundane activities. Activities provide access to practices, which is where the production and reproduction of social life takes place. Activities are hence more interesting than actors. The focus is on what is done, and why, rather than on who is doing; practices do not exist without actors, but the actors are not necessarily the same all the time.

2) Opportunities to include individual agency in the analysis has been striven for. Thereby a “possibility [is created] to make room for both an informed and intelligible agent and an organized context for action that constitutes a field of possibilities and impossibilities for the doing of that agent” (Nicolini, 2013, p. 42). Adhering to this principle responds to the ambition of steering a path between individualism and societism, to avoid the dualism between individual and system. This principle is inspired by the idea that the inputs of individual actors contribute to the shaping of practice which in turn provides a setting that enables or constrains activities.

3) Knowledge is conceived as collective. To be knowledgeable is viewed as being able to act in conjunction with others in practice. To be able to act in practice is, for instance, a matter of knowing what to do, what to say, how to speak, and to know what tools to use for certain activities. It is both a matter of knowing what is morally accepted and what is perceived as relevant in the specific practice in which one acts. Actors are socialized into
practice while they gradually make themselves at home in the tradition that characterizes the practice, and the tradition is an output of the activities carried out in practice.

4) *Practices are viewed as constellations of power that allow people to do certain things but not others.* Practices are therefore always perceived as being in a state of tension regarding what can be done and who can do what. In this respect the issue of power is always present in practice. Power resides in practice, but since practices are interrelated, activities that are taking place in one practice can have repercussions in another. For example, when a university is reorganized, it may have effects on the practice of scholarly communication.

5) *Materiality is assigned a prominent position in the analysis.* Regarding this principle, it should, however, be mentioned that this is one of the features of practice-based approaches that vary the most. Some practice scholars tend to emphasize material dimensions more than others. Since different practice approaches have been applied in the respective studies, the focus on materiality has varied. For strands of practice-based approaches that explicitly relate to a science and technology studies-tradition it is common to emphasize that agency is distributed between humans and non-humans (e.g. Gherardi, 2006). There are, however, examples of advocates of the practice approach that emphasize materiality more strongly. Prominent examples of the latter are found in Knorr Cetina (1997; 2001) who presents the notion of an *object-centered sociality*, Suchman’s (2005) concept of *affiliative objects* according to which objects are perceived to “bite back’ in a myriad of ways” (p. 381), and in Orlikowski’s (2007, p. 1437) suggestion of “a view of constitutive entanglement”. According to Orlikowski, such a view
does not privilege either humans or [materiality] (in one-way interactions), nor does it link them through a form of mutual reciprocation (in two-way interactions). Instead, the social and the material are considered to be inextricably related — there is no social that is not also material, and no material that is not also social (2007, p. 1437).

In contrast to “milder” views of materiality, these authors represent a stance that can be described as post humanist (cf. e.g. Barad, 2003) in that it attaches equal importance to humans and non-humans (e.g. things). In this thesis, the view of constitutive entanglement has gradually evolved and it reached its peak in study IV, in which information sharing is made visible through the study of material objects.

4.4 Information sharing in a practice perspective
This section of the theory chapter serves to outline the consequences of a practice approach to the study of information sharing. There are several obvious connections between the theoretical perspective and the methods applied for gathering empirical material. These are, however, not in focus for the subsequent account, but will be discussed in chapter five. In the following, the specific case of information sharing in Nordcode as it has unfolded through the reported studies is discussed in relation to the five guiding theoretical principles. Illustrative examples from the empirical studies are used throughout the account in order to describe how the practice approach applies to the present project.
4.4.1 Activities, power, materiality, agency, and knowledge

Since the general idea is that a practice approach, as adopted in this project, is guided by all the guiding principles in concert, it is not meaningful or even possible to conceptualize a practice-based study around just one or a few of the principles. For example, all practice-based studies must necessarily focus on activities, since they constitute practice. A crucial matter, though, for the researcher who aims to explore information practices is to illuminate, through analysis, how activities and artefacts interplay and form socio-material practices that are intertwined with understandings of how to do things, with explicit and implicit rules, and teleoaffective structures, i.e. beliefs, hopes, expectations, emotions, and moods that have bearing on what is done. Through the adoption of Schatzki’s (2002) site ontology, this ambition was particularly striven for in study II, where the activities of information sharing were identified and explicated in practice.

All of the empirical studies thus entail openness toward all of the principles. Nevertheless, specific principles are more prominent in certain of the studies presented in the thesis. The issue of power, for instance, is at the fore in study III, where trust in relation to information sharing is concentrated on. Since perceived trust enables sharing, trust is an issue that can be related to the question of what can be done and what cannot be done in practice, which in extension is a matter of power. By identifying how trust manifests itself in information sharing and in artefacts used for information sharing, and by uncovering people’s strategies for dealing with it, focus is put on relations – not only between people but also between people and material objects – interests, and potential conflicts, all of which can be related to the issue of power.

The guiding principle of materiality runs as a thread throughout all of the studies. In study II it is conceptualized as the order in which practices are rooted. According to Schatzki (2002, p. 1), an order is “the basic disposition of a domain of entities”. Entities can, however, appear in many different orders and thereby be given different meanings depending on where they appear. For the researcher it thus becomes important to identify how things become meaningful and which functions they thereby may fill. The reference management system, which is used as an empirical illustration in study III, serves as a good example of how a material object can fill a certain function in a socio-material practice. In this particular illustration, it functions as a system that implies a certain risk with regard to trust, despite that it in everyday parlance is usually described as a system that enables efficient information sharing. Compared to how materiality is conceptualized in study III, where it tends to be treated in an almost abstract capacity, the material aspects of practice constitute the focal point for study IV in which information sharing is explored through material objects. By concentrating on the role of material objects in practice, it is shown how these objects contribute in organizing, structuring, and shaping activities in the explored practice.

The explicit focus on materiality also calls for a greater attention to, and discussion of, the distribution of agency over humans and non-humans. This is particularly pertinent in relation to the theoretical concept of epistemic objects (Knorr Cetina, 1997), which entails the idea that material objects being dynamic in nature are characterized by lack and incompleteness and thus give rise to activities. The prime empirical evidence concerning
how an epistemic object is integrated into the fabric of practice is presented in study IV. Here, it is demonstrated how the participants interact with Dropbox, i.e. the file hosting system that they use for storing and sharing documents. Their activities are directed towards the system, but Dropbox in itself also instigates further activities. In this regard, objects can be understood as having agency, not because they are perceived as animated, but because they contribute to the reconfiguration of practice (cf. Barad, 2003).

All the empirical studies offer several interesting examples of how *knowledge* resides in practice, both as the capacity to act in ways that are collectively deemed meaningful and in accordance with practice, and as the capacity to do the right thing in a moral sense. Especially the latter is of importance with regards to information sharing, e.g. knowing not to share someone else’s work in progress. Since the network gathers both experienced and novice researchers, the empirical material contains passages that demonstrate how novice researchers are gradually socialized into practice – for instance through information sharing – and learn to become fully recognized members of the network. For example, study II presents an instance where a young researcher describes how she works out which journals are important for her work by paying attention to the journals used by other more experienced researchers. With regards to this particular case, knowledge can be conceptualized as a collectively created social entity negotiated in an institutionalized context, which contributes to the collective understanding of how to do things. In extension, this process is an important contributor to the evolution of practice.

### 4.5 Enactment

A central theoretical concept for this thesis is that of *enactment*. The way it is used here is strongly influenced by Annemarie Mol who writes in an ethnographical, practice-oriented tradition. In the following, I have employed a passage from her book *The body multiple* (2002) in which she reports a study of the day-to-day diagnosis and treatment of atherosclerosis at a Dutch hospital. In this passage, Mol is discussing the frequently used metaphor of “constructing”, the emerging concept of “performance”, and the notion of “enactment”. At the core of the following account is the issue of how to portray a grouping of interdisciplinary researchers involved in a process of “disciplining”, that is, an emerging academic discipline; it is discussed whether it ought to be seen as constructed, performed or enacted.

With reference to Mol (2002), it can be claimed that the discipline, as it appears in the empirical material "is never alone. It does not stand by itself. It depends on everything and everyone that is active while it is being practiced". The discipline is “*being done*” (p. 31-32). This is, however, as stated above, metaphorical language, which so often and inevitably is used in the social sciences. Consequently it can be asserted that disciplines are not really made, nor are they *constructed*. Because, as Mol says:

> [t]hose are clumsy words [that] suggest that material is assembled, put together, and turned into an object that subsequently goes out in the world all by itself. Instead of the “construction” metaphor […] we might try to mobilize a theater metaphor for what happens in the [field of design research]. When a [discipline] is being done, we may say that it is *performed* in a specific way.
The word “performance” has various appropriate connotations. There may (but need not be) a script available for doing a discipline. If the script is not put to play, it is of no value for what happens in the theater. At different times and places scripts are staged in various ways. If there is no script, actors improvise. The stage props are as important as the people, because, after all, they set the stage. But then again, the performance metaphor has some inappropriate connotations as well. It may [for example] be taken to suggest that there is a backstage, where the real reality is hiding (p. 32).

What Mol suggests instead is a “shift from an epistemological to a praxiographic inquiry into reality” (p.32), which is an approach in accordance with that outlined previously in this chapter. For this, a word is needed

that doesn’t suggest too much. A word with not too much of an academic history. The English language has a nice one in store: enact. It is possible to say that in practices objects are enacted. This suggests that activities take place – but leaves the actors vague. It also suggests that in the act, and only then and there, something is – being enacted (p. 33).

An important implication of adopting the concept of enactment is that it invites a view of the discipline as something ongoing that evolves in conjunction with peoples’ doings and sayings, and the material arrangements where practice unfolds, i.e. in a setting where agency is being distributed over humans and non-humans. I will return to and make use of the word enactment in the concluding discussion chapter when I discuss disciplinary dimensions in relation to information sharing.

The theoretical framework outlined in this chapter, together with the concepts reviewed in chapter two and three, constitutes the ground for the upcoming discussion of the empirical findings. Before that, however, in the next chapter the methods applied will be discussed and motivated.
5. METHOD

This chapter serves to explain how and why the studies have been carried out in the way they have. The thesis contains four papers of which three are single-authored and one co-authored:


IV. Pilerot, O. (2014). Making design researchers’ information sharing visible through material objects. Accepted for publication in *Journal of the American Society for Information Science and Technology*. [Empirical]

A thesis is an intellectual construction resulting from the author’s decisions in great and small. It is not necessarily so that what was carried out first from a chronological perspective is given the same numeric position in the final intellectual construction. For example, in this thesis, the four articles were written consecutively, but as can be seen from the publication years, the article which is presented as number one was actually written after the first one. In the following, I will refer to the articles (or studies) as number I, II, III and IV, i.e. with reference to the order presented in the list above.

5.1 General premises – methodology

When contemplating different methods, there are several aspects to pay attention to. Of crucial importance is of course to try to identify methods that correspond with the assumptions and the theoretical frame that the study rests upon, and to adopt those methods that seem workable. The general idea is that there is something to be investigated or explored. This means that in conjunction with the selection of method(s), one also has to establish the character of that which is to be investigated. It is especially at this point that the interrelation between theory and method manifests itself. It has been argued that social science methods are productive, that they contribute to the making of different realities. In line with this idea, Law and Urry (2004, p. 399) speak of the “Euclidean compartments and categories of social science”, which they derive from methods developed during the 19th and early 20th centuries. They argue that there is a multitude of “more or less spatial metaphors to do with height, depth, levels, size, and proximity” (Ibid., p 398) that can be associated with and are often portrayed as containers such as contexts, institutions, societies, states, nations, structures, cultures, and networks. These containers can be seen as metaphors and concepts which are produced by social inquiry and in this respect social inquiry and the methods applied can be thought of as performatve. Among the most important aspect of methods’ capacity to perform is

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13 The first author designed the study, conducted the interviews, analyzed the material and wrote the article with input from the second author.
their preoccupation with fixing, demarcating, and separating entities in that which is investigated. This is, however, an approach that does not resonate well with the conceptualization of the study object that is offered by the theoretical framework applied in this thesis. Rather, the practice lens emphasizes other “reality enactments” than those that can be fixed, demarcated, separated and neatly ordered. For instance, an illustration of how the practice lens works in analysis can be found towards the end of study II:

[T]he analysis presented in this article indicates that the key to understanding the information-sharing activities existing in the network is diffused. It resides in the people involved and in the way they interact, shape and are shaped by elements in the material context. Elements such as ICTs, furnishing and the physical layout of premises impose rules and constraints, as well as affordances. The key is also to be found in the information used, evaluated and shared, and it is embedded in short and long-term routines such as the social interaction that takes place in connection with formal and informal meetings – in the corridor at work, over lunches, at conferences and seminars, in routines and conventions regarding publishing and reviewing procedures developed over time. It also resides in the variety of sharing modes, and in teleaffective dimensions transpiring out of socially and historically developed conceptions of success, fame, friendship, altruism, guilt and of being good (Pilerot & Limberg, 2011, p. 330).

Instead of fixing, demarcating, and separating entities in the study object, the analysis presented in the above quote attempts to describe the unfolding of elusive phenomena in motion. According to the theoretical perspective, this description and explanation of a world in flux and characterized by contingency is dependent on the creation of a new set of “metaphors and images for what is impossible or barely possible, unthinkable or almost unthinkable” (Law, 2004, p.6).

As aptly put by Law and Urry (2004, p. 404) “[m]ethod needs to be sensitive to the complex and the elusive. It needs to be more mobile. It needs to find ways of knowing the slipperiness of ‘units that are not’ as they move in and beyond old categories”. It is against the methodological backdrop outlined in this section that the adoption of methods in this thesis should be understood.

5.1.1 Bricolage
The prime feature in the methodological strategy of this thesis is the idea of bricolage (Denzin & Lincoln, 2000), a perspective on research which is concerned with multiple methods of inquiry, and which appreciates the complexity of knowledge production. Moreover, it is an approach that acknowledges the multifaceted character of the research object, as described by Law (2004), for example, and on this basis deploys a pluralistic methodological strategy.

An approach characterized by bricolage embraces interdisciplinarity, which is well-suited for LIS in that it mirrors its interdisciplinary character (cf. Nolin & Åström, 2010). In this thesis, this stance is manifested through the intersectional position that connects with LIS areas such as the field of information behaviour, information practices-research, and research into scholarly communication. It is also communicated through the overarching sociologically oriented perspective that has influenced the project. In this respect it also
ties to and is well-suited for approaching the interdisciplinary character of design research.

An important aspect of a bricolage approach is the kind of boundary-work (Gieryn, 1983) that serves to both develop and adopt conceptual tools, and which can be used for a dynamic and deepened inquiry (cf. Kincheloe, 2001, p. 690). Hence, from both a theoretical and a methodological perspective, influences on the thesis can be traced to the educational sciences, mainly through its interest in learning, to organization studies, through its focus on how individuals and groups function within a network (such as Nordcode), and to science and technology studies through its engagement with scholarly practices. With a clear position in LIS, these three areas together form the interdisciplinary ground on which the thesis has been produced, and this is reflected not only conceptually but also in the set of methods that have been employed.

5.1.2 Methods from a practice perspective

With some exceptions (e.g. Gherardi, 2012), methods have so far not been treated extensively in the literature on practice theories. Somewhat generalized it can be claimed that ethnographic approaches have been favoured. In a recent text, however, Schatzki (2012) outlines an approach that in many regards is similar to bricolage; at least concerning a willingness to adopt a multiple methods-approach. In order to uncover practices, the researcher cannot avoid an approach influenced by ethnography: “[t]here is no alternative to hanging out with, joining in with, talking to and watching, and getting together the people concerned” (p. 11). In the same text, however, he also emphasizes the importance of interviews, which he, admittedly, includes under the heading of ethnography. Accordingly, “[u]nderstanding people’s words for activities and practices […] provides access to the activities and practices that make up their practice-arrangement bundles” (2012, p. 11). Even though it is not enough, but rather needs to be carried out in conjunction with observations and interviews, it is also suggested that the researcher prepare him or herself through taking courses, consulting the literature, attending conferences, and talking to people who are knowledgeable about the study object; “[w]ith the knowledge thereby gained [the researchers] can, when encountering their subjects, decently well identify the activities and practices these people carry on, as well as the material entities and arrangements” (Ibid. p. 11) where activities take place.

In sum, what is suggested by Schatzki describes well what I have done in order to carry out the studies presented in this thesis. That is, time has been spent with participants so that I have had the opportunity to observe activities and material arrangements in the participants’ “natural” settings, for example in workplaces and conference/seminar settings. Interviews, as well as more informal conversations, have been carried out, and documents of various kinds have been studied. These actions will be accounted for in more detail further on in this chapter.

Regarding nuances and differences between the methods of interview and observation, it should be pointed out that also in connection with those studies where interviews have been the prime means of data production (i.e. studies II and III) observations have taken place. When I visited workplaces to do interviews, I also planned for time spent in cafeterias and department areas, and asked for guidance through the premises, all in order
to be able to observe what was going on in the respective locations. However, the extended and careful observation of the participants’ work activities primarily took place in connection to study IV. Both the interviews and the observations are part of the explorative approach applied in the thesis; an approach that will be elaborated further on in the chapter where I account for Mol’s (2002) idea of study participants being their own ethnographers, and for the idea of the thesis by publication as a method. Before that, though, a brief comment on the role of the reflexive researcher is called for.

5.1.3 The role of the reflexive researcher

Every researcher has to relate not only to singular previous contributions in the field of research but also, and especially, to the norms and conventions of how to carry out research, which have evolved over time as a result of a multitude of studies and the practices established in relation to these. However, if, as elaborated by Law (2004, p.4) “research methods” are allowed to claim methodological hegemony or (even worse) monopoly /.../ then when we are put into relation with such methods we are being placed, however rebelliously, in a set of constraining normative blinkers”. Resonating with this assertion, it can be argued that at the same time as the researcher is supposed to design and carry out studies that are consistent with existing studies, (s)he is also expected to emulate and deviate from these studies. The way this situation is interpreted in this thesis is that it implies the need for critical reflectivity and transparency regarding the methodological moves made.

An example of a situation where this need was particularly exacting occurred during study IV; it is an example of where I, as a researcher, perhaps deviated from what can be termed a traditional approach to the study object. As a result of my previous empirical studies I had at this stage become closer to the participants than I was when the project started, simply because I had gotten to know some of them better than I did when I embarked on the project. With some of them I had developed relationships that, for example, included discussions about future common professional undertakings; relationships more similar to those between colleagues than those between researcher and study participants. So, in preparation for the final empirical part of study IV – a three-day seminar that I participated in – I was encouraged by a group of participants to get involved in the preparations for the activities of the seminar. Even though they continued to identify me as the person who is doing research on them, they also approached me in my capacity as an “expert” on information sharing and research dissemination because that expertise was something they felt a need for in their context. What this specifically meant was that I, like all the other seminar participants, was given the task of contributing to a collection of texts for reading that was put together before the seminar. The selected texts, which consisted of various articles and chapters that the participants had found relevant for the seminar, were supposed to form the basis for the discussions that were planned to take place during the seminar. From my research perspective, my recommendations of texts and my participation in the capacity of expert can be described as an intervention. I was actually explicitly contributing to shape the activities that I had set out to study. In this sense my position in study IV can be described as that of a complete participant (cf. Hammersley & Atkinson, 2007, pp. 82).
Another instance of intervention that also took place during study IV was that I presented a paper at the conference as a person doing research on Nordcode. The unpublished paper I presented is titled “Information sharing in the Nordcode network: glimpses from an ongoing PhD project” and contains an account of my then ongoing project. The comments and questions that I received after my presentation can also be viewed as part of the data from which I have produced my empirical material.

A third and last example of an instance of an interventional character, that ought to be reflected upon, is that the selection of texts analysed for study I included one of my own articles, namely the one which reports the first empirical study (study II).

In accordance with the idea of the reflective researcher, it is important that the instances accounted for above are highlighted. It is an example of how reflexivity can contribute to making the methodological moves transparent.

As emphasized in chapter four, people are always situated and caught up in practices infused by interests and enjoinments. This is also the case for a person who is conducting research, which should be obvious from the account in the preceding paragraphs. For the present project, it is also worth pointing out that for a researcher investigating other researchers there are both pros and cons. My background in, and knowledge about academia, which also guided my choice of empirical case, meant that I could relatively quickly develop the ability to act competently and in accordance with the general norms and traditions that prevail in the settings that I aimed to explore. For example, access to the field was probably easier to get than it would have been if I had investigated a field which was not so similar to my own. With access I do not only mean physical access, but rather the ability to act in an appropriate way when in the field, so that the participants develop some kind of trust in me (cf. Hammersley & Atkinson, 2007, pp. 43). On the other hand, being too familiar with the field is not good, since one then risks falling prey to misleading preconceptions about the setting and the people there; things may not be seen because they are taken for granted. Related to the issues of access is the question of to what degree the researcher ought to interfere in the activities investigated. For the present project, and as indicated previously, this question was particularly relevant during study IV. According to a widespread categorization of different levels of participation, one can distinguish between, on the one hand, the most extreme kind, which is “complete participant” to, on the other hand, “complete observer” (Hammersley & Atkinson, 2007, pp. 82). If I employed a stance similar to “participant-as-observer” throughout most of the project, in study IV, as previously suggested, I became an almost “complete participant”.

The realization that my role as a researcher changed during the course of conducting the studies indicates that the research process can be described as explorative.

5.2 Development of studies

This section describes how the overall study has unfolded from the initial idea, which was outlined in a brief plan at the beginning of the project, to the final thesis in its present form. Still with a specific focus on methods, it also outlines the connections between the four separate studies thus describing how they form a coherent unit.
In accordance with the practice perspective applied, my initial attention was primarily
directed towards the activities, the doings and sayings, of the people in the network. The
very first study to be conducted was thus the first empirical study, which later became
listed as study II. The prime method applied in this study was the interview, even though I
also visited workplaces and studied documents. Here, I subscribed to an ethnographic
approach inspired by Annemarie Mol (2002). Like her, I considered the participants to be
their own ethnographers, not of thoughts and feelings, but like those who account for how
information sharing “is done in practice” (Mol, 2002, p. 15). What participants say are not
just conglomerates of meaning. They also impart a lot about, for instance, computers,
desks, meeting rooms, coffee lounges, printers, documents, etc. “What people say in an
interview doesn’t only reveal their perspective, but also tells about events they have lived
through” (Ibid.).

In connection to the work carried out for the first empirical study it was also necessary to
delve thoroughly into the literature on information sharing. This endeavour resulted in the
study that finally became study I in the intellectual construction that makes up this thesis,
even if it was not the first study to be conducted.

As explicated in chapter four, in this thesis a practice is understood as comprising doings
and sayings (in addition to materialities, rules, and emotions). In study I, the explorative
and analytical focus is on the area of research on information sharing within LIS. This
research area is conceived as a specific practice, which I explored in this study through
studying the outcomes of the doings and sayings of information sharing-researchers, i.e.
their research publications. By searching for literature, chaining (e.g. Ellis & Haugan,
1997), and on the basis of my previously established familiarity with the field, 36
pertinent publications were identified. Each text was studied and classified in accordance
with a set of categories decided beforehand: empirical material/user group, setting;
method; theoretical stance; conceptual or definitional statements about information
sharing; and other potentially interesting aspects.

Study I served two main purposes: 1) It enabled an orientation in the field, which shows
not only how other researchers conceptualize and write about information sharing, but
also in the empirical settings in which information sharing has been investigated; 2) it
provides an inventory and analysis of the theoretical perspectives and frames that have
been applied in order to conduct research on information sharing. It is especially in this
latter capacity that the study served as a guide for my project. Since it indicates that
information sharing has often been investigated from a particular perspective that has
excluded other possible foci, it has contributed in shaping the theoretical lens applied in
my studies. Previous studies have tended to focus either on people, on information, or on
the context where information sharing takes place, but not often on all of these in concert,
which is something that my project as a whole has striven for. This ambition has
inevitably also resulted in considerations regarding method: different empirical foci call
for variation in methods.

Study III focused on the issue of trust in relation to information sharing. This specific
interest and research focus was to a great extent a result of study II, which indicated that
trust is of crucial importance regarding decisions about whom to share information with.

53
Compared to study II, study III engaged far more participants and thus more workplaces to visit. Based on the nature of the research focus, i.e. trust, the decision was made that interviews, again, would best suit my purpose. However, also in relation to this study, inspiration from Mol (2002), which I touched upon above, should be acknowledged.

That different empirical foci call for variation regarding research methods is perhaps most apparent in study IV, with its clear focus on material objects. All empirical studies required visits to the places that the participants talked about during the interviews. To actually be in the workplaces that they referred to when we were talking and being able to see, for instance, the corridors, offices, coffee rooms and meeting rooms, and the people moving around in these places, enabled me to develop a sense of the places they described. However, for study IV, some sort of participatory orientation was unavoidable. In order to see and understand how things matter in information sharing activities, short visits to workplaces were not enough. I had to seek out settings where I could be “hanging out with, joining in with, talking to and watching, and getting together the people concerned” (Schatzki, 2012, p. 11). This, I found in the conference and the seminar during which the data for the last study were produced. The importance of participating in these kinds of events was identified already in study III, where the results indicated that conferences and seminars, and materiality in general, are essential for the creation of fruitful grounds for information sharing.

As indicated above, the research process leading up to the thesis can be described as explorative even though this exploration took place within a frame that was loosely structured already from the beginning of the project. Figure 2 aims to illustrate the explorative dimension running through the studies.
Compared to study II, study III engaged far more participants and thus more workplaces to visit. Based on the nature of the research focus, i.e. trust, the decision was made that interviews, again, would best suit my purpose. However, also in relation to this study, inspiration from Mol (2002), which I touched upon above, should be acknowledged. That different empirical foci call for variation regarding research methods is perhaps most apparent in study IV, with its clear focus on material objects. All empirical studies required visits to the places that the participants talked about during the interviews. To actually be in the workplaces that they referred to when we were talking and being able to see, for instance, the corridors, offices, coffee rooms and meeting rooms, and the people moving around in these places, enabled me to develop a sense of the places they described. However, for study IV, some sort of participatory orientation was unavoidable. In order to see and understand how things matter in information sharing activities, short visits to workplaces were not enough. I had to seek out settings where I could be “hanging out with, joining in with, talking to and watching, and getting together the people concerned” (Schatzki, 2012, p. 11). This, I found in the conference and the seminar during which the data for the last study were produced. The importance of participating in these kinds of events was identified already in study III, where the results indicated that conferences and seminars, and materiality in general, are essential for the creation of fruitful grounds for information sharing.

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<table>
<thead>
<tr>
<th>STUDY</th>
<th>POINTING FORWARD FROM STUDY I</th>
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</thead>
<tbody>
<tr>
<td>STUDY I</td>
<td>Orientation in the literature</td>
</tr>
<tr>
<td>Inventory and analysis of theoretical frames applied in information sharing research</td>
<td>Focus on people, information and context in concert; Bricolage and compilation thesis as method</td>
</tr>
<tr>
<td>STUDY II</td>
<td>Description of participants’ information practice</td>
</tr>
<tr>
<td>Identification of sharing modes and situations, and of important aspects of these</td>
<td>The central role of trust for information sharing</td>
</tr>
<tr>
<td>STUDY III</td>
<td>Analysis of trust in relation to information sharing</td>
</tr>
<tr>
<td></td>
<td>The importance of place and materiality for information sharing</td>
</tr>
<tr>
<td>STUDY IV</td>
<td>Analysis of the role of material objects in information sharing</td>
</tr>
</tbody>
</table>

Figure 2: The explorative dimension of the research process

The explorative research process relates to the theoretical understanding of the study object as being elusive, slippery and in constant flux, and it is also relates to the decision to present the thesis in the shape of a thesis by publication (rather than in the shape of a monograph), which in itself entails some methodological advantages. It has, for example, made it possible to approach the same study object from, as in this case, four rather different and distinct although interacting perspectives and with variation regarding methods. The idea of bricolage can also be seen in the light of the ethnographic approach that characterizes study IV in particular. In this study, I connect with the tradition of multi-sited ethnography, which in contrast to the most common mode of ethnography that focuses on one specific location, “moves out from the single sites and local situations /…/ to examine the circulation of cultural meanings, objects, and identities in diffuse time-space” (Marcus, 1995, p. 96). In particular, I draw upon the distinction between co-presence and co-location (Beaulieu, 2010). Beaulieu’s contribution to this tradition should be viewed with regard to the fact that today a substantial amount of research practice is distributed through the web. Her work on this subject also informs studies aiming to investigate research practices without laboratories such as those in the social sciences and
the humanities, as in the Nordcode network. The web based, mediated research milieu also generates many traces of scholarly interaction that can be used by the researcher in order to analyse practices. Moreover, to adhere to the idea of co-presence rather than co-location entails a re-articulation of the notion of fieldwork. The idea of co-presence foregrounds social interaction between the researcher and the participants, and it “decentralizes the notion of space without excluding it. It opens up the possibility that co-presence might be established through a variety of modes, physical co-location being one among others” (Beaulieu, 2010, p. 2). Accordingly, for this thesis, empirical work has been conducted – and intensified – during co-location, but it has not come to a stop between workplace visits, interviews, and observations in the field. In the mode of co-presence, work has continued over the web, through the study of documents and over the phone.

5.3 Methods for production of data and empirical material

As described above, the data produced for the studies is the result of different methods that thus have given rise to various kinds of empirical material. As can be gathered from table 1, which presents an overview of the empirical material and the means applied in order to produce it, I have conducted interviews (predominantly face-to-face but also over the phone and via Skype). Moreover, I have spent time with the participants allowing me to chat and converse informally with them, but also to observe activities and places, take field notes and photograph. Interviews and field notes were supplemented by the study of personal and institutional web pages as well as documented reports from seminars and conferences produced within the network.
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<table>
<thead>
<tr>
<th>Years</th>
<th>Study</th>
<th>“Sources” of data</th>
<th>Empirical material produced</th>
</tr>
</thead>
<tbody>
<tr>
<td>2010</td>
<td>2</td>
<td>• 7 interviews with researchers,</td>
<td>• Circa 10 hours of recorded interviews</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 4 workplace visits</td>
<td>• Transcriptions of these interviews</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Published testimonies from participants in previous Nordcode seminars (proceedings and blog entries)</td>
<td>• Field notes</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>• Annotations from the study of documents</td>
</tr>
<tr>
<td>2011</td>
<td>1</td>
<td>• LIS literature on information sharing research</td>
<td>• 36 texts (35 research articles and one monograph)</td>
</tr>
<tr>
<td>2011</td>
<td>3</td>
<td>• 15 interviews with researchers</td>
<td>• Nearly 20 hours of recorded interviews</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 7 workplace visits</td>
<td>• Transcriptions of all of the interviews</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>• Field notes</td>
</tr>
<tr>
<td>2012</td>
<td>4</td>
<td>• 1 Conference (3 days)</td>
<td>• Field notes and photographs</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Comments and questions from conference delegates after the presentation of my own paper at the afore mentioned conference</td>
<td>• 40 responses to a small-scale questionnaire</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 1 seminar (3 days)</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>• A series of preparatory meetings with seminar organizers</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>• E-mail communication with fellow seminar organizers</td>
<td></td>
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<tr>
<td></td>
<td></td>
<td>• Informal conversations with approximately 30 people during the two gatherings</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 1 small-scale questionnaire</td>
<td></td>
</tr>
</tbody>
</table>

Table 1: An overview of the empirical material

In addition to the six days of concentrated participatory observations during the conference and the seminar (Table 1.), I have also spent 19 days visiting seven different workplaces throughout Scandinavia. In connection to study IV, a small-scale survey was also carried out primarily to gain a background understanding for the events under study. The answers, which were received from forty respondents, were mainly used in the article for describing the empirical setting. Apart from the interviews conducted in connection
with the two first empirical studies, I also carried out three complementary interviews in the initial phase of study IV. The article emanating from study IV contains photographs, which primarily function as illustrations of, and support for, the analysis presented in the article. However, both field notes and photographs have contributed throughout the project to lay the ground for my overall understanding of the study object.

5.4 Selection of participants

A central principle for the selection of study participants was that those who were recruited had recent experiences of participation in Nordcode activities. The participants were selected with the aim of forming a critical mass; i.e., a large enough number of people to talk to in order to produce a material rich enough to make it possible, on a sophisticated level, to analyse that which was under study. In order to ensure a thick description of the object under study, I was also striving for variation regarding the following features:

- **Academic rank**, which means that I have interviewed and talked to PhD students, those who recently had attained a doctor’s degree, and senior researchers such as full professors and associate professors;
- **Epistemological background**, including researchers and PhD students with backgrounds in for example the arts, engineering, philosophy, and business;
- **Geographical location** – Altogether I have visited six universities in four Nordic countries and also carried out interviews over Skype with representatives from two more universities;
- **Size of research group**, which means that I have interviewed participants who are active at departments where there are relatively large research groups and even people who work alone at their departments doing the kind of design research that is conducted within Nordcode.

The two locations that I explored through participatory observation were chosen because they happened to host events at times that suited me well. The first was an annual Nordcode conference held in the main on the ferry between Helsinki and Stockholm but also in university departments in these two cities. The second seminar was not a regular Nordcode event, but a special seminar on the theme of dissemination of design research. The seminar was arranged because the steering group saw a need for it. The participants were all invited senior researchers. It took place on the small island of Ven, located between Denmark and Sweden, where all participants stayed at the same guest house for three days.

5.4.1 Ethical considerations

For each study, I have approached potential participants via an e-mail that briefly described my interests and intentions (see appendix 1). Attached to this e-mail was a document outlining my ambitions for the particular study in relative detail (see appendix 2). Positive replies were taken as informed consent. No participant required that legal contracts for ethics or access were drawn up.

In this communication with the participants, I also expressed my intention to make sound recordings and transcriptions of the interviews and I ensured that I would be the only
person with access to transcripts and recordings, which would be kept strictly confidential. Furthermore, I offered the participants the opportunity to read and review transcripts in order to identify and indicate potentially sensitive information (see appendix 3). This offer, however, was declined by the majority of the participants.

When the studies were reported through published articles, the participants were provided with either a link to the site where the article is accessible or I sent them an e-mail with the article attached (see appendix 4). In the articles, all quotes from the transcripts were reported anonymously.

5.5 The process of analysis

According to a conventional image of the process of analysis, the researcher enters the field, collects data, leaves the field, and then does the analysis; it is a relationship between the researcher and the study object, which can be described in terms of distance and closeness. This kind of relationship can to some extent be identified in my project. For example, I had at my disposal two central “tools” for the analysis: theory (including theoretical concepts and metaphors) and data. In this respect, analysis has been either mainly theory-driven or mainly data-driven. The theory-driven analysis can be described as a process in which theory has inspired me, or informed me regarding what to search for in the data. Study IV, which focused on material objects, was clearly theory-driven in that what I was looking for in the data were instances that related to the theoretical concepts that I had decided to use in my analysis. Data-driven analysis entailed directing focus to emerging themes, corresponding instances and patterns that relate and contribute to the discussion and elucidation of the research questions. This has most clearly been the case in study III, the “trust study”, even though the theoretical frame offered a structure on to which I could hinge the discovered themes and patterns. It was also, to some extent, the case in study II, but there too, theory constituted a frame for analysis.

However, in order to explicate the process of analysis in a more sophisticated manner, I return to the conceptualization of theory as a lens through which I view the study object. It has been emphasized throughout the present text that the study object is both contingent and in a state of constant flux and thereby elusive. Analysis is hence a challenge. The overall picture is that I have followed, talked to, and joined the people in the Nordcode network. I have read and looked at the outcomes of their work, and I have kept a constant eye on the network website and individuals’ web pages. All these efforts of mine have resulted in the production of data, i.e. interview recordings, transcripts of interviews, photographs, working notes and field notes. The data should be seen as co-produced by me and the participants I have followed and talked to, because without them this production process would not have been possible. All these “frozen” images of the world under study I have then analysed. I see analysis as an act of pulling apart and scrutinizing with the aim of illuminating the problem and addressing the aim. This activity has been carried out through a constant and more or less intensified interaction with the ongoing practices of Nordcode. That is, the frozen parts of the recent history of Nordcode activities have been pulled apart and scrutinized in the light of what is going on in the network. This description of the process of analysis also implies that analysis has been going on constantly, but that it has been intensified during the production of empirical
material, which is the part of the data that became incorporated in the outcomes of my research efforts; bits and pieces that I explicitly have used and referred to in order to communicate my rich description and interpretation of the information sharing activities in the network.

This approach to the data, and to analysis, corresponds with what Alvesson and Sköldberg (2009, p. 271) term an “open play of reflection across various levels of interpretation”, by which I mean that the data were analyzed on more than one level: like an ethnographer I have “listened to” and “looked at” utterances and accounts in the material. Using a discursive approach (e.g. Talja & McKenzie, 2007) for instance in study II, I have interpreted transcripts in order to unfold meanings and references. Likewise, in both studies II and III, I have critically interpreted the material with the purpose of identifying power relations and tensions regarding social reproduction, which for example showed that there are somewhat different approaches to the assessment of trust between researchers who are early in their careers and experienced researchers.

Again, with reference to the elusive character of the study object and the risk of falling prey to the “Euclidean compartments and categories of social science” (Law & Urry, 2004, p. 399), the role of metaphors must be emphasized. This is of particular importance for the communication of analysis. Otherwise the research reports run the risk of being reduced to mere exercises in fixation, demarcation and separation without vibrations from the practices explored.
6. THE FOUR STUDIES SUMMARIZED

In order to prepare the discussion of the four studies taken together as a whole, this chapter contains summaries of the individual studies.

In the previous chapter it was mentioned that the whole thesis project is characterized by an explorative stance, which means that even though the project has been conducted in accordance with a pre-established, albeit rough plan, each study has given rise to further questions, which have indicated directions to take. In the subsequent accounts, the connections between the studies are illuminated. However, the bulk of the chapter is used for presenting findings and conclusions from each individual study. In order to set the findings and conclusions in context, each summary is introduced by a presentation of the problem area from which the studies depart.

6.1 Study I – A review of the LIS literature on information sharing

This study constitutes the conceptual foundation for the subsequent empirical studies. It also presents a map of the LIS landscape regarding information sharing research. The study emanates from the observation that the LIS literature on information sharing is somewhat elusive. Moreover, the study concludes that it is a literature with rather blurred borders. Primarily due to the literature’s variation regarding empirical settings and theoretical approaches it is relatively difficult to overview. An assumption that guided the study was that the literature is characterized by conceptual multitude and vagueness.

The theoretical lens applied comprises Wittgenstein’s notion of language games according to which “the meaning of a word is its use in the language” (Wittgenstein, 1968, #43). The theoretical frame also includes Waisman’s (1945) concept of “open texture”, which dictates that a concept can be “defined when the sort of situation is described in which it is to be used” (Ibid.). Further support for the theoretical frame was found in the idea of meaning holism, i.e. the view that “what a linguistic expression means depends on its relations to many or all other expressions within the same totality” (Pagin, 2006, p. 213). Equipped with these concepts, the practice of information sharing research within LIS was approached. With reference to Collins (1981) it can be argued that within this practice, individuals and groups of researchers try, through the “use of rhetorical and presentational devices [to] make their own interpretation […] the one credible possibility” (Collins, 1981, p. 5). The basic assumption was hence that conceptualizations of information sharing activities are located within a particular theoretical framework, used for certain reasons and given meaning by the setting in which they appear.

The aim of the study was to critically examine how information sharing activities are conceptualized in previous contributions to library and information science (LIS), and how these conceptualizations are connected to theory, empirical material and other supporting concepts. For this reason a meta-analysis was conducted on 36 selected texts.

It was shown that LIS researchers offer slightly different definitions of the concept of “information sharing”. The variations can be related to differences regarding theoretical perspective but also to how authors connect the concept to their empirical material. The most favoured conceptualization of information sharing activities is “information
scholarly information sharing. It seems that the conceptualizations and how comprehensive they are meant to be, depend on what aspect(s) of information sharing the researcher has decided to investigate. There is a variation of degree regarding the extent to which the reviewed studies are theoretically or empirically driven. The connections between the concept of “information sharing” and other supporting concepts, such as “information” and “knowledge” varies from one text to another, which possibly can be explained by differences regarding theory and empirical material. Six theoretical frameworks for the study of information sharing were identified in the reviewed literature. The overall conclusion is that ambiguous conceptualizations are frequent but that it is possible to discern three interrelated foci: researchers tend to focus either on the identification of common interests, beliefs, and norms; on the flow and transfer of information; or on co-existence and material conditions characterizing the site where sharing takes place. This last conclusion has been of particular importance for the design of the empirical studies of the thesis since it has provided guidance and ensured not omitting aspects that might be of importance for the further understanding of scholarly information sharing.

6.2 Study II – A qualitative study of design scholars’ information practices

This study constitutes my first thorough empirically-based exploration of the Nordcode network. It is a study with a broad approach in the sense that I not only concentrate on information sharing activities but also on the researchers’ information practices in general. My approach to the study of information sharing mirrors the overall idea of the thesis, namely that the separate activities that constitute a practice tend to be intertwined and nested within each other. In accordance with such a stance, separate information-related activities must be anticipated as contextualized and thus viewed not only as connected to, but also shaped by, other activities carried out in the practice. Without losing sight of information sharing, the study presents a thick description of the researchers’ information practice. Apart from generating knowledge about the studied researchers’ information practices, this description has also come to function as a foundation for, and a stepping stone towards, the subsequent empirical studies.

Previous studies have indicated that interdisciplinary research collaboration is increasing (e.g. Sonnenwald, 2007) and that there are tendencies towards technological determinism regarding the development of information systems supporting, for instance, information sharing (e.g. Orlikowski, 1996; Kling et al, 2005). In the present study information sharing is conceived as a collective practice which needs to be approached from not only a technological angle but also as a social phenomenon. The empirical material was primarily generated through in-depth interviews but also through note-taking in connection to a number of workplace visits.

The study confirms the assumption that information sharing is intertwined with other information-related activities, such as writing, reading and the seeking and use of information. It also showed that information sharing tends to be embedded in routine work. It was further indicated that mutual research interests, rather than being colleagues at the same department, are the most salient aspects regarding decisions about whom to
share information with. This suggests that traditional organizational settings, for instance academic departments, can be substituted or complemented by rather flexible groups of people. In this process, the activities of information sharing seem to play an important part in their capacity to establish ties between people. Objectives for information sharing do not necessarily reside within the actual information practice but can also be traced to the more comprehensive practices of design research. It is suggested that information sharing contributes to nurture and maintain the common project of design research. Moreover, it is indicated that the propensity to share information increases when a shared responsibility for the information needed, created and shared is perceived. The study also indicated that the material context imposes rules and constraints, as well as affordances for information sharing. This indication strongly contributed to the design of the project’s last study (IV), described further on in this chapter. Even though study II did not produce clear findings related to trust issues, there are instances in the empirical material indicating that trust is of importance for information sharing. This understanding inspired the design of study III, which is summarized in the subsequent section.

6.3 Study III – Information sharing and trust

There are several influential contributions to the field of the sociology of science, which demonstrate that research work is a social practice permeated with moral issues (e.g. Merton, 1973; Mitroff, 1974, Shapin, 1994). Research collaboration undoubtedly entails a multitude of instances where people need to judge the credibility of peers but also of the information used. Cronin (2003) eloquently asserts that even though “[t]he conventions for evaluating research may have changed in the last few centuries […] trust, a manifestation of the ‘normative ghost in the scientific machine’ […] remain[s] central to the conduct of science in general” (p. 10). This study identifies and explicates trust in relation to the investigated design researchers’ information sharing. It also aims at a theoretical contribution through its practice perspective. Practice theory was a salient feature in the theoretical framework applied in study II. In this study, it is given an even more prominent position.

The empirical material, which was produced through in-depth interviews with 15 researchers from four countries, was analysed with reference to a set of concepts and analytical distinctions from the previous literature on trust. One distinction of particular importance is that which separates, on the one hand, trust as a micro-level phenomenon, according to which it is a psychological, calculative or moral issue important for the relationship between individuals, and, on the other hand, trust as a macro-level phenomenon. The latter implies that trust is an issue that needs to be understood as related not only to individuals but also “in the light of specific institutional arrangements” (Bachmann, 2011, p. 207). The concept of “epistemological trust” (Davenport & Cronin, 2000; Van House, 2002) which asserts that trust can be assessed through verification of membership in an epistemic community, is also applied in this study.

It is concluded that trust issues related to information sharing emerge on both micro and macro levels and should not necessarily be perceived as solely tied to interaction between individuals. When trust issues are connected to information sharing, they emerge in relation to the shared information, the people involved, the tools used for sharing, and the
places where information sharing occurs. Strategies for creating and assessing trust encompass conscious collective efforts to establish an open and permissive atmosphere within the network, including the careful selection of suitable locations for seminars and conferences and the shaping of the material dimensions of workplaces. Regarding the study’s aim to contribute theoretically, it is concluded that the practice perspective is useful in order to identify and elucidate the elusive phenomenon of trust in relation to information sharing.

In conformity with study II, this study also points of the way to the fourth and last of the thesis’ studies. The clearest sign of connection between the two is found in the ways they deal with the material aspects of information practices.

6.4 Study IV – Material dimensions of information sharing

On the basis of study I it can be concluded that previous contributions to the literature on information sharing rarely consider material aspects. In consequence, information sharing has tended to be depicted as an invisible activity. As previously indicated in the thesis, particularly in the summary of study II, information sharing activities are often intertwined with other activities such as writing, reading and the use of information; they are basically embedded in routine work. Work is, however, often invisible (e.g. Suchman, 1995; Star & Strauss, 1999). Even though researchers are visible, the work they carry out is often “relegated to a background of expectation” (Star & Strauss, 1999, p. 15). Also the diffuse character of the concept of “information” contributes to making sharing activities difficult to grasp and describe. Increasingly, it is suggested in the literature that the concept of “document” is a fruitful replacement for “information” since “[a]ttention to practices with documents reveals how it is that particular documents, at particular times and places and in particular areas of social and cultural terrain, become informative” (Frohmann, 2004, p. 405). In this fourth study, a theoretical framework is elaborated which includes a theory of documents (Lund & Skare, 2010) and, importantly, a materiality approach emanating from the social study of science and technology thus bringing material objects into focus (e.g. Star & Griesemer, 1989; Knorr Cetina, 1997; Suchman, 2005; Barad, 2003). From this theoretical perspective, the aim of the study was to make visible information sharing activities within Nordcode. Through an ethnographic approach I attempted to identify and describe the socio-material dimensions of information sharing.

This theoretical perspective on objects together with the ethnographic approach allowed information sharing to be seen in situ as well as in the past; and documentation from events and gatherings function as representations of the world studied. These three analytical levels taken together brought the study object to the fore. The study also indicated that by being alert to technological breakdowns, light can be thrown on mundane information sharing activities that in previous research have tended to be “blackboxed”. Trajectories of sharing that reach across time and space were identified by studying how people interact with multidimensional objects, such as documents. These were found to coordinate and shape the social practice under study. The identified trajectories also indicate how practice is pre-figured and re-formed. Annotated articles, e-mails, shared file hosting services, mind-maps, and documentation appearing on the
network’s website form evidence of information sharing activities that, together with other activities, constitute practice.
7. DISCUSSION AND CONCLUSIONS

In this chapter, I discuss and conclude the results of the four individual studies. My aim is to present a discussion, which refers to the studies and revolves around the results as a coherent unit, not as isolated parts. Accordingly, the discussion to some extent takes place on an analytical level above the individual studies. The prime driving force regarding the structure of the presentation are the results from the studies, but the structure is also influenced by the guiding theoretical principles introduced in chapter four. In order to acknowledge the mobile and contingent character of the study object, the discussion oscillates between three nested and interconnected frames. The inner frame, which is closest to the empirical material, concerns design research as it is carried out in Nordcode. The next frame is the field of design research. Surrounding these, interdisciplinary research practices constitute the third frame. Before a brief final reflection on the PhD project, the chapter is rounded off with a section that concludes the discussion.

7.1 Activities as access to practice

The four studies conducted within this project were all guided by the following overarching question: 1) How, where, when, and why do interdisciplinary researchers share (or not share) work-related information? While engaging with the extended analysis of the four studies in concert, another overarching question was formulated, namely: 2) how do information sharing activities interplay with the research field in which they are taking place? On the basis of insights drawn from the reported studies on information sharing in Nordcode and with the empirical findings generated from these as a foundation, it is possible to carry out a theoretical discussion regarding these overarching questions.

In addition to answering the first question, details about the nature of that which is shared or not shared are presented (see table 2). Even though the findings listed may appear somewhat generic, they need to be explicated in order to further the discussion of pertinent themes and features, which will be elucidated from a theoretical perspective and thereby lay the ground for addressing the second question. To acknowledge the function of empirical findings as a key for analysing the outer frame is an analytical strategy in line with the theoretical idea that activities provide access to practices.
How: via e-mail, face to face, through social media (Facebook, Twitter, blogs), through mailing lists, and through file-hosting services such as Dropbox; less commonly through putting informative objects on someone’s desk, in someone’s post box, through sending text or image messages via mobile phone. Information sharing is not often structured by planned responsibilities, but tends to be carried out as an ubiquitous activity.

Where: at the workplace, e.g. in offices, lunch rooms, corridors, meeting rooms; during conferences and seminars; when travelling together with colleagues, e.g. on trains and airplanes; when working from home via e-mail and through other digital means, including social media.

When: in connection with collaboration, especially in the beginning of a research project, during reading and information seeking, when literature reviews for collaborative projects are conducted, and in connection with specific problems, e.g. concerning method or theory.

Why: because that is what one does as a scholar, because one shares interests with others, because it makes one feel good, because one is kind and thoughtful, because it is expected from others, because one wants to establish a professional relationship with a particular person.

What is shared: references to various documents such as research articles, monographs, and theses; documents of these kinds attached to e-mails; links to webpages, videos such as TED-talks and YouTube-videos; images, film clips and diagrams; and also: information about information, e.g. “there is a new article about…”, “NN has published on that…” or “…is a good journal to publish in…”.

What is not shared: work in progress, especially work in progress invited by someone else, and information pertaining to commercial enterprises.

Table 2: What is shared and how, where, when, and why do interdisciplinary researchers share (or not share) work-related information?

In contrast to the empirical findings presented in the table above, the line of reasoning in the subsequent account is characterized by a perspective that has resulted in a discussion of a more theoretical nature. This discussion is, however, closely related to the empirical findings and refers recurrently to table 2.

The following line of reasoning presents a theoretical reflection against which the findings in table 2 must be read. It can thus be concluded that activities of information sharing contribute to the creation, accentuation, shaping and maintenance not only of a specific information practice shared by design researchers, but also a practice of design research. By focusing on activities in situ, it can also be asserted that the locations where the activities take place and the tools used in order to carry them out contribute to the creation, accentuation, shaping and maintenance of the practices. Some locations facilitate certain kinds of activities, while others restrain certain activities. As can be seen in table 2, conferences, and in particular social events pertaining to them, are emphasized as fruitful facilitators of information sharing. The enactment of practices is also connected to the adoption of new tools and resources. The introduction of new media such as TED-talks and YouTube clips, for example, give rise to new kinds of activities, and contributes to the transformation of practice in that these things open up and call for new directions.
for activity. The activities that are taking place, and the ways they are carried out, are mutually constitutive with historically shaped rules, norms, and routines regarding how activities are supposed to be carried out within the network. These rules, norms and routines are in turn embedded in the unfolding of practice.

7.2 Knowing how to act

Readings of the empirical material indicate that learning how to become a “Nordcoder” goes on through all sorts of interactions between members, as well as between members and documents and other material objects that relate to Nordcode. This learning process does, however, seem to be intensified during seminars and doctoral courses. In connection to these, knowledge situated at the practice of design research, as it is enacted in Nordcode, is developed. The empirical finding presented in relation to the why-question in table 2 indicates that the members “learn to cope with those communicative means and processes that mediate participation with others” (Bazerman, 1997, p. 305). This knowledge, which is partly a result of information sharing, then provides the ground for the capacity to act in accordance with, but also to reproduce, the rules, norms and routines in Nordcode.

As can be seen on the Nordcode website (Nordcode, n.d.), a prime feature of the network is that it fosters its members’ shared interest in design research. The network is constituted by its members and comprises the activities carried out within the network. In the interplay between activities and things a certain amount of material outcomes emerge such as publications and artistic artifacts (since a few of the participants are also designers and artists). The network is manifested through these activities and outcomes, including its website, and activities and outcomes are molded in the notion of what it means to be a capable actor in Nordcode. Furthermore, it is indicated on the website that a common denominator among the members is that they all share an academic background and that they in their everyday work are located to university departments. Also there, in their respective departments, they are exposed to rules, norms and routines, which pertain to a wider practice of working in academia. In this respect, the members of Nordcode can be seen as carriers of practices (cf. Shove & Pantzar, 2007) within the research practice that characterizes the network.

Rooted in the wider practices of academia is the conception of research work as taking place within disciplines as if these “always [had] existed in their current form and as representing something essential about human knowledge” (Salter & Hearn, 1997, p. 17). However, as Salter and Hearn point out with reference to Foucault (Ibid., p. 26), the academic notion of discipline has become more flexible and includes a number of possible interpretations.

Once again returning to table 2, I would argue that the response to the why-question in the table can be seen as a manifestation of the line of reasoning about disciplines as also including “the inculcation of appropriate forms of consciousness, roles, and norms within a framework of knowledge and discourse” (Salter & Hearn, 1997, p. 26). That is, it is prescribed in practice, as practice is being cared for in Nordcode, that researchers share information in order to maintain and develop the common project of design research. Several participants also adhere to the idea that the way they communicate, the
information sources they refer to, and their sense of a common epistemic culture (Knorr Cetina, 1999), constitute a multifaceted complex that is turned to in order to assess trust in peers. In a similar vein, activities of information sharing can be interpreted as the moral and “political deployment of knowledge products” (Salter & Hearn, 1997, p. 26) which is an argument that can also be applied in relation to the issue of withholding information; such decisions are rooted in the teleoaffective structures (Schatzki, 2005, p. 471) of practice.

7.3 Shaping identity
In the earlier literature, the importance of common interests and mutual beliefs for information sharing are emphasized (e.g., Huotari & Chatman, 2001; Jaeger & Burnett, 2005; Sonnenwald, 2006; Fisher et al., 2007; see also study I). The studies in the present project reassert the importance of these features. However, the finding, which suggests that traditional organizational settings can be complemented or even substituted by flexible groups of actors such as those in the investigated network, serves to clarify this line of thought. Accordingly, institutional relationships, such as being colleagues at the same department, did not in these studies figure largely with regard to decisions about whom to share information with. The empirical findings rather indicate that information sharing predominantly occurs between people who collaborate and have shared research interests (table 2). The latter raises issues related to the networks’ identity work (cf. Wenger, 1998) and evokes the question regarding what is the prioritized identity for a Nordcode member. Especially for the younger researchers in the network, the issue of belongingness emerges as important. A sense of loneliness at one’s own university department is not unusual. In such cases, identification with the network and with the discipline of design, albeit elusive and fragmented, seems to supersede identification with the formal home institution. Consequently, the activities of information sharing seem crucial not only for successful learning and teamwork but also for collective identity shaping and the enactment of design research.

7.4 Interactions with things
In table 2, information sharing is described as an un-structured, ubiquitous activity. Information sharing seems to be going on almost constantly but it is difficult to see, grasp and describe. This is partly due to its embedded character as it is intertwined with activities such as writing, reading, and talking. In this respect, one can describe information sharing as invisible or, as previously suggested, “relegated to a background of expectation” (Star & Strauss, 1999, p. 15).

Throughout the three empirical studies, instances of material objects have emerged as pertinent to the understanding of what matters regarding information sharing. The decision to operationalize Buckland’s (1991) notion of information as thing, to conceptualize that which is shared as informative objects, has contributed in making information sharing visible. It has also lead to the position where the adoption of the theoretical concept of “document” into the discourse of information sharing-research was inevitable. The study participants’ interactions with informative objects such as documents have invited analyses that indicate that practice is infused with material objects in relation to which information sharing-activities unfold. A multitude of
materialities have offered opportunities to pay attention to how material objects appearing in information sharing activities constitute reference points in interactions. It is also possible to discern how they contribute to structure and give rise to activities, and how they function as boundary objects that can contribute to connect groups of people. These observations were made possible by focusing on, for example, the architecture of buildings; physical lay-outs of rooms, offices and other premises; file hosting-services such as Dropbox; reference management-systems like Endnote, Zotero, and Delicious; social media such as Facebook and Twitter. Other media formats also invited a focus on materiality, for instance the basic distinction between paper-based or digital documents.

In addition and in conjunction with this analytical approach to the functions of objects in information sharing, it is also possible to identify how agency is distributed among the people involved, the things used, and the places where they are located. It can also be established that the introduction or the adoption of new things contribute in shaping and changing practice. Primarily, it is noticeable that social media has gained ground over the years that I have spent with Nordcode, which accordingly is reflected in change of practice.

7.5 Information sharing in the process of disciplining

The overarching research question for this thesis was complemented by the question regarding how information sharing is interlinked with the research field in which it is taking place. My argument was that the interdisciplinary field of design research is striving towards the shape of a discipline, and that information sharing plays an important part in this process of disciplining. In the subsequent section, this issue and this argument are addressed.

As has been indicated previously, especially in chapter three, there are several authors within the field of design who claim that design research already constitutes a discipline. Even if they may not be in the majority, these authors’ claim can be interpreted as an expression of the ambition to form a discipline. This ambition seems particularly salient when regarded in combination with the many statements that exist in the literature, which suggest that it is of great importance for design researchers to join forces in common conferences and to maintain a common literature (e.g. Simon, 1969; Buchanan, 1992; Margolin, 2010). On the basis of this line of reasoning, I suggest that the field of design research is approaching an organization similar to that of a discipline, as these are characterized by Whitley (2000, p. 82). With reference to Klein (2010), it can be argued that parts of several disciplines have been detached “to form a new coherent whole” (p. 21) through a process of restructuring. Throughout this course of events, activities of information sharing have been shown to constitute an important feature in the restructuring process.

This thesis contributes an addition to Whitley’s (2000) list of criteria of what characterizes a discipline. His list comprises 1) educational programs; 2) facilities for knowledge production and a labour market for academic positions; and 3) a communication system including publication outlets. Design research has established its own educational programs on various levels, academic posts aimed at specialization into design, and its own journals, conferences, and communication channels such as e-mail.
lists (e.g. PhD Design list\textsuperscript{14}). However, I suggest that a fourth criterion can be added to this list, namely the ambition to strive for a canonical literature (e.g. as asserted by Margolin, 2010). Information sharing constitutes a central strategy for creating such a literature. It contributes to nurture and maintain the common project of design research, and can therefore be seen as an important component of an overall strategy aimed at the establishment of a discipline.

7.6 Conclusions
The main contribution of this thesis is that it is illustrated how activities of information sharing not only contribute to, but actually play a central role in the shaping of the practice of design research. Information sharing emerges as an activity that takes place for instrumental reasons beyond the activity itself (cf. Sundin & Johannisson, 2005). The thesis shows within three different frames how information sharing works as a contributor to the development, maintenance and shaping of practice: within 1) design research as it is conducted in Nordcode; 2) in the field of design research; and 3) within interdisciplinary research. Through zooming in and out of practice (cf. Nicolini, 2009) it has been possible to trace and identify connections between the frames. Founded in the LIS literature on information sharing (study I), the empirical study of design researchers’ information sharing in practice has allowed for the identification of not only interests, discourse, histories, and futures, but also trust mechanisms and material objects as fundamental aspects to consider in the understanding of scholarly information sharing (study II, III, IV).

This PhD project has focused on the question of what matters regarding information sharing in scholarly interdisciplinary practice. The studies have been conducted through focusing on the field of design research, and in particular on the Nordcode network. Regardless of the issue of the field’s disciplinary status, it has been illustrated that information sharing as it emerges in an interdisciplinary practice such as in Nordcode, functions as a unifying force towards the probable goal of establishing a discipline. Without losing sight of the empirical material, the theoretical analysis has made it possible to illuminate the connection between activities of sharing and the enactment of a discipline.

7.7 Final reflections
The analytical move from the middle frame to the outer frame accounted for in the previous section indicates a generalizing ambition which calls for caution. It can be asserted that fields of research exhibit differences and similarities, e.g. being in different developmental phases (e.g. Whitley, 2002). The finding that information sharing is a constituent in the enactment of a discipline may not be valid for all fields, but is primarily relevant for fields similar to design research. That means fields that can be characterized as fragmented adhocracies and that are involved in restructuring processes (e.g. Klein, 2010).

\textsuperscript{14} PhD Design is a very active UK based mailing list “for discussion of PhD studies and related research in Design”, which attracts an international audience: https://www.jiscmail.ac.uk/cgi-bin/webadmin?A0=phd-design (accessed the 29\textsuperscript{th} of January, 2014).
A research project such as the one presented in this thesis necessarily involves a number of decisions regarding theoretical and methodological approaches. Even if the final outcome entails a stance, which is the result of conscious decisions, the project could, of course, have been different, for example in terms of theory and method, and also with regards to the literature on which it is based. The practice based approach characterizes the thesis together with the explorative tone of inquiry and the explicit connection to the tradition of user studies within LIS. There are, however, other research areas with promising and exciting literature which could have been consulted more extensively. For example, the literature of organization studies and knowledge management offer contributions, which fruitfully could have been employed here. Future studies of LIS based research on information sharing should explore and pay careful attention to the multitude of interesting studies that can be found within these areas.

A consequence of not relating to these areas in this thesis can be noted on a conceptual level, i.e. the concept of information sharing has been embraced, partly at the expense of the concept of knowledge sharing (cf. study I). Still on a conceptual level, it can also be noted that the thesis could have been conducted differently with regards to the concepts employed. A topical example is that the further the work proceeded, the more fruitful the concept of document appeared. On the basis of study IV, it is suggested that it would be beneficial to adopt the analytical concept of document into the discourse of information-sharing research. It would increase thereby the possibility to emphasize and highlight the material features of information sharing, without reducing social and cognitive aspects. However, this was an insight gained too late in order to characterize the thesis in full. In these circumstances it seems reasonable to suggest that future studies further test and explore the analytical advantages that have been indicated here in relation to the concept of document.

In spite of the present project’s multifaceted approach, there is still a range of important aspects of scholarly information sharing to be elucidated. There is, for example, a need for research on information sharing among scholars and researchers, which to a greater extent than in the present case takes place on-line. The present project has been carried out through the means of qualitative methods, predominantly through interviews and ethnographically oriented participatory observation. Increased understanding of information sharing could also be obtained by further quantitative inquiry. In this thesis, focus has been on a field that using Whitley’s (2000) term can be described as a fragmented adhocracy, i.e. a field with a range of different problems that are addressed in a variety of ways. Studies of information sharing in other types of fields would most likely yield different results in comparison to those presented here. Additional studies could therefore offer opportunities for comparisons.
REFERENCES


Appendix 1 – Example of an e-mail to potential participants

Dear NN,

I am contacting you in your capacity as design researcher. I would be ever so happy if you would consider to be interviewed by me for my ongoing PhD project.

If you find my request interesting, I hope you will take the time to read the letter that is attached to this e-mail. It will provide you with further details about my study.

Best wishes

Ola Pilerot

[Full contact information was originally included at the bottom of the letter, but is excluded here.]
Appendix 2 – Example of an initial contact letter
[University logtype originally included is excluded here]

Swedish School of Library and Information Science

Inquiry regarding participation in a research project

Dear NN,

My name is Ola Pilerot. I am a doctoral student currently undertaking a thesis project with the working title Sharing and non-sharing of work-related information amongst scholars within the field of design research. I am contacting you because I hope you are willing to be interviewed for my next empirical study.

More specifically, I am interested in how and why and in which situations researchers are sharing (or not sharing) work-related information. The group of researchers I have turned to consist of researchers (including PhD students) with a connection to the network Nordcode. Through documentation found on the web, I have concluded that you have participated in a Nordcode seminar. On the network website I can see that its activities, among other things, aims at making it possible for the participants to exchange information. Through participating in my study, I believe that you can contribute to elucidate this activity.

At the moment I am preparing my second empirical, qualitative study. Therefore I am interested in establishing contacts with a small amount of researchers that are (more or less) active in Nordcode.

I have previously carried out a small-scale empirical study, in which I interviewed seven “Nordcode-researchers”. This study resulted in the following journal article:


My first study indicated that the matter of trust and credibility is of importance for decisions made concerning which information that is disseminated and shared with colleagues. In my forthcoming study, I therefore intend to explore the following overarching question: What contributes to create, and how is trust and credibility created that is of importance for decisions regarding information sharing?

In case you are willing to participate, I intend to interview you at a time that suites you. I estimate that the interview will last approximately forty-five minutes, probably a little less than so, most likely not more than an hour. If you agree to participate, I will visit your workplace, unless you prefer to meet me somewhere else. I can also imagine that we carry out the interview over the phone.
As a participant in the study you are guaranteed full confidentiality. I am thus the only one who will know the names of the participants. My intention is to make sound recordings of the interviews. These recordings will only be listened to by me.

The interview will be performed in English, or Swedish if preferred.

If there is anything regarding the information above that you wonder about, I am of course prepared to provide you with further information about my project and my intentions with it. I sincerely hope that you will take my proposal into consideration, and that you will get in contact with me soon. If I do not hear from you, I will try to get in touch with you over the phone in the foreseeable future.

My project is carried out within the frame of the research environment LinCS, Linnaeus Centre for Research on Learning, Interaction and Mediated Communication in Contemporary Society at the University of Gothenburg. Scientific leader for LinCS is Professor Roger Säljö. My main supervisor is Professor Olof Sundin, University of Borås. Assistant supervisor is Professor Jan Nolin, also University of Borås.

Best regards

Ola Pilerot

[Full contact information was originally included at the bottom of the letter, but is excluded here.]
Appendix 3 – Example of an offer to participants to read and review transcripts

Hi NN!

finally I have finished the transcription of the conversation we had. In case you are curious about the result, there is a file attached. I regard the interview as very good, and I am very grateful that you participated. Thanks a lot!

In case you have any suggestions about changes, corrections or other modifications, please do not hesitate to get in touch with me.

I wish you a merry Christmas and a happy new year.

Kind regards

Ola
Appendix 4 – Example of message to participants about publication

Dear NN,

It has now passed nearly two years since you so kindly allowed me to interview you for the study I then was working on. After a period of writing and a long waiting for referee comments, the paper is now ready for publication.

It will be published in a peer-reviewed open access journal within the field of Library and information science, i.e. Information research. Officially, the issue goes live the 15th of December, but already now my contribution is accessible via:

http://informationr.net/ir/18-4/paper595.html

The paper that can be found via the link above is the third of the four papers that I have planned for my thesis work. The fourth paper is also on its way towards publication. It is primarily based upon the empirical material, which was produced during the 11th Norcode seminar in Helsinki and Stockholm, and the Norcode meeting that took place on Ven in November 2012. The paper, which is given the title Making design researchers’ information sharing visible through material objects, will soon appear in the Journal of the American Society for Information Science and Technology.

Since the interviews, and the time that I have spent with you (and many of your colleagues), constitutes the foundation for my work, I would like to thank you very much for your contribution.

Kind regards

Ola

[Full contact information was originally included at the bottom of the letter, but is excluded here.]
Appendix 4 – Example of message to participants about publication

Dear NN

It has now passed nearly two years since you so kindly allowed me to interview you for the study I then was working on. After a period of writing and a long waiting for referee comments, the paper is now ready for publication.

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8. THE FOUR STUDIES
Due to copyright reason the articles included in this PhD thesis by publication are not available in the digital version of the thesis. Complete references to the articles can be found on the following pages.
STUDY I

STUDY II

STUDY III

STUDY IV

Pilerot, O. (2014). Making design researchers’ information sharing visible through material objects. Accepted for publication in *Journal of the American Society for Information Science and Technology.*
Publikationer i serien *Skrifter från VALFRID*


Jarneving, Bo (2005). *The combined application of bibliographic coupling and the complete link cluster method in bibliometric science mapping.* (ISBN 91-89416-12-0) Skriftserien ; 30


Olson, Nasrine (2010). Taken for granted : the construction of order in the process of library management system decision making. (ISBN 978-91-89416-26-0) Skriftserien ; 45


