Resources for scholarly documentation
in professional service organizations

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Resources for scholarly documentation in professional service organizations

A study of Swedish development-led archaeology report writing

Lisa Börjesson

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Abstract
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This information studies dissertation deals with the problem that results from research outside academia risk to receive little or no attention if communicated through reports, instead of in mainstream academic genres like research journal articles. The case in focus is Swedish development-led (DL) archaeology, i.e. state regulated archaeology preceding land development. Swedish DL archaeology is organized as a semi-regulated market. The organizations competing on the market are professional service organizations selling research services to land developers. Regional government departments, county administrative boards, function as intermediaries setting up procurement-like processes.

In previous research on archaeological documentation, the problem with non-use of reports has been described as depending on cultural issues of access, possible to solve if individuals make efforts to communicate and use extra-academic results. This dissertation offers an alternative definition of the problem, highlighting a different set of solutions. The aim is to further the understanding of how the distribution of research duties to professional service organizations affects the scholarly documentation in Swedish archaeology. The aim is met through identification, operationalization and analysis of resources available to report writing DL archaeology practitioners, and an analysis of how practitioners draw on these resources. The results further the understanding of how reports are shaped within the DL archaeology institution. In view of these results, efforts to solve issues of access should target the organization of research in the archaeology discipline, and specifically how scholarly documentation is governed on the archaeology market.

The dissertation draws on science and technology studies, practice theory, and document theory for the design of the study of documentation resources and contexts in extra-academic research. A mixed methods approach is applied to capture regulative, institutional, and infrastructural resources, and practitioners' use thereof. Dissertation papers I-III contain analyses of concrete instantiations of the resources: information policy, documentation ideals, and information source use. The fourth paper presents an analysis of how practitioners draw on these resources in their everyday report writing. The dissertation concerns archaeology specifically, but serves as grounds to inquire into the premises for scholarly documentation in other areas of extra-academic research and knowledge-making as well.

Keywords: Archaeology, Extra-academic research, Knowledge-making, Scholarly communication, Documentation, Report writing, Science and technology studies, Practice theory

Lisa Börjesson, Department of ALM, Box 625, Uppsala University, SE-75126 Uppsala, Sweden.

List of Papers

This dissertation is based on the following papers, which are referred to in the text by their Roman numerals.

I   Börjesson, L., Petersson, B. & Huvila, I. (2015) Information Policy for (Digital) Information in Archaeology: current state and suggestions for development. *Internet Archaeology*, 40, no pag.

II Börjesson, L. (2016) Beyond information policy: Conflicting documentation ideals in extra-academic knowledge making practices. *Journal of Documentation,* 72(4): 674-695.

III Börjesson, L. (2015) Grey literature – grey sources? Nuancing the view on professional documentation. The case of Swedish archaeology. *Journal of Documentation,* 71(6): 1158-1182.

IV Börjesson, L. (2016) Research outside academia? – An analysis of resources in extra-academic report-writing practices. *Proceedings of the 79th ASIS&T Annual Meeting,* vol. *53*, no pag.

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Contents

Acknowledgements

And those that met on board, and were carried by the same hull for a few hours or a few days,
how well did they get to know each other?
Talking in misspelled English, understanding and misunderstanding, but very little conscious lying.
How well did they get to know each other?

Excerpt from "Baltics" by Tomas Tranströmer, translated by Samuel Charters in Hass, R. (ed.) (1987) *Tomas Tranströmer, Selected poems, 1954-1986*. New Jersey: The Ecco Press.

Abbreviations

ARKDIS - Archaeological Information in the Digital Society (research project)
CAB - County Administrative Board
CRM - Cultural Resource Management
DiVA - Academic Archive Online (Swed. Digitala Vetenskapliga Arkivet)
DL archaeology - Development-Led Archaeology
IS - Information Studies
MARK - MuseiArkeologiska Branschorganisationen (Engl. The museum archaeology association, my translation)
NGO - Non-Governmental Organization
NHB - The Swedish National Heritage Board (Swed. Riksantikvarieämbetet, RAÄ)
NPM - New Public Management
PSF - Professional Service Firm
PSO - Professional Service Organization
R&D - Research & Development
STS - Science and Technology Studies
SUBo - Sveriges Uppdragsarkeologiska Branschorganisation (Engl. The Swedish development-led archaeology association, my translation)

Tables and figures

1. Introduction

"So, what do we do? Should we go for a white paper or publish in this journal?" The man next to me on the plane consults his colleague over the phone as we tax in to Denver International Airport. He is an engineer designing resource management software for nurses. Right before takeoff he received an e-mail with the suggestion to publish findings from a study in the *Journal of Hospital Administration*. First thing after landing he, eager to discuss the matter, calls his colleague. They debate pros and cons of publishing in a research journal compared to self-publish a white paper: the relative freedom to design the paper, the publication pace, and the legitimacy of each form of publication. We de-board before they reach a conclusion, but the conversation serves to illustrate two premises constituting the point of departure for this dissertation: people do *research*[1] in a range of different *institutions*[2] and organizations throughout society, and research can be communicated in a variety of forms.

There is no uniform definition of research taking place outside universities. Rather, research is undertaken in a range of settings and with a variety of purposes. Besides university research, government and industrial research are two other major components in the societal "knowledge production system" (Nowotny, Scott, & Gibbons, 2001, pp. 66–78). Research activities are for example carried out in research and development (R&D) departments in public health and medicine, as part of non-governmental organizations (NGOs) and special interest organizations, and at R&D departments at consultancy firms. Some of the extra-academic[3] research endeavors merge with academic research, while others have little to do with university research. There are both special-interest societies and

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[1] *Research* denotes the activity of posing questions, applying methods, doing documentation, and communicating results in a particular way, more or less agreed upon in a community of researchers, for the purpose of knowledge making. Research can be conducted in a variety of institutional and organizational settings offering varying premises for the research.

[2] I use the term *institution* in a colloquial sense to denote a group of organizations, e.g. universities, corporate firms, or organizations in a specific industry or field of activity (cf. Brante, n.d.). The group of development-led (DL) archaeology organizations form an institution. An institution can be made up of a variety of organizational forms and thereby contain a variety of work settings. I do not delve deeper into institutional theory in this dissertation.

[3] In this dissertation, the *academy* denotes the research and teaching institutions known as universities and university colleges.

specific publications catering to these extra-academic research activities (Finnegan, 2005a).

Doing research outside academia can on the one hand entail a certain freedom. Researchers may choose to work outside academia to enjoy less strict review of their work (e.g. Hansson, 2014), less publication intensive work, a wider range of publication and communication venues to name but a few reasons. Those doing research outside academia negotiate and decide how to communicate their results depending on how they view, and expect their audiences to perceive of, each mode of communication. Working outside academia can on the other hand also be connected with limitations. Legislation, regulations, guidelines, organizational structures, and managerial decisions can limit the scope of and ambitions in research undertakings, as well as which results that are publishable and how. Limited access to information infrastructures like databases and sources like journal articles and books can also constrain extra-academic research (Nilsson, 2015).

Practitioners[4], like the engineer on the plane, thus sometimes have the option to choose how to conduct and present their research. Other times practitioners are directed to undertake and communicate their research in specific ways. As is illustrated by the introductory example, communicating *in-* or *outside* what is considered to be academic publications, matters. It matters to authors, like the software engineer on the plane, because the form of communication affects what can be written and how, each form is reviewed in a particular way before presented to its audience, and each form is ascribed a certain status by different audiences. It matters to readers because each form of communication is likely to present knowledge in different ways with regards to how a study is framed, related to previous research, how methods and results are presented, how the results are promoted, how the publication can be accessed (Price, 2015), and referred to in different settings.

This information studies (IS) dissertation explores the premises for *scholarly documentation[5]* in one case of research taking place outside academia, namely in Swedish development-led (DL) archaeology (further

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[4] In this study the term *practitioner* describes professionals working in DL archaeology organizations. The term is used in place of *researcher*, which is too narrow to describe the diverse tasks performed by those working in DL archaeology organizations. DL archaeology and its relation to academic research archaeology is further described in "Development-led archaeology", Chapter 2.

[5] I use the term *scholarly documentation* instead of the more general term *scholarly communication.* The former describes the object of study in greater detail. *Scholarly documentation* refers to the range of activities DL archaeology practitioners perform to preserve observations from archaeological assessments, surveys, and investigation in different mediums (cf. Buckland, 2013).

explained in the forthcoming sections and in Chapter 2).[6] Swedish DL archaeology enables monitoring and preservation of archaeological remains in land-development processes. It is undertaken by *professional service organizations* (PSOs) (cf. von Nordenflycht, 2010) at a semi-regulated market. Documentation, and particularly reports, is pictured as instrumental for the communication of DL archaeology results (Riksantikvarieämbetet, 2015a). Yet, the responsible government agency, the Swedish National Heritage Board (NHB), express that reports do not serve to communicate results satisfactorily. The NHB points out that reports risk to not receive attention by the research community (Riksantikvarieämbetet, 2015b).

I do not adopt the NHB's concern as my own, but the fact that the concern is raised by the NHB spurs my IS interest: Why are reports, a form of documentation central to Swedish extra-academic archaeology, perceived of as a significant problem for the communication of archaeology results? The expressed problem with reports is based on the Swedish government's and the government agency the NHB's expectations that DL archaeology documentation should be the product of work of good scientific quality and be of use for archaeology researchers. In this dissertation I target and problematize these premises for the expressed problem. The IS research problem I explore concerns the character of the resources for scholarly documentation in Swedish DL archaeology, one example of research outside academia. I investigate this research problem with a documentation practice (Frohmann, 2004a, 2004b) perspective, by analyzing resources (cf. Pickering, 1992) in extra-academic documentation contexts. Based on the analysis, furthering the understanding for the extra-academic documentation contexts, I return back to the expressed problem to suggest a different way of perceiving of the report problem. In the following I introduce Swedish extra-academic archaeology. Thereafter I further explain the expressed problem and its potential causes, and clarify how I approach one dimension of the challenge from a documentation studies perspective.

Scholarly documentation in extra-academic archaeology

Swedish DL archaeology is an institution separated from its academic counterpart by external factors rather than by a more organic disciplinary development. DL archaeology share academic archaeology's epistemic goal, to create knowledge about the past, but is set apart from academic archaeology by cultural heritage legislation, subordinate formal regulations, and guidelines. Swedish DL archaeology is organized as a service market where PSOs compete for tenders in procurement-like processes. Criteria for

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[6] This dissertation is part of the project ARKDIS (Archaeological Information in the Digital Society) funded by the Swedish Research Council (grant number 340-2012-5751).

competition are stated in national regulations. Regional government authorities decide who wins each contract (cf. Chapter 2).

The governance enacted through heritage policy directs DL archaeology practitioners to write reports, a form of documentation different from forms of scholarly documentation negotiated by, and preferred in the academic research community. Practitioners in DL archaeology present assessment results (what is likely to be found at a site of future land-development), survey results (what is found by ocular inspection and by digging test pits), and excavation results (what is found by excavating selected parts of an area of land-development) in reports. Of course, Swedish cultural heritage legislation, regulations, and guidelines applies to academic research archaeologists as well, and particularly when academic research archaeologists take part in and report DL archaeology undertakings. The difference is that while the DL archaeologists are contracted to primarily communicate through reports, academic research archaeologists can choose to also communicate through other forms, not directed by government issued policies (cf. Huvila, 2016).

As opposed to DL archaeology in many other countries (Carver, 2009), Swedish DL archaeology is directed by explicit, legally binding formulations concerning the methods for, and content of, the documentation. Practitioners are obliged to use "scientific methods" (Riksantikvarieämbetet, 2015a, § 2, 2015b, p. 5), to do work of "good scientific quality" (§ 11, Kulturmiljölag (1988:950), n.d.), and to create "knowledge of relevance for government agencies, research, and the public" (Riksantikvarieämbetet, 2015a, § 2, 2015b, p. 5) (my translations).[7]

At the same time as DL archaeology practitioners are expected to do work of good scientific quality, the administrative procedure directing DL archaeology is different from procedures guiding academic research. Furthermore, the competing DL archaeology service organizations are in many aspects different from academic departments. DL archaeology organizations are hybrid organizations (Gulbrandsen, 2011), incorporating rationales from academia as well as from the government, and from the private sector. They are akin to professional service firms (PSFs) (von Nordenflycht, 2010), but not all are corporate firms. Rather, DL archaeology organizations as a category are better described as PSOs (cf. Chapter 2). DL archaeology practitioners are thus required to accomplish reports of good

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[7] I have translated the Swedish word "vetenskaplig" with the English word "scientific". In English, "scientific" has connotations to the natural and social sciences, rather than to the humanities. In Swedish, "vetenskaplig" applies equally to natural and social sciences, and to the humanities. If I would redo the translation, I would replace the term "scientific" with "scholarly", which I believe better describes the intention of the policy. In spite of this reflection, I use the term "scientific" in the dissertation to achieve coherency between the dissertation papers and this introduction.

scientific quality but to do so in contexts different compared to the typical academic research department.

I argue that Swedish DL archaeology, based on the above described characteristics, is a particularly interesting case for studying the role of and challenges of scholarly documentation outside academia. In Swedish DL archaeology, documentation is assigned a central role both with regards to DL archaeology should contribute to the wider *archaeology discipline*[8], and with regards to how the archaeology service market should function. Despite the ideas about how the documentation should function, according to the Swedish NHB, Swedish archaeology face a significant challenge with regards to the communication of DL archaeology results and with regards to the joint disciplinary knowledge making. Reports are at the core of the perceived problem.

The report problem

In the following I describe how reports are framed as a problem in Swedish archaeology. I also explain four potential causes of the challenge. This explanation is crucial as a background to the research problem, which is presented under the heading "The research problem". I view the expressed problem of reports as the motivation to explore the research problem.

Little or no use of reports has been expressed as a pressing problem in Swedish archaeology (Andersson, Lagerlöf, & Skyllberg, 2010a; Lönn, 2006; Riksantikvarieämbetet, 2015b). Similar issues are described for example in the UK and in the US (cf. "Report writing in archaeology" in Chapter 3, and e.g. Muckle, 2008a; Roth, 2010). How grave the Swedish NHB deem the situation to be is illustrated in the guidelines for reporting, dissemination, and archaeological documentation material:

> It is very beneficial if the scholarly supplements [Swe. "vetenskapliga fördjupningarna"] are published as independent publications or articles, since they risk to 'disappear' and not receive any attention if they are only published together with the basic report. Therefore, for an investigation yielding important results, a publication form with expected impact on the scholarly community, for example an article, monograph or conference proceeding should be considered. (Riksantikvarieämbetet, 2015b, p. 21, my translation)

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[8] The notion the *archaeology discipline* refers to archaeology research and education with its supportive functions (e.g. funding bodies, special interest associations, publishers and journals etc.). Archaeology consists of several sub-disciplines (e.g. classical archaeology, medieval archaeology, maritime archaeology). There are several activities related to the archaeology discipline (e.g. public archaeology, museum pedagogics, heritage management). In this dissertation, DL archaeology activities are considered to be part of the archaeology discipline. However, the institutional and organizational premises for DL archaeology differ significantly from the institutional and organizational premises for academic research archaeology.

The quote illustrates the severity of the problem from a knowledge making perspective: according to the Swedish NHB's estimation, results presented in or together with basic reports risk to fall into oblivion. Publication forms with "expected impact" (Riksantikvarieämbetet, 2015b, p. 21) on the scholarly community are promoted as better choices.[9] The severity is further underlined as the Swedish government in the proposition for a new cultural heritage policy urges government agencies and "other actors" to take a "clear strategic responsibility" for making sure that DL archaeology actually contributes to scientific advances (Kulturdepartementet, 2017, p. 151, my translation). This encouragement is followed by an ultimatum: "Only then [when DL archaeology contributes to scientific advances] does DL archaeology contribute to fulfill the cultural political goals and the national cultural heritage goals" (2017, p. 151, my translation).

In other words, to include archaeology as part of land-development processes, a significant part of all archaeology undertakings are carried out by practitioners working outside academia. However, the results produced by these practitioners risk to receive little or no attention. Thus, what from a heritage politics point of view is a solution has from a research politics perspective become a liability; it can be viewed as indefensible to make land owners finance undertakings while there is an apparent risk that the results of these undertakings receive little attention.

The experience of the report problem does of course have many dimensions. It is related to the government agency's ambitions regarding the documentation, expectations on imagined users of the documentation, and ideas about how DL archaeology should contribute to archaeological knowledge making. Moreover, the assertion that it is a problem that results risk to disappear if only published in or together with basic reports is evasive in the sense that it depends on one's perspective. In order to accept the NHB's assertion in the first place and view the phenomenon as a problem one has to assume at least three premises. The first and basic premise is the idea of and valuation of a cultural heritage based on physical remains, and the related trust that DL archaeology undertakings produce knowledge about these remains. Secondly, one has to assume that all results from investigations of physical remains are of potential importance for the making of archaeological knowledge. Thirdly, one has to believe that results of potential importance are presented in DL archaeology reports. If one accepts

[9] There are no published statistics or other extensive user study results to validate the information about the use of reports implied by the NHB quote. However, the NHB quote corresponds to similar concerns expressed in two research journal special issues on the topic grey literature in archaeology (*The Grey Journal - Archaeology and Grey Literature*, 2009; *Archaeologies - Black-and-White Issues About the Archaeological Grey Literature*, 2010). In this study I take the NHB quote and what it implies about use of reports as an indication that the NHB personell experience a problem in the communication of extra-acdemic archaeology results in Swedish archaeology. Further studies could investigate use of reports with bibliometric methods to provide a quantitiative impression of the extent of the phenomenon.

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these premises and view the phenomenon as a problem deserving effort, then four causes of the problem, described in previous research and debate, are relevant to consider. In the following I summarize these.

Potential causes of the report problem

Based on previous research and debate four potential causes can be identified. I do not probe into or discuss these causes further. Nevertheless, to briefly explain these provides a perspective on the many ways in which the problem of lacking attention to results presented in Swedish archaeology reports can be explained:

- *Legal term of access*. Potential users lack legal rights to access reports and underlying data, either because disclosing detailed information about heritage sites is illegal (like in the US), because data beyond that which fits within the report is considered proprietary, or because of conflicts of interests concerning open heritage information (as illustrated by several of the articles in Gnecco & Dias, 2015) between indigenous groups and potential users. Neither of these aspects are prevalent in Sweden where reports are public documents and heritage site information is generally considered to be a public asset.[10]
- *Practical access to analog and digital reports*. Practical access can depend on how reports are organized, described, archived, and on the infrastructures for giving potential users access to reports (e.g. ordering procedures and online search interfaces). Open government, open science ideals, and digitization provide the ideological incentives and affordances to increase accessibility to reports through online search interfaces and remote digital access to full texts (Evans, 2015; Peters & Roberts, 2012). Practical access is generally gradually improved as digital reports are produced, older reports are digitized, and online search functions improved, e.g. in the UK, the Netherlands, and in Sweden. In Sweden, reports are made available both through archaeology organizations' websites, and since 2013 through the NHB's digital repository SAMLA ("Samla - Riksantikvarieämbetets öppna arkiv," n.d.). Following this development archaeology reports have moved from relatively secluded places in analog repositories to being visible and accessible to all sorts of users in the public (but still language dependent) sphere of the internet. Similar development can be seen in many other areas of knowledge making as well. Many government agencies make their reports

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[10] Although indigenous groups in Sweden, like Sámi groups have special interests in the material remains of their culture (cf. Spangen, Salmi, Äikäs, Ojala, & Nordin, 2015).

and publications available online, as do think tanks, labor unions, and NGOs etc.

- *Report content quality*. Swedish DL archaeology report content quality is acknowledged as a problem and addressed by the NHB with extended guidelines for reports (Riksantikvarieämbetet, 2015b), and through educational seminars for DL archaeology organizations (e.g. Å. Larsson, 2016; Riksantikvarieämbetet, 2011). However, it is also reasonable to assume that report content characteristics is subject to trends (Hodder, 1989), and quality being a matter of preferences. Report content has for example been criticized for being too lengthy and detailed (by informants in a study presented in Börjesson, 2016b), too brief and general (Goldhahn, 2010), too schematized (Hodder, 1989), too interpretative (by informants in a study presented in Börjesson, 2016b), too popular (Glørstad, 2010), and too scientific in an intra-academic sense (Andersson et al., 2010a).

- *Cultural issues of access*. "Cultural issues of access" is an expression borrowed from the American archaeologist Deni J. Seymour. Seymour argues that "Issues of access [to reports]…are as much cultural, as they are about indexing and databases" (Seymour, 2010a, p. 229). Seymour explains the cause of the issues by referring to a split in the archaeology profession between those who produce and use reports (i.e. DL archaeology practitioners, according to Seymour), and those (i.e. academic researchers, according to Seymour) who operate independently of the reports (Seymour, 2010b). Similarly, the Swedish archaeologist Marianne Lönn talks about "segregated reading" obstructing scholarly communication between DL and academic archaeology (Lönn, 2006, p. 102, my translation). The recent quote from the Swedish NHB's guidelines (Riksantikvarieämbetet, 2015b) about how results risk to 'disappear' if presented in or with a report (Riksantikvarieämbetet, 2015b) articulates with these perspectives on the problem.

In a situation of potential use of reports, for example when a researcher investigates a specific type of artefacts, a combination of above described causes can inhibit report use. Therefore, all of the causes need to be addressed for the potential problem to be reduced. The first of these aspects is not relevant to the Swedish situation. The second and third causes receive attention and are the focal points of the Swedish NHB's development of archiving and dissemination infrastructures (significantly so through the project Digital Arkeologisk Process, DAP), and more detailed guidelines for report writing.

The fourth cause has received less attention. Seymour argues that the solution to cultural issues of access would be that research archaeologists start to acknowledge and use reports as sources on par with traditional scholarly genres[11] like research journal articles, book chapters, and monographs (Seymour, 2010b). The Swedish NHB contrarily reasons DL archaeology practitioners should conform to academic routines for scholarly communication and publish their findings in established academic genres (Riksantikvarieämbetet, 2015b). The Swedish archaeologist Marianne Lönn expresses herself more moderately and distributes the responsibility to both DL archaeology practitioners and academic archaeologists when stating that "dissertations, theses and articles, produced by DL archaeology practitioners, should function as an information bridge" (Lönn, 2006, p. 102, my translation).

In the following I clarify how the expressed problem of reports has an IS research problem dimension. I explain how a documentation practice analysis can further the understanding of reports as extra-academic scholarly documentation, an understanding which in turn can be drawn upon to alleviate the expressed challenge.

The research problem

The IS problem explored in this dissertation concerns the role of and challenges of documentation in research practices (Pickering, 1992; cf. Palmer & Cragin, 2008) outside academia (Finnegan, 2005a; Nowotny et al., 2001). This area include inquiries into how research is directed through the governance of documentation, how "scientificness" is achieved in and through documentation, and how practitioners and organizations make documentation available with ambitions to communicate results, to establish social positions, and to be trusted as makers of knowledge.

A knowledge production system (Nowotny et al., 2001) where research is carried out at and communicated from positions outside of academia (Finnegan, 2005a; Nowotny et al., 2001) may raise the expectation on scholarly documentation to transfer knowledge from one position to other positions in the system. The Swedish NHB's arguments above indicates such an expectation. IS have demonstrated that while documents may fall short as carriers of information, they can have other significant functions. Documentation enable or disable social interfaces between different actors and communities (Huvila, 2011, 2016) and uphold social structures and infrastructures on which people can act (Frohmann, 2004a, 2004b). However,

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[11] I.e. a category of documents characterized by a particular form, style, and purpose (Oxford English Dictionary Online, 2016), cf. "Archaeology reports – a brief introduction" following in this chapter.

as I read the Swedish NHB quote, the shortcomings of reports as carriers of information risk to destabilize the social role of DL archaeology in relation to cultural political goals. Though I do not adopt the Swedish NHB's perspective (as explained above), the experience that such a problem exists, points to an IS problem area: the role and capacity of different types of documentation in a landscape where research disciplines transcend the boundaries of academia. The experience of the problem with reports stems from the ideas that reports should be the products of work of good scientific quality and should be of use to researchers (cf. "Scholarly documentation in extra-academic archaeology"). Through my research, exploring the character of the resources for scholarly documentation in Swedish DL archaeology, an example of research outside academia, I problematize these premises of the expressed problem with reports. Inquiries into this problem area has implications for how we understand scholarly documentation outside academia, beyond their functions as boundary objects (cf. Huvila, 2011, 2016).

I adopt a documentation practice perspective to analyze the conditions for scholarly documentation outside academia. The perspective on documentation as a practice builds on practice approaches in science and technology studies (STS) (Fleck, 1981; Pickering, 1992), and more specifically on the documentary practice concept as developed in IS (Frohmann, 2004a, 2004b). I view *document* and *information* approaches as espoused perspectives, both useful for analyses of intertwined aspects, and apply a practice perspective inspired both by works using the concepts "document" or "documentation practice" and by works preferring the concept "information practice" (this stance is further developed in Chapter 4, "Theoretical framework"). I apply this perspective to attain an understanding for the contexts in which reports are produced and become informative. The analysis of the contexts is carried out through an analysis of *resources*[12] available to practitioners, and an analysis of how practitioners draw on these resources. The design of the study of documentation contexts is modeled with inspiration from the sociologist Andrew Pickering's reasoning on the contexts of practices (1992).

In the study I view archaeology reports as documentation in hybrid organizations where elements from expert work (Meuser & Nagel, 2009, cf. "Studying experts" in Chapter 5) and research meet and integrate (cf. Huvila, 2011). I analyze DL archaeology reports as scholarly documentation created by expert practitioners working outside academia. The theoretical foundation for this framing is derived from STS (Collins & Evans, 2002, cf. "Capturing research outside academia" in Chapter 4). Following from this framing, the study is situated in the tradition of archaeological documentation studies as

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[12] *Resource* is a term borrowed from the sociologist Andrew Pickering (1992). The term aids dismemberment and identification of the components making up scientific culture (in this dissertation called context) (cf. "Sensitizing contexts by identifying resources" in Chapter 4).

well as in the two IS traditions of scholarly and professional documentation studies.

The research problem investigated in this dissertation could also have been approached from a number of other angles developed in IS. *Genre theory* can be used to analyze report content. Use of reports could be studied either with theories of *information use* and the related conceptualizations of *non-use* of information[13], or with theories of *information sharing* and *scholarly communication*. As neither report content nor use, sharing, or communication of reports are the immediate focus in this particular study these approaches lies outside of the dissertations' limits. All of these foci could be considered for further studies.

Aim and research questions

The relation between the research problem and the aim and research questions is explorative and definitional.[14] The object of the aim and the research questions is to explore and suggest a description of extra-academic scholarly documentation based on an analysis of its documentation contexts. Through defining documentation as emerging out of a particular context I can discuss and point to solutions of the expressed problem of reports on the level of the contexts for documentation. This approach makes way for a contribution to both to IS documentation research, and for engagement with the expressed problem.

The aim of the dissertation is to further the understanding of how the distribution of research duties to professional service organizations (PSOs) affects scholarly documentation in Swedish archaeology. The aim is met through an identification, operationalization, and analysis of resources available to DL archaeology practitioners, and an analysis of how practitioners draw on these resources for *report writing*.[15]

Through these analyses I further the understanding for how scholarly documentation produced in Swedish DL archaeology is shaped in documentation contexts. A secondary, yet important task, is to form a base

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[13] The concept *non-use* has this far been applied in research of non-use of for example technology and information services (Baumer, Ames, Burrell, Brubaker, & Dourish, 2015; Haider, 2017; Wyatt, 2015).

[14] The organizational theorist Nils Brunsson promotes the idea of *language making* research (Swe. "språkbildande", Brunsson, 1980). In language making research the researcher suggests a language to use when dealing with a previously not described phenomena. This study subsumes to this category of research as it attempts to suggest a language for talking about the premises for scholarly documentation outside academia.

[15] *Report writing* denotes DL archaeology practitioners' activity to compile investigation documentation into a report (in the Swedish NHB's terminology by 2015 called "basic report", Swe. "basrapport", Riksantikvarieämbetet, 2015b). (Nota bene: *reporting* is a wider concept potentially including other activities than report writing, like the writing of journal articles or lecturing). I treat *report writing* as a subset of *scholarly documentation.*

from which to pose further IS research questions about extra-academic contexts for scholarly documentation and their consequent implications for research and knowledge making in society. The reason to undertake this research is twofold: from a scholarly humanistic point of view it is relevant to learn more about the premises for research outside academia because extra-academic research makes up a significant portion of the knowledge making in many disciplines and in society (Finnegan, 2005b; Nowotny et al., 2001). From a practical point of view it is relevant to refine insights into extra-academic scholarly documentation and how it can (and perhaps sometimes should not) be integrated in academic scholarly communication by means of pedagogy, information management and information infrastructures.[16]

The first overarching research question encompasses the first three studies:

- What characterizes the resources, with particular focus on regulative, institutional, and infrastructural resources, for Swedish DL archaeology report writing?

The choice of these particular resources is the result of an iterative research process, further described in Chapter 4, "Theoretical framework".

Each of the resources, the regulatory, the institutional, and the infrastructural, are studied in one of the papers I-III, by means of the following operationalizations:

Paper	Resource	Operationalized with the concept(s)	Empirical material
I	Regulative	Information policy	Legislation, regulations, and guidelines for DL archaeology documentation
II	Institutional	Documentation ideals	Experienced practitioners' opinions about DL archaeology documentation expressed in a debate in a research journal
III	Infrastructural	Information source use and Frames of references	Reference lists in DL archaeology Reports

Table 1. Overview of Papers I-III

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[16] The practical reason to refine understandings of extra-academic scholarly documentation is concretized for example as report collections are made accessible in search systems traditionally presenting primarily academic literature (e.g. the Swedish NHB's SAMLA database has been integrated with the Swedish National Library System, the LIBRIS database). Such integrations give rise to questions such as: Is it always unproblematic to integrate extra-academic collections with academic collections? Which are the means in such systems to communicate the premises for the making of extra-academic documentation to users of the system?

The results from the first three studies then make up the background for the second overarching research question, answered in Paper IV:

- How do practitioners in Swedish DL archaeology draw on regulative, institutional, and infrastructural resources in their everyday report writing?

In the concluding chapter I discuss contexts for DL archaeology report writing in the light of the PSO setting. The dissertation thus primarily probes into the premises for scholarly documentation in extra-academic archaeology, but does also open up for a discussion of the conditions for research and scholarly documentation in other extra-academic institutions as well, and particularly in PSOs on semi-regulated markets.

Archaeology reports – a brief introduction

Swedish archaeology reports are united both by aspects of form (see below), and by socially recognised purposes (cf. Orlikowski & Yates, 1994; cf. Andersen, 2008; Miller, 1984). The reporting activity and form of reports change over time (cf. Hodder, 1989) and varies between regional (i.e. administrative units) and social settings (i.e. how a certain community of practitioners interpret concepts like report quality) (Riksantikvarieämbetet, 2014). The social purposes of report writing, for example to present knowledge gained from an investigation and to conclude an investigation, remain more stable.

The socially recognized purposes in focus in this study are the knowledge making purpose and the administrative purpose. From a knowledge making perspective, the rudimentary purpose of DL archaeology reports is to be the primary place to communicate findings from archaeological undertakings. From an administrative perspective, reports (as the standard deliverable) provide closure for undertakings (Riksantikvarieämbetet, 2015b). Other social purposes, outside the immediate scope of this study, is the role of reports in individual practitioners' careers and in the formation of relations between groups involved in the DL archaeology institution (cf. Huvila, 2011, 2016).

Reporting in Swedish DL archaeology is currently formally described as "reporting about results and observations made during an investigation" (Riksantikvarieämbetet, 2015b, p. 4, my translation). Basic data ("grunddata", 2015b, p. 5) for each investigation must be described and interpreted in a report ("basrapport", 2015b, p. 5). The report can be complemented by other forms of reporting, like a scholarly supplement or dissemination to the public (e.g. site tours, lectures, social media communication).

DL archaeology reports should contain:

1. a summary
2. an evaluation of the investigation plan
3. a description of the background to the investigation and the cultural environment
4. underlying assumptions, aim, and investigation questions
5. description of method
6. description of sites and objects
7. basic interpretations
8. maps and plans
9. photos and illustrations
10. administrative details (registration number, time of undertaking, personnel at undertaking, area and volume of the investigated site, location and coordinated of the investigated site, coordinate and height system used at the investigation, inventory of documentation material and finds, and details on storage of these)
11. literature references
12. finds lists or tables

(Riksantikvarieämbetet, 2015b, pp. 15–16, 21).

As of today (in 2017) Swedish DL archaeology reports look more or less like a book, as opposed to, for example, an interactive data publication. Components like those listed above are assembled in a printable document with consecutive pagination. Reports are both analogue and digital documents. They are created with digital word, image, and data processing programs and often accessed and read in the digital PDF format. Still, the possibility to print reports remains central in administrative processes and for archiving (Riksantikvarieämbetet, 2015b).

Figure 1. A sample of a DL archaeology report cover (Lega, 2014)[17]

Figure 2. A sample of a geographical overview in a DL archaeology report (Låås, 2016, p. 8)
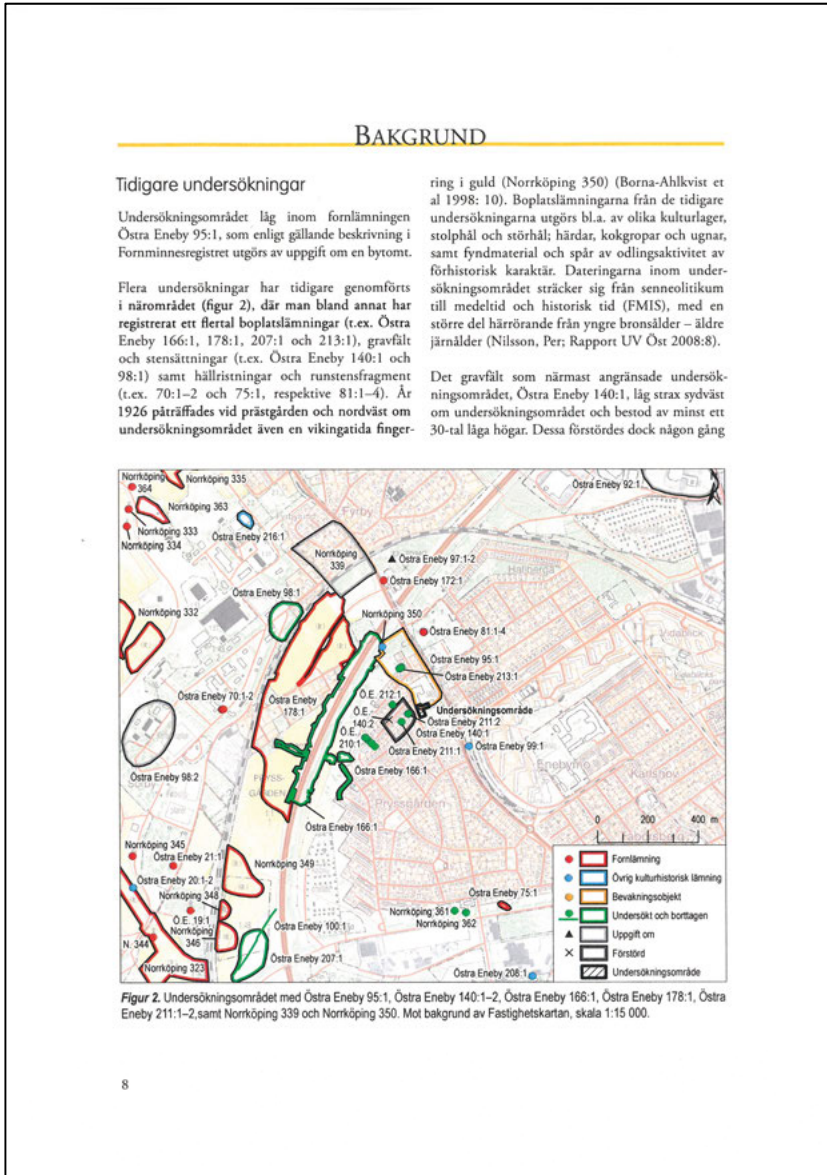
Figure 3. A sample of illustrations in a DL archaeology report (Låås, 2016, p. 13)
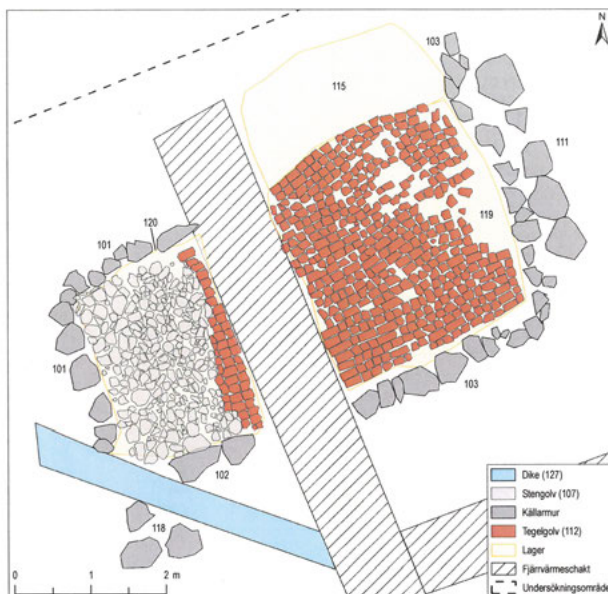
Figur 8. Plan över källaren, skala 1:50.

Figur 9. Den framrensade källaren. Fotot taget från SSV.

Figur 10. Tegelgolv 112 och källarmur 103. Fotot taget från NNV.

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Figure 4. A sample of text describing results in a DL archaeology report (Gustafsson Gillbrand, 2016, p. 9)

Kartusianerklostret *Pax Mariae*. Det är oklart i vilken omfattning och utbredning det medeltida Gripsholm haft, men år 1485 och 1505 omnämns både ett kapell och ett torn (Westlund 1948, s. 11ff).

Vid början av 1500-talet återkrävde Gustav Vasa klostret, bildade kungsgård av Gripsholm och lät bygga ut och om borgen under åren 1537-1545 (Lovén 1996, s. 305, Westlund 1948, s. 4). Därefter följde en rad byggprojekt initierade av Erik XIV och Karl IX. Bland annat färdigställdes den östra och västra sträckmuren (försvarsmurar) som Gustav Vasa påbörjade år 1550 och som slutfördes under Erik XIV:s tid. Därtill uppfördes den så kallade Stureskansen och Porthuset (Hauptmannflygeln) av Karl IX som därmed sammanband borgens äldsta delar med försvarsmurarna och Vasaborgen.

Den östra sträckmuren är väl belagd och ingår i den så kallade Kavaljersflygeln som uppfördes på 1770-talet (Westlund 1948, s. 4). Muren finns även avbildad i Svecia Antiqua (figur 9). Däremot saknas närmare kunskap om var den västra försvarsmuren stod och hur den var uppbyggd. I samband med att Ståthållarflygeln uppfördes av änkedrottning Ulrika Eleonora år 1691 omnämns dock att den västra sträckmuren revs (Westlund 1948, s. 181).

Resultat

Schakt

Schakt 1 följde utsidan av Ståthållarflygeln och var totalt 7,8 meter långt, 1-1,9 meter brett och 0,7–1 meter djupt (figur 4 & bilaga 2-4 & 7-8). I schaktets hela längd framkom en grundmur (**A1**) samt ett fragmentariskt tegelgolv (**A2**).

Eftersom det visade sig att muren fortsatte åt nordväst, förlängdes schaktet med ytterligare 2,8 meter. Det förlängda schaktets bredd var mellan 1-1,6 meter och grävdes ned till mellan 0,2-0,4 meter från markytan. Muren fortsatte i ytterligare 1,9 meter, där ett hörn till muren påträffades. Därför breddades schaktet in mot flygelns yttervägg och muren kunde följas i ytterligare 0,5 meter åt väster. Här fanns dock endast den kalkbruksfogade grundmuren av natursten bevarad (figur 5, bilaga 3 & 7-8).

Direkt norr om muren påträffades en cirka 0,8x0,8 meter stor kalkstensplatta som låg i anslutning till överkanten av murens grundläggningsstenar, cirka 0,4 meter under markytan. Kalkstensplattan har förmodligen ingått i en stenbeklädd gårdsplan samtida med muren (figur 5, bilaga 3 & 7-8).

Schakt 2 upptogs i det sydöstra rummet inne i Ståthållarflygeln under ett befintligt trägolv (figur 7 & bilaga 2-4 & 7-8). Schaktytan uppgick till en storlek om 5x2 meter och grävdes cirka 0,5 meter ned under golvet. Större delen av ytan bestod av utfyllnadsmaterial i form av kalkbrukskross med inslag av sten och tegelkross. I rummets nordvästra och sydöstra delar återfanns murbasen till flygelns väggar.

I den sydöstra delen av schaktet fanns en cirka 2 meter lång och 1,5 meter bred yta av kalkbruksmurade stenar (**A4**). Inga fynd eller daterbart material påträffades i schakt 2.

Figur 4. Schakt 1 efter upprensning. I bild ser man en mur och ett tegelgolv. Bilden är tagen från nordväst. Foto: Patrik Gustafsson Gillbrand 2016, Sörmlands Arkeologi AB.

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Dissertation outline

The dissertation continues with a description of the setting of the study: a society where knowledge making is distributed to sites within and outside academia, and where DL archaeology is one of the activities ascribed a knowledge making role, by the state through legislation. For this background I primarily draw on STS literature, and on literature about the history and current state of DL archaeology. Thereafter follows a presentation of two research areas in relation to which I position the dissertation: interdisciplinary research on archaeological documentation and IS documentation studies, particularly studies of scholarly and professional documentation.

In the fourth chapter I explain the theoretical approach, drawing on STS, and on practice and document theory. The specific application of practice theory is presented, as well as explanations of the concepts used in each of the sub-studies. The fifth part lays out the methods and materials from a perspective arching over the dissertations' four papers. This fifth part also contains discussions of ethical considerations, considerations related to the study's limitations, clarification of author contributions in the co-authored paper, and details on archiving. The sixth chapter summarizes the papers. The seventh chapter presents a concluding discussion, and the eight chapter contains a summary of the dissertation in Swedish. The second part of the dissertation contains the four research papers, previously published in research journals.

2. Development-led archaeology: professional service organizations

Research takes place in different institutions, and within different types of organizations, throughout society. DL archaeology is one example of such an institution. Yet, Swedish DL archaeology organizations are neither examples of government research, industrial research, nor are they independent research organizations (cf. Nowotny et al., 2001). Rather, Swedish DL archaeology organizations are hybrid organizations (Gulbrandsen, 2011) akin to PSFs (von Nordenflycht, 2010).

In this chapter I provide an introduction to DL archaeology, emphasizing how the structure of Swedish DL archaeology has evolved during the recent decades. The chapter also introduces STS literature concerning the state of science as distributed in society. Lastly the chapter explicates how the PSF concept is useful for understanding Swedish DL archaeology organizations as research service providers. The chapter begins by a note on the DL archaeology term.

A note on terminology

There is no universal term to denote commissioned archaeology research prior to land-development. In Sweden, the terminology has changed over time: from *development archaeology* (Swe. 'exploateringsarkeologi') and *rescue excavations* (Swe. 'räddningsgrävningar') in the 1960's to *investigation services* (Swe. 'undersökningsverksamhet') and *commissioned services* (Swe. 'uppdragsverksamhet') in the 1980's. Swedish government officials today prefer the term *development-led archaeology* (Swe. 'uppdragsarkeologi') as they consider it to be a description of work prompted by land development (Andersson, Lagerlöf, & Skyllberg, 2010b). Terminology also differs between countries: *contract archaeology* and *CRM (cultural resource management) archaeology* are commonly used in the US, *commercial archaeology* in the UK, *arqueología de contrato* (Eng. 'contract archaeology') in Spanish speaking countries, and *archéologie préventive* (Eng. 'preventive archaeology') in French speaking countries, only to name a few examples. I use the term DL archaeology to denote archaeological

investigations prior to land development because it is the English term preferred by senior advisors at the Swedish NHB (Andersson et al., 2010b).

Development-led archaeology

State engagement in registry of and care for archaeological remains in Sweden dates back to the 17th century (Jensen, 2012). However, historically much archaeology worldwide has also been conducted by independent scholars collecting antiquities for private collections (Trigger, 2009). In the late 19th century, public museums became more common and many private collections were transferred to these institutions for education of the public (Lucas, 2012). The first academic chairs in archaeology were established during the same era, and university archaeology educations emerged. The first Swedish chair in archaeology was established 1914 (Welinder, 2000).

Archaeology prior to land development has evolved during the course of the 20th century. In the US, extensive government issued archaeology projects were undertaken already during the 1930's and 40's. In Britain DL archaeology grew due to the extensive exploitation of new land areas after World War II (Lucas, 2001a), similarly to the situation in Sweden (Ambrosiani, 2012).

Today DL archaeology activities, both in Sweden and elsewhere, are directed by national heritage legislation, regulations, and guidelines. DL archaeology is also governed from a global level by international conventions issued by UNESCO (UNESCO World Heritage Centre, n.d.), and in Europe by the Council of Europe (Council of Europe, 1992, 2005).

Archaeology as a science, much like many other research endeavors, is based on pieces of data from different sites investigated at different times. DL archaeology contributes to this fragmented character of archaeological data as DL archaeology investigates sites of projected land-development, rather than the sites most interesting from the perspective of academic research archaeology.

Swedish development-led archaeology

There are no up to date statistics[18] on the proportion of DL archaeology undertakings compared to other types of archaeology undertakings in Sweden. Based on the most recent numbers, academic research investigations make up approximately 6 % of the total number of Swedish

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[18] The Swedish NHB website inform about the number of different types of DL archaeology undertakings yearly (Riksantikvarieämbetet, 2016) without comparison to other types of archaeology undertakings. According to correspondence with a NHB official (Börjesson & Skyllberg, 2016) the most recent official statistics are from 2007 (Riksantikvarieämbetet, 2008).

archaeological investigations yearly. 4 % of the investigations are initiated as a result of environmental deterioration like storm damages, and the remaining 90 % are DL archaeology investigations (Riksantikvarieämbetet, 2008). This situation is comparable to that of for example the US (United States Department of Labor, Bureau of Labor Statistics, 2015) and the UK (Aitchinson & Rocks-Macqueen, 2013).

The cover photo illustrates the presence of DL archaeology in Swedish society. The motif is scraps of plastic tape, left behind after a DL archaeology undertaking. This particular site at Mogatan in Alsike south of Uppsala, which the previous inhabitants left for about 1 500 years ago, will soon give way to new homes.

In early Swedish DL archaeology most undertakings were carried out by local branches of the NHB's DL archaeology department (e.g. "UV Syd"), complemented by archaeology departments at regional and municipal museums, and university archaeology departments (Ambrosiani, 2012). DL archaeology activities have since then developed from being comparatively state controlled to being gradually deregulated and adapted to market principles.

The adaptation to market principles has come in the form of increased competition through procurement-like processes, privatization of previously publicly run DL archaeology departments and organizations, and formalization of control mechanisms. Competition on the Swedish DL archaeology market has been discussed since the 1990s. Increased competition is addressed as desirable in government investigations (e.g. Riksantikvarieämbetet, 2012b, 2014; *SOU 2005*, 2005) and strengthened through revisions of the heritage preservation legislation (Kulturmiljölag (1988:950), n.d.) as well as in the subordinate ordinance with instruction for implementation of the heritage preservation legislation (Riksantikvarieämbetet, 2015a).

The first private organization in Swedish DL archaeology was founded in 1988 (*Arkeologikonsult*, n.d). Parallel to the strengthening of competition in archaeology, a diversity of DL archaeology organizations has emerged. In addition to government departments, there are now foundations and member associations as well as incorporated businesses and sole proprietorships (Börjesson, 2015). Commercialization of previously publicly run organizations is not limited to archaeology but a phenomena affecting an array of areas (Christensen & Lægreid, 2001) like education, health care, and public transportation to name a few examples.[19]

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[19] The organization of DL archaeology can be analyzed from a marxist perspective on markets, means of production, and work (Zorzin, 2015). I omit this perspective in this dissertation because it entails an economistic view on resources rather than the practice theory inspired view on resources which I adopt for the analysis.

In 2017, Swedish DL archaeology activities are organized as a semi-regulated market. It is a market in the sense that organizations compete in procurement-like processes for contracts. It is semi-regulated in the sense that the criteria for competition are stated in the NHB's regulations and general advice for DL archaeology (Riksantikvarieämbetet, 2015a, p. 6), and in that the CABs decide who wins a contract. It is however important to note that the marketization in archaeology has played out differently at different places in Sweden. The differences can depend on such aspects as the extent of resources for DL archaeology at the regional authority and on the number of DL archaeology organizations in the regional market. Regions may have different capacity to arrange for and oversee fair competition. A limited number of actors on a regional market undermines competition.

There are also differences within the DL archaeology organizations that may affect the local character of DL archaeology. These are not fully explored in the research literature, but has been brought to my attention in conversations and in my interviews with archaeologists. One characteristic that may differ significantly is the level of education and the level of immediacy in the contacts between DL archaeology practitioners and the academic research community. These aspects co-vary, among other factors, with the organization of the archaeology Ph.D. education, personal relations between practitioners in DL archaeology and researchers at university archaeology departments, forms of employment in DL archaeology, and on theoretical trends in academic archaeology. During certain periods in Swedish archaeology it has, thanks to dedicated funding, been easier to combine a DL archaeology employment with Ph.D. dissertation research (Kristiansen, 2016; Larsson, 2013). As a result, persons with research training are found at all levels of Swedish archaeology (Welinder, 2000). This may lead to closer connections between DL and academic research archaeology. Furthermore, personal relations between DL archaeology practitioners and academic research archaeologists established during collaborations may have a positive, or adverse, impact on the exchange between DL and academic research archaeology. However, a permanent full-time position in DL archaeology is not always easily combined with keeping up to date with a research interest and maintaining a research competency. Thus, a Ph.D. degree on the CV is not the same as an active participation in the academic research community. Moreover, the theoretical interest in academic research archaeology has not always been favorable for constructive exchanges between academic research and DL archaeology. For example, research influenced by post-processual theory, emphasizing the investigating archaeologist's subjective interpretation of a site, has been challenging to combine with large-scale re-use of DL archaeology data. This excursus on the variation of the character of archaeology at different times and places is meant as a reminder that the reasoning in this dissertation is

carried out on a level of generalization to which there are many local exceptions.

As earlier mentioned there is no uniform definition of non-university research. This applies to archaeology as well. As a consequence, it is not undisputable to say that DL archaeology practitioners conduct "research". The definition of DL archaeology as research in this dissertation is based on the fact that DL archaeology organizations are contracted by land-developers to deliver research services. The research process is regulated by the state and implemented by regional authorities, the county administrative boards (CABs). There may also be other grounds to discuss if and propose that DL archaeology constitutes research, for example by looking at what DL archaeology practitioners do in field and by their desks. I leave definitions on such grounds outside the scope of this study. I foreground research as defined by the service relation between the state and research service providers. The reason is that I want to explore what happens to scholarly documentation in the realms of a service relation.

In the following I turn to STS literature to put the above described organization of Swedish DL archaeology and its place in the archaeology discipline in the perspective of the place and role of research in today's society.

Extra-academic research

In the early 1990's the Swedish Council for Research and Planning (Swe. "Forskningsrådsnämnden, FRN", later part of the current "Vetenskapsrådet, VR") funded a project aiming at exploring major changes in the ways knowledge was made at the time. The outcome of the project was the essay style book *The New Production of Knowledge* (1994). In this book Gibbons et. al. launch the terms *Mode 1* and *Mode 2* to describe changes in the relation between society and science. In brief, Mode 1 denotes research initiated by researchers and conducted within universities and research institutes with clear demarcations toward other types of organizations such as commercial companies, NGOs, and think tanks. Mode 2 denotes a "new" knowledge making, highly distributed in society and responding to different needs of knowledge throughout society. Mode 2 adds to the earlier form, rather than replaces Mode 1. Mode 2 knowledge making is, according to Gibbons et. al., characterized by taking place in transdisciplinary, heterogeneous, and non-hierarchical forms, and by not being shaped primarily within university structures. From these features follow less unanimous quality criteria and that the authority to control quality becomes less centralized. Gibbons et. al. concluded, and possibly also foreboded, that Mode 2 affects "at the deepest levels what shall count as 'good science'" (Gibbons et al., 1994, p. vii).

The claims made in *The New Production of Knowledge* has had significant influence over STS research as well as on government science, technology, and innovation polices (Hessels & van Lente, 2008). Yet, Gibbons et. al.'s proposal and similar descriptions have received substantial critique for lacking empirical validity, for making too far-reaching claims, for neglecting long-term historical perspectives, for not connecting to sociological theory, and for being political (Hessels & van Lente, 2008). However, in a comparison of Gibbons et. al.'s (1994) claims with seven alterative diagnoses of changes in science, two of the claims recur in all of the descriptions (Hessels & van Lente, 2008). Laurens K. Hessels and Harro van Lente conclude that there are consistent evidence for the claims that researchers choose research topics aiming at innovations and policy development, and that relationships between science, industry, and government are becoming more interactive.

Hence, keeping above described critique against the Mode 2 concept in mind, we should be aware that the concept does not offer a complete and all-encompassing description of how knowledge making has developed. Despite these limitations, the work of Gibbons et. al., and especially the sequel (by three of the authors of *The New Knowledge Production) Re-thinking science – Knowledge and the Public in an Age of Uncertainty* (Nowotny et al., 2001), are useful for this study as the texts discuss how the relationships between science, industry, and government has become more interactive. In *Re-thinking science* Nowotny et. al. draw on and configure sociological theories about for example post-industrialization (Daniel Bell), risk society (Ulrich Beck), reflexive modernity (Anthony Giddens), solidarity versus objectivity in research (Richard Rorty), and research culture (Bruno Latour) to explain the transformation of the sites where knowledge making takes place in society around the turn of the 21st century. Nowotny et. al. state that:

> /…/ a much wider range of social, economic and even cultural activities now have 'research' components. /…/ many institutions are now learning-and-researching organizations – because they trade in knowledge products and because they employ many more 'knowledgeable' workers. (Nowotny et al., 2001, p. 89)

Knowledge making, in addition to taking place at universities, occurs in many different settings like government research establishments acting in accordance with national priorities, industrial R&D laboratories or departments tailored to strongly contextualized problem solving, and in independent research organizations (Finnegan, 2005b; Nowotny et al., 2001). Organizations in these setting can be described as *hybrid organizations* (Gulbrandsen, 2011). Hybrid organizations are those engaged with two or more cultural spheres, for example with heritage administration and with research in the case of DL archaeology. Such organizations need to

align with values from all of the spheres with which they engage in order to survive. Following the diversification of settings for knowledge making Nowotny et. al. argue that knowledge production takes place "within and between open and shifting boundaries" (2001, p. 19) between science and non-science.

The Swedish DL archaeology institution is one example of the variation of the institutions contributing to knowledge making in society. Scrutinizing the DL archaeology institution, we find both overlaps and deviations from the typical Mode 2 setting for knowledge making:

Typical Mode 2 setting (Gibbons et al., 1994)	The DL archaeology institution
Transdisciplinary forms	A primarily disciplinary form
Heterogeneous forms	Primarily forms adapted to the administrative process preceding land-development
Non-hierarchical forms	Dependent on legislation and government agencies. Forms of hierarchy between and within organizations.
Not shaped primarily within university structures	Structured to serve land development
Less unanimous quality criteria (than before)	Quality criteria formally stated in policy, regulations, and guidelines. Informally put into practice by practitioners in the extra-academic institution.
Authority to control quality less centralized (than before)	Authority to control quality distributed between extra-academic organizations (e.g. DL archaeology organizations' managers, CABs, NHB)

Table 2. Overview of comparison between the typical Mode 2 setting for knowledge making and the typical DL archaeology setting

DL archaeology practitioners are educated in academia, but the DL archaeology market is structured to serve land development and thus not shaped within university structures. Yet, DL archaeology organizations are mainly concerned with archaeological knowledge making rather than being transdisciplinary. However, their activities stand out from academic archaeology research in that the undertakings primarily are shaped by the administrative process preceding land-development.[20] DL archaeology organizations are subordinate to legislation and government authorities. Furthermore hierarchical structures arguably characterize relations both

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[20] Moreover, DL archaeology undertakings can be viewed as heterogenous in the sense that they also can be shaped by additional processes, e.g. by collaborations with research projects or by public archaeology (i.e. participation of laypersons in archaeolgical undertakings) projects. From my perspective in this analysis, deliberately foregrounding the land-development process, I view these additional processes as secondary to the land-development process.

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between organizations, e.g. between those winning and losing procurement bids, and within the DL archaeology organizations, e.g. between those with permanent positions and temporary workers (as opposed to being non-hierarchical, cf. Berggren & Hodder, 2003). Criteria for and formal authority to control quality is distributed between several extra-academic organizations, e.g. DL archaeology organizations' managers, CABs, NHB, as well as informal functions of quality control, e.g. work ethics and peer pressure (cf. Börjesson, 2016a).

Taken together, the organizations in the Swedish DL archaeology institution conform to some of the typical Mode 2 characteristics, but the institution stand out in that it by and large has the same epistemological goal as its academic counterpart, is highly structured and rather hierarchical. At the same time, the knowledge presented in DL archaeology reports is meant to impact decision making about potential changes of physical environments. Authority to control quality is distributed to, and quality criteria emerge from, an institution outside academia.

This far, I have discussed how Swedish DL archaeology can be understood as Mode 2 knowledge making, carried out in hybrid organizations. In the following I further detail which type of hybrid organizations Swedish DL archaeology organizations can be understood as.

Professional service organizations

To further detail the description of Swedish DL archaeology organizations I refer to the established term *professional service firms* (PSFs). I explain how DL archaeology organizations are akin to and differ from PSFs, and introduce the alternative term *professional service organizations* (PSOs). To begin with PSFs, these are characterized by knowledge intensity, low capital intensity, and a professionalised workforce. Knowledge intensity means that the firms' production rely on a substantial body of complex knowledge, it is "knowledge-based" (Evetts, 2010). Complex knowledge can refer to such forms of knowledge controlled by means of academic educations, but also to forms of knowledge controlled by professional associations' or states' regulations, or even by client control (e.g. customers' demands and evaluations) (Svensson & Evetts, 2010). Notably, PSFs can also be based on forms of knowledge with loose or no scientific grounds as Rebecca Lave shows in a study of US stream restoration (Lave, 2012). Thus, in this case the concept *complex knowledge* does not imply that the knowledge is vetted by independent reviewers. Low capital intensity means that production does not involve significant amounts of non-human assets like industrial machinery. A professionalized workforce refers to a workforce with a particular knowledge base, autonomous regulation and control over that

knowledge base and its application, and with professional codes of ethics (von Nordenflycht, 2010; cf. Sundin & Hedman, 2005).

Traditional examples of PSFs are law, accounting, and architecture firms. More recent types of PSFs highlighted in management research are technology developers like biotech and other types of R&D labs, neo-PSFs like diverse consulting and advertising firms, and professional campuses like hospitals (von Nordenflycht, 2010). Thus, not all PSFs are engaged in research relevant beyond each specific investigation. For example, a consulting firm can sell market analysis to a customer, which can be a form of research, but has limited relevance to others than the customer and its competitors. DL archaeology organizations are contrastingly explicitly ordered to make knowledge of relevance for 'government agencies, research, and the public' (my translation) (Kulturmiljölag (1988:950), n.d.; Riksantikvarieämbetet, 2015a).

In comparison to common examples of PSFs (von Nordenflycht, 2010), most being commercial organizations, there is a diversity of organizational forms within Swedish DL archaeology. The variety includes such forms as foundations, member associations, and government agency departments, in addition to commercial firms and sole proprietorships. Still, Swedish DL archaeology organizations are typically akin to PSFs in that their 'production' relies on the complex body of knowledge taught during academic archaeology educations and acquired through DL archaeology work. The DL archaeology organizations have low capital-intensity; the employees are the foremost asset. The workforce is professionalised in the sense that they share the DL archaeology knowledge base (Lönn, 2006). The DL archaeology profession in Sweden does not yet have formal autonomous regulations and control over that knowledge base like lawyers do through bar associations, but do have professional associations (MARK and SUBo with membership on organizational level) and codes of ethics (Svenska arkeologiska samfundet, 2000).

In sum, Swedish DL archaeology organizations trade in research services and their activities are regulated by the state and administrated by regional government. However, they are neither government research establishments, nor a case of industrial R&D laboratories or departments, nor an example of independent research organizations (the examples of knowledge making institutions discussed by Nowotny et al., 2001). Rather, as I demonstrate above, if we describe Swedish DL archaeology organizations as an organizational type in a knowledge production system (cf. Nowotny et al., 2001), they are better described as a type of hybrid organizations (Gulbrandsen, 2011), and more specifically as research PSOs at a research service market. Thus I argue that we based on the analysis of scholarly documentation in Swedish DL archaeology organizations can learn about scholarly documentation in PSOs. Still, Swedish DL archaeology organizations are but one type of PSOs. Further reaching conclusions about

contexts for scholarly documentation in PSOs would require additional investigation covering other examples of PSOs, in addition to my analysis of Swedish DL archaeology organizations.

3. Previous research

This chapter introduces the research areas in which the dissertation is situated: the interdisciplinary archaeological documentation studies tradition, which IS researchers contribute to, and the IS documentation studies tradition. I first introduce the archaeological documentation research with particular focus on studies of report writing from a scholarly communication perspective. Secondly I describe the IS document studies field, emphasizing studies of scholarly and professional documentation. These two areas, which each can be viewed as a separate area of research, are presented together in order to set the scene for discussing DL archaeology report writing as scholarly documentation undertaken as part of expert work (this stance is further explained in "Capturing research outside academia" in Chapter 4 and in "Studying experts", Chapter 5). It is worth mentioning that I use a wider conception of "document" to encircle archaeological documentation studies and IS documentation studies, than I use in the theoretical framework to frame report writing as a documentation practice (cf. Chapter 4, "Theoretical framework"). Literature reviews relevant to each of the sub-studies are presented in the papers in the second part of the dissertation.

Archaeological documentation

Archaeologists need to describe what they find and their interpretations thereof. As a result, numerous documents are produced at different stages of undertakings. Likewise, archaeologists use a number of different types of documents in their knowledge making. Therefore, it is not surprising that the study of archaeological documentation is of interest to many archaeologists.

The archaeologist Gavin Lucas's *Understanding the archaeological record* covers the evolution of the archaeological record, of which documentary records are one type, from the nineteenth century up until today's archaeology (2012). Lucas makes a distinction between three meanings of the term "the archaeological record": artefacts (i.e. physical objects), residues of contexts (i.e. the lived contexts in which physical objects and materials were used), and sources. Sources are the documents in which finds and interpretations are recorded. These can be historical documents like 16th-century antiquarian records, or more contemporary documents like reports from the 1960's created by archaeologists. A

foundational principle in Lucas' reasoning is the recognition of the record as a "…contemporary phenomenon, yet also one which derives from the past…" (2012, pp. 13–14). This perspective rests upon the assumption that the record does not mirror the past. Rather, the record draws on the past while being a product of the moment of creation.

Lucas' view on the record as a contemporary phenomenon corresponds with the IS scholar Bernd Frohmann's view on documents. Frohmann view documents as becoming informative at particular "times and places" and in specific "areas of social and cultural terrain" (2004b, p. 405, cf. "Report writing - a documentation practice" in Chapter 4). Frohmann points not only to time as a pertinent aspect, but also to the social and cultural place of document creation. The many terrains of documentation are significant in archaeology where multiple communities of archaeologists are involved in the discipline and in archaeological knowledge making. Academic research archaeologists and DL archaeology practitioners can rely on and refer to widely different conceptualizations and forms of documentation in their knowledge making. This array of conceptualizations of documentation may lead to communication challenges between academic researchers and DL archaeology practitioners within the discipline (Börjesson et al., 2016).

From Lucas' and Frohmann's views follow that we need to interpret, not only historical records, but also the more contemporary documentary records as created in a certain theoretical and methodological tradition. This leads to a double interpretative process in use of documentary records in archaeology – the interpretations of document as being *about* and *of* the past. For this double interpretative process, we need knowledge about documents. Without the tools to interpret why and how a document has been shaped the way it is, we risk to miss or misinterpret document content. This perspective on documentation justifies and amplifies the importance for the archaeology discipline to engage in the ongoing reflexive project of writing the evolving history of archaeological documentation.

Empirical research of how archaeological documentation is done include for example studies of how the production of information is embedded in bodily practices of field archaeologists (Olsson, 2016). Another perspective on archaeological documentation is the comprehensive study of archaeological information in work processes (Huvila, 2006). Specific studies expounds on the use of specific media types, like images and physical models in archaeology (Beaudoin, 2014; Moser, 2012; Nordbladh, 2012). Documentation is touched upon secondarily or peripherally also in research with primary focus on archaeological work (e.g. Berggren & Hodder, 2003). This study contributes to research on archaeological documentation through the focus on DL archaeology, and the problematization of the terrain in which DL archaeology reports become informative, namely the research PSOs terrain for scholarly documentation. Since the dissertation focuses on report writing, which is a specific type of

archaeological documentation, the focus of the next section is studies dedicated to report writing.

Report writing in archaeology

Archaeology reports and archaeological report writing are addressed in a variety of senses in a number of studies. The archaeologist Ian Hodder reviews historical styles of writing in order to suggest development of current styles of report writing (Hodder, 1989). Hodder writes from a post-structuralist and normative position, arguing that it would be better for knowledge making if reports did contain richer narratives from investigations. On a level closer to the practical DL archaeology activities a host of equally normative literature by archaeologists have described reports in order to define the challenges with, and sometimes to suggest improvements of reports (e.g. Berggren & Hodder, 2003; Magnusson Staaf & Gustafsson, 2002).

The information science scholar Isto Huvila contrastingly views reports as boundary objects. In his analysis different communities of archaeologists and other stakeholders of archaeological knowledge mediate their conflicting interests in and through reports. Huvila identifies twelve discourses relating to archaeological information mediated in expressions about reports: Education, Rescue archaeology, Scholarly field archaeology, Collection management, Public dissemination, Academic research, Cultural heritage administration, Methods development, Amateur curatorship, Development, Amateur archaeology and history, and Amateur investigation. Huvila's analysis show that while reports may seem to be a consensual object, i.e. not a matter of overt power struggle, reports are shaped under the influence of different stakeholders' articulations of power. Reports become devices for creating and maintaining power relations among the groups of people working with reports in different ways (Huvila, 2011). In a further study of reports and documentation data Huvila explores how primary research data does not achieve a boundary object function like reports do. The reason that research data lacks the boundary object function is that data does not enable sufficient disclosure to the different stakeholder communities (Huvila, 2016). Huvila's analysis of reports as boundary objects serves as a foundation for understanding why reports accommodate to several purposes and likely will not succumb to any one stakeholder group's needs. My analysis furthers Huvila's results by providing an analysis of the contexts in which reports as boundary objects are created. However, my analysis also points to a situation displaying the frailty of reports as boundary objects.

Another perspective on reports is that viewing reports as a type of "grey literature". The concept grey literature denotes a larger body of literature produced on all levels of government, academics, businesses, and in industry that are protected by intellectual property rights, of sufficient quality to be

collected and preserved by library holdings or institutional repositories, but not controlled by commercial publishers (Schöpfel, 2010). Thus both university researchers and practitioners outside academia produce grey literature when writing reports. However, in Swedish DL archaeology a large share of the reports are written by extra-academic practitioners.

The formal definition of grey literature focuses on completed documents (Schöpfel, 2010; cf. Farace & Schöpfel, 2009). Also empirical and theoretical works framing archaeology reports as grey literature primarily discusses qualities of, awareness of, access to, and usage of completed archaeology reports (e.g. Aitchison, 2010; Donelly, 2015; Harlan, 2010; Roth, 2010; Seymour, 2010a), rather than the conditions under which reports are produced. A specific strand of research concerns the impact of digital technologies on archaeology grey literature. As techniques for web based self-publication develop, the difference between grey literature and commercially published works partly diminish, which in turn affects information infrastructures. Based on this background one may argue that the character and role of grey literature in archaeological knowledge making are in transition (Evans, 2015).

As a quantitatively significant genre, the report genre is also described in introductions to the archaeology subject and in literature guides. In an popular introduction to archaeology, *Archaeology: a very short introduction* (2012), the British archaeologist Paul Bahn states:

> /.../ a new phenomenon known as 'grey literature' (in every sense) has sprung up which comprises endless semi-published or unpublished reports which can be hard to track down and yet which may contain useful information. (2012, p. 14)

Bahn's description, using the term "endless", witness of an overwhelming experience of an unruly genre. Although Bahn's experience is that of a British archaeologist his description is similar to what the American archaeologist Robert J. Muckle express in the literature guide *Reading Archaeology* (2008b), using the term *semi-scholarly* literature:

> Students need to understand the nature and diversity of archaeological literature... Throughout their college or university studies, they will be required to write research papers with the provision that scholarly sources be used. So learning how to differentiate between scholarly literature and popular or semi-scholarly sources is essential. (2008a, p. 1)

However, it soon becomes more complicated as Muckle notes that many kinds of writing actually fall somewhere in between scholarly and popular, in the category called *semi-scholarly*. Muckle describes project, field, and lab reports as part of the semi-scholarly category, typically written in the same style as scholarly works but lacking extensive citations and discussions

compared to scholarly literature. He then acknowledges that "project, field, and laboratory reports are perhaps the *most common* type of writing by archaeologists…" (2008a, p. 5, my emphasis) and often contain "*significant information*" (Muckle, 2008a, p. 6, my emphasis). Thus, according to Muckle, users of archaeological literature need to distinguish between scholarly and popular or semi-scholarly literature. However, they also need to recognize the significant information in semi-scholarly works. The importance of this skill is underlined by the quantity of the report literature.

These examples of how report literature can be described in introductions to the discipline and in literature guides serve a dual purpose. Firstly, they illustrate that the description of the challenge with Swedish report literature (cf. "The report problem", Chapter 1) has equivalents in other countries like the UK and the US. Secondly, the examples underline why it is important to expand and nuance the descriptions of report literature, for example in introductions and literature guides.

However, I argue that both the *grey literature* term and the *semi-scholarly literature* term are problematic to use to describe DL archaeology reports. Grey literature falls short as the distinction between published and not published literature dissolves (Evans, 2015). The semi-scholarly term is too vague: it does indicate that the literature would somehow be half scholarly, but does not inform us of what the other half would be made up of. Because of this ambiguity I refrain from using the term semi-scholarly. Due to these shortcomings of the terminology I have throughout the dissertation work searched for other terms to describe archaeology reports as a category of documentation. To find an appropriate descriptive term is vital if we want to compare archaeology reports to extra-academic documentation in other research disciplines. In the first study (Paper III, Börjesson, 2015) I use the term *professional literature*. However, the term professional literature does not fully pinpoint the scientific mission of the Swedish DL archaeology reports. Therefore, I have at a later stage in the dissertation work introduced the general terms *scholarly documentation in professional* or *extra-academic work* and the archaeology specific term *scholarly documentation in DL archaeology*. These terms, although not very elegant, have the advantage that they indicate the context of production. The rationale behind these terms, to through the term imply the documentation context, makes up a conceptual suggestion both to the empirical field and to research dealing with this type of documents. These terms only cover documentation produced outside academia, not documentation produced within academia but not controlled by commercial publishers as included by the wider grey literature concept.

This dissertation contributes to previous research on archaeological documentation through its analysis of contexts for report writing in archaeology PSOs. In the following section I explicate how the study relates

to IS documentation studies, and particularly to studies of scholarly and professional documentation.

Documentation studies

Just like there are different meanings of the concept *record* in archaeology (Lucas, 2012), there are different meanings of the concept *document* in IS. To *document* is a verb, but also a noun (a document). Likewise, the noun documentation can refer both to physical records or documents (the documentation), and to the act of managing these documents (Buckland, 2013, 2017). Related terms are the nouns *documenting practice* (e.g. Østerlund, 2003) and *documentary practice* (e.g. Scifleet & Williams, 2011), broadly meaning practices involving documents. All of these terms, with a spectra of connotations, are used within IS to research documents and their role in different setting, like in different work and leisure settings. I use the terms *documentation* and *documentation practice* in an extended sense, denoting all doings and non-doings with documents including the creation of documents (cf. "Report writing – a documentation practice" in Chapter 4).

Early efforts in the name of documentation were in large a response to increasing number of publications, and a need and wish to order and make these publications available (Briet, 2006, originally published 1951; Otlet, 1989, originally published 1934). In *Documentation*, the librarian and documentalist Samuel C. Bradford summarizes:

> /…/ documentation is the art of collecting, classifying and making *readily accessible* the records of all kinds of intellectual activity. (1948, p. 11, my emphasis)

At large, these basic challenges are still present in situations of scholarly communication and certainly in the archaeology discipline.

More recently, the documentation studies field has undergone a rejuvenation. If striving for accessibility once primarily was confined to collecting, classifying, and offering accessibility to physical records through institutions like libraries and archives, documentation studies today take on a broader set of challenges. In 2007 the documentation scholar Niels Lund outlined the research field a-new. Lund explained the field as cutting across all disciplines and engaged not only with completed documents, as in Bradford's statement and in the first generation of grey literature research (cf. previous section), but also with the *creation* of documents. Further, Lund added the qualitative quest to documentation studies, to identify what a good document is in different situations (Lund, 2007). By doing this Lund emphasized how documentation studies can have an applicable aspect with

regards to document creation as well, besides guiding collection and classification of documents.

Today, the research discipline document and documentation studies inquire into all documentation activities. A common denominator is the long term goal to increase accessibility to, and use of, the records of all kinds of intellectual activity. Importantly, by means of philosophy of information and philosophy of documentation, the concept "access" has been problematized: to have access to a physical or digital document does not equal having intellectual access to the document content. Documents have cultural or social aspects and functions besides the document type and the physical aspects of the documents (Brown & Duguid, 1996; Buckland, 2017). With this insight, providing access becomes a more complex task than providing access to physical documents. So called domain analysis, for example studies of document structures and institutions in scientific documentation, is one method by which information specialists can acquire knowledge about and teach users to navigate the documentation in specific subjects or fields (Hjørland, 2002). Further, how users access document content, and how document providers can help users, has been treated in literacy research (Bawden, 2001; Lloyd, 2006). Both the domain analysis and literacy research lie outside the scope of this dissertation. Yet, the results of the dissertation may be useful for domain analyses, and spur further research questions about intradisciplinary literacies.

DL archaeology activities, can depending on one's perspective, be conceptualized both as research and as professional practices. Therefore, this study relates to research on scholarly documentation (often carried out under the more general heading *scholarly communication*) as well as to research on professional documentation. These two related areas are the focus of next section.

Scholarly and professional documentation

Studies of scholarly communication and documentation targets what researchers do with documents. Inquiries into professional documentation concerns documentation in work processes. Investigations in these two fields can have diametrically different objectives, e.g. on the one hand to further the understanding of research processes and on the other hand to streamline corporate knowledge sharing. However, these two field can also be adjoined, forming the background for studies of documentation in knowledge making work like DL archaeology. In the following I give a brief introduction to studies of scholarly and professional documentation, and explain how I view them as interlinked. Finally, I point to the complexity of delineating the unit of analysis in the boundary zone between scholarly and professional practices.

This study is undertaken in a research tradition recognizing the social dimension of research (Palmer & Cragin, 2008). A pertinent question in studies of scholarly communication is how the communication in a given discipline works, and how well communicated documents meet researchers' needs. In the big picture, results do on the one hand show how the form of scientific records, like the form of research articles, can meet varying needs in science during different periods, for example needs arising due to data intensive research (Lynch, 2009). On the other hand, there are also studies showing inertia with regards to how scholarly documentation develops. For example, a close examination of the evolution of the journal article format in the transition from paper journals to e-journals suggests that the influence of the web medium's multimodality on the article format was lesser than expected (Francke, 2008). While the medium changed from analogue to digital, the article form remained largely the same. These examples serve to illustrate how scholarly documentation and communication partly is up to researchers to shape, while at the same time molded in slow-changing social, technical, and commercial structures.

Grey literature research (cf. "Report writing in archaeology", Chapter 3), can be viewed as part of the scholarly communication research. Grey literature research in the IS tradition include for example investigations of challenges with identifying and accessing grey literature, the place of grey literature in open archives and institutional repositories, development of bibliographic control, analysis of the impact of grey literature in scientific publications, and impact of the internet and related technologies on the production of grey literature (Farace & Schöpfel, 2009). Another strand of grey literature research adopts a critical perspective on the premises for grey literature, discussing the economic structures for and the social functions of grey literature. A fundamental question in this strand of research is whether or not grey literature should be included in state funded collections of research literature (Pavlov, 2006). Swedish DL archaeology reports are already collected and disseminated by the state. However, the practice to collect the output of extra-academic research gives rise to further questions such as: to what extent and how should extra-academic reports be integrated with collections of conventional academic literature such as published books and research journal articles? And: what the implications of integration are for users of integrated collections (cf. footnote 20)?

Studies of professional documentation explore the relationship between documentation and work, and importantly the functions of documentation for work. Studies of professional documentation include both historical studies of the evolution of recordkeeping (Siegler, 2010), and analysis of contemporary documentation practices (Heath & Luff, 2000; Østerlund, 2003; Scifleet & Williams, 2011). Historical studies do for example follow how aspects such as professional interests and theories, technology development, and administrative restructuring are mirrored and thus possible

to study through analysis of documents (Siegler, 2010). Others make suggestions for design of documentation routines and systems based on analysis of how documents, e.g. digital documents compared to analogue documents, are used in practices (Heath & Luff, 2000).

A common motive, both in studies of scholarly and of professional documentation, is thus that documentation is central to how scholarly and professional communities undertake activities (e.g. how article writing structure research), and to how those activities in turn structure communities (e.g. how research communities are shaped by publishers and publication channels). This dissertation shares this assumption with above described research on scholarly and professional documentation: documentations' forms and social functions are configured by, and affect, communities' activities. In keeping with these studies I examine report writing as both an outcome of, and as generating, the DL archaeology institution.

An on-going challenge in practice oriented scholarly communication research is how to decide the unit of analysis, i.e. to define the boundaries of a research community. There are a number of computer aided techniques to map connections between researchers and institutions, but these are inevitably based on analysis of activities leaving data traces, such as information searches, downloads, referencing etcetera (Palmer & Cragin, 2008). In studies of professional practices, the unit of analysis may be easier to delineate as it can be more clear who works at a certain workplace or is involved in a certain work process. Introducing an institution such as DL archaeology as the object of study highlights yet another aspect of the complexity of delineating research communities. The challenge can be likened to that of studying interdisciplinary scholars (e.g. Gullbekk, 2016), with the added intricacy that practitioners in research service delivering organizations work outside academia. The complexity involves both theoretical and methodological challenges. Theoretically, one has to decide how to view research service organizations in relation to the academic institution. Methodologically, one has to find ways to analyze connections based on traces left by practitioners outside academia, who may not have access to, or use, for example the same databases as their colleagues in academic institutions. In the following chapter, "Theoretical framework", I explain how I have studied research outside academia through documentation practice studies.

4. Theoretical framework

In this chapter I explicate the theoretical framework and conceptual tools I employ to link together the four dissertation papers. I first explain how I by means of STS of expertise and documents frame DL archaeology reports as scholarly documentation outside academia. Secondly, I turn to practice theory and particularly to the *context* concept to explain my choice to study the contexts of a documentation practice rather than foregrounding physical documents or practical activities with documents. In the third section I expound on the context approach and clarify how I sensitize contexts for report writing by analyzing three different *resources*. Thereafter I describe each of the three resources. As this is a compilation dissertation, the framework has been developed parallel to the formulation of the research problem and during the work with the papers (2013-2016).

Capturing research outside academia

Concisely, STS has developed in three waves (Collins & Evans, 2002). The first wave consisted of social analyses explaining sciences from authoritative positions. The second is characterized by an interest for science as a social activity studied by means of anthropological methods and ethnomethodology. Pickering, a forerunner of the second wave, explains the study of practices as the study of:

> /…/ what scientists actually do, and the associated move toward studying scientific culture, meaning the field of resources that practice operates in and on. (1992, p. 2)

The third wave revokes the previously assumed distinction between the scientific community and citizenry. Attention is directed to *expertise* rather than to scientists in academic institutions (Collins & Evans, 2002).

In line with the third wave of science studies I investigate Swedish DL archaeology, expert activities in which research is one component, rather than research in academic institutions. Moreover, in keeping with the second wave I view DL archaeology report writing as a practice. I will soon return to justify the practice perspective, but I will first describe the backing for

positioning reports as the focal point of my studies of scholarly work and particularly documentation outside the academy.

Reports are at the core of the phenomenon I study. Reports are the documents DL archaeology practitioners are obliged to write and deliver, yet reports are at the same time pictured as a threat to archaeological results. For example, the Swedish NHB warns that results presented in reports risk to not receive any attention (cf. "The report problem", Chapter 1). Thus, reports have an incongruous status in Swedish DL archaeology. They are central in DL archaeology service delivery, yet at the same time potentially distorting archaeological knowledge making. Because of the centrality and the, by some experienced (cf. "The report problem" in Chapter 1), problematic status of reports I make reports the focal point of my analysis.

It is worth to mention that I, by viewing archaeology reports as a type of *scholarly* documentation, take a stance in this study. This stance has two grounds. The first is the official prescriptive expectations on the function of report documents. The content of Swedish archaeology reports should according to policy be produced with *scientific* methods, be of good *scientific* quality, and provide government agencies, research and the public with knowledge (Kulturmiljölag (1988:950), n.d.; Riksantikvarieämbetet, 2015b, cf. "Scholarly documentation in extra-academic archaeology, Chapter 1). The second ground is the theoretical backing in STS to include knowledge-generating expert work outside academia in the scope of science studies (Collins & Evans, 2002). In line with the expert studies tradition, and from the perspective of documentation, I illuminate the conditions for DL archaeology practitioners' contributions to the body of archaeological research documentation.

Because of the focus on reports I turn to documentation studies for the theoretical framing of my study. Documentation studies in STS can both be a way to trace science and technology practices, and a way to investigate the roles of documents in science and technology (Shankar, Hakken, & Østerlund, 2017). The potential to analyse documents and documentation to get at the social processes of science and expert work was exploited already in the 1930's by Ludwig Fleck (1981; cf. Frohmann, 2004a). Fleck studied documentation and documents to investigate the history of medical thought. At the core of Fleck's analysis we find the concept "thought collective", preceding concepts like "paradigm" and "social intellectual movement", in STS research (1981). According to Fleck, a thought collective is made up by esoteric and exoteric circles. Scientists working on a specific problem constitutes the esoteric, inner, circle. Outside the esoteric circle we find exoteric circles containing all those with a potential interest in the results of the inner circle's work. Fleck theorizes on how knowledge develops through uses of documents specific to each circle. As knowledge travels, in a two-way motion, between the inner and the outer circles, the knowledge is constituted in different ways in types of documents specific to each circle.

Further, Fleck asserts that artefacts like documents are standardized within each circle by means of social methods, for example by "ordinances and legislative measures" (1981, p. 78). These standardized artefacts then permeate activities, they do, in Fleck's words, become "style-permeated" (1981, p. 38). Further, artefacts like documents entail a *"…readiness for stylized (that is, directed and restricted) perception and action…"* (1981, p. 84, emphasis in original). Thought styles and documents particular to each circle in a thought collective thus amplifies one another.

Fleck's thinking on thought collectives and documents has inspired my perspective on DL archaeology. I assume the idea that documents are standardized in particular circles of thought collectives (Fleck, 1981). It is the process of standardization, driven by the collective, that shapes the document. Therefore, it is the situation of standardization we need to understand to access document content. However, Fleck mainly discusses thought collectives as consisting of researchers in the inner circles and interested amateurs in the outer circles. I make use of the inner and outer circles as an analogy: I view the archaeology discipline as consisting of many thought collectives of which DL archaeology is one. DL archaeology practitioners are at the centre of the DL archaeology research pursuit while at the same time part of many outer circles in the discipline, and vice versa.[21] For DL archaeology practitioners, reports permeate their research activities. At the same time, we find many of the intended recipients of the DL archaeology reports, like academic researchers, government agency personnel, and the public (Riksantikvarieämbetet, 2015a), in exoteric positions in relation to the DL archaeology practitioners.

Fleck's thesis on how documents are specific to circles in thought collectives provide one plausible explanation as to why results presented in reports can be challenging to access for audiences in exoteric circles in relation to the DL archaeologists. The perspective also encourages an exploration of how it is that documents become standardized in a specific way in a particular circle. The focus on the situation in which documents come into being, rather than on the documents corresponds to the *practice* perspective in IS and particularly to a *documentation practice* (Frohmann, 2004a, 2004b) approach. In the following section I introduce my reading and application of practice theory.

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[21] The information science scholar Bernd Frohmann (2004a) has picked up Fleck's conceptualization of inner and outer circles to discuss stratification of scientific documentation and particularly how the journal article differs from other types of scientific documentation. While the concept stratification could be used to analyze how the DL archaeology report relates to other forms of archaeological documentation in terms of hierarchy and power, these matters lie outside the scope of this dissertation.

Report writing – a documentation practice

Application of practice theory is a longstanding tradition in IS and has developed into a variety of theoretical and methodological approaches (Pilerot, Hammarfelt, & Moring, 2017). Practice theories from philosophy, sociology, and anthropology have been adapted both in *document practice* research (e.g. B. P. Frohmann, 2004) and in *information practice* research (e.g. Cox, 2012). Document practice approaches complements an epistemological perspective on science, framing science as above all intellectual work, in studies of scholarly communication (Frohmann, 2004a). Parallel, information practice approaches is an alternative to rational-cognitive views in information behavior (e.g. information needs, seeking, use, and sharing) research (Cox, 2012; Savolainen, 2007). Because I view document and information approaches as espoused perspectives, both useful for analyses of intertwined aspects of the research problem at hand, I take the liberty to develop a practice perspective building both on works using the concept document or documentation practice and on works preferring the concept information practice.

In general, a practice approach in IS entails focus on document or information related "repeated and regular actions" (Savolainen, 2007, p. 121) or "routine and habit" (Cox, 2012, p. 179). A practice theoretical perspective also often implicate a focus on the situations wherein actions, routines, or habits are carried out by members of communities (Savolainen, 2007). The focus is not on individual community members' cognition but on the interrelations of "mind, body, action, tools, technologies, and culturally organized settings" shaping actions, routines, or habits (Talja & Nyce, 2015, p. 64; cf. Fleck, 1981, p. 107).

A practice perspective on documents more specifically serves to reveal:

> /…/ how it is that particular documents, at particular times and places and in particular areas of the social and cultural terrain, become informative. (Frohmann, 2004b, p. 405)

Bernd Frohmann's above standing quote declares that informativeness emerges in practices. Consequently, studies of practices with documents are needed to reveal how documents become informative. Frohmann builds his argument on Ludwig Wittgenstein's philosophy on language-games presented in *Philosophical investigations* (Wittgenstein & Hacker, 2009). In short, Wittgenstein's idea is that words' meanings emerge as they are used. Meaning cannot be pinned down outside of language in action. Frohmann transfers this idea to documents and develops his theory through an analysis of the role of the academic journal article in scholarly communication (2004a). Based on the analysis Frohmann asserts that journal articles, more than conveying information, stabilize the networks with and upon which

research is undertaken. Thereby Frohmann makes a strong case against the abstract notion of information as content independent of its context, previously used in information science. In its place he proposes descriptions of documentation practices to understand the role of documentation for knowledge production. By doing this Frohmann aligns with a wider movement in science studies focusing on research as work practices rather than as cognitive activities.

I follow Frohmann's injunction by viewing report writing as a practice. I define the practice as the report writing undertaken in response to the official requirements in the heritage policy (Kulturmiljölag (1988:950), n.d.; Riksantikvarieämbetet, 2015a). By doing this I encircle a range of activities from initial drafting of research questions to final archiving of reports into one unit, one practice. Thus I target the generalized level of report writing rather than the separate activities making up the practice. Moreover, reports are treated as one genre. The level of abstraction brought by the genre concept enables analysis of a practice wherein, with a closer look, several different types of reports could be distinguished (from different phases of land-development), wherein specific form features and the content of reports vary (Magnusson Staaf & Gustafsson, 2002; cf. to regional variations in the conditions for and praxis of DL archaeology at large, Riksantikvarieämbetet, 2014), and wherein report writing trends cause variation from one time to another (cf. Hodder, 2012). From Frohmann's take on practice theory I infer that the social and cultural terrain, where the documents are "standardized" in Fleck's wording (1981, p. 78), is the place which we need to understand and change in order to alleviate or solve a challenge with documentation. Therefore, reports are the focal point binding the papers and the overarching analysis together. Yet, reports are not the object of analysis in any of the studies.

The documentary practice concept as developed by Frohmann (2004a) entails interpreting reports primarily as objects with a function in research work. However, considering the practical problem with reports expressed by the Swedish NHB, which has to do with the interlinked aspects content, form, and function of reports (cf. Fleck, 1981), I do not focus solely on the function of documents in my analysis. I assume report documents to at the same time be objects with a function or malfunction (cf. Huvila, 2011, 2016) in an infrastructure for knowledge making, and successful or unsuccessful as carriers of content between inner and outer circles of thought collectives.

In sum, using the documentation practice concept is a way to get at the contexts in which reports are produced and become informative. Based on the analysis I can draw conclusion about how the contexts in which DL archaeology reports are produced affects reports and warrant for a particular type of scholarly documentation. In the following I explicate how I sensitize contexts for report writing by identifying and analysing three different resources contributing to documentation contexts.

Sensitizing contexts by identifying resources

The *contexts* concept is based on science studies stating that the local work place and the resources available therein are crucial to how ideals of scientific theories and method play out in practical work (Knorr-Cetina, 1999). Studies of contexts are thus pivotal to understand which activities researchers can realise in a certain setting, and thereby central in studies of science practices. I extend this line of reasoning to scholarly documentation: I assume that reports are constructed in practitioners' doings and non-doings in relation to the contexts of the practice (Pickering, 1992; Pinch & Bijker, 1984). Contexts are thus critical for practitioners' documentation activities and the consequent character of documentation. Borrowing Frohmann's terminology, context studies is a way to get at the social and cultural terrain wherein documents become informative (cf. Frohmann, 2004b).

Context[22] in science studies generally refers the field of epistemological and conceptual, institutional and social, technical and physical resources scientist (in this study the practitioners) draw upon in their work. In other words, the field of resources includes "all of the resources, many of them humble and mundane, that scientists deploy and transform in their practice" (Pickering, 1992, p. 3). Pickering likens resources with tools and building materials. He reasons that a hammer, nails, and some planks not are the same as the act of building (Pickering, 1992). Using the symbolism of this analogy my study is largely a study of the tools and materials available to DL archaeology practitioners in documentation work. My rationale for studying resources is that the materials you have available will affect what you can build.

Contexts can be studied from the perspective of actors' activities. Such a study foregrounds local resources. The *contexts* concept in science studies is in fact largely developed in studies of laboratory research in which resources in physical, and sometimes also local, laboratory settings are highlighted (e.g. Knorr-Cetina, 1999). I do instead study a documentation practice from the perspective of wider contexts for documentation. Rather than zooming in on resources in a particular physical context I aim at capturing resources in an institutional setting shared by Swedish DL archaeology practitioners. The purpose is to enable a discussion of the implications of the organization of archaeology research on scholarly documentation. This focus requires focus on non-local resources and on primarily non-physical aspects of resources. The non-local resources I have identified are regulative, institutional, and infrastructural resources (further explained under the next heading). I investigate the primarily non-physical aspects of these resources, namely policy content, ideals, and frames of references. This is merely an effect of prioritization in this study, not a stance against analysis of technical or

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[22] Other terms for context in practice theories are "culture" (Pickering, 1992) and "activity settings" (Talja & Nyce, 2015, p. 65).

physical aspects of contexts which I assume to be equally significant for report writing. A study of technical or physical aspects of contexts would respond to a different set of research questions, and would certainly also further our understanding of premises for research and scholarly documentation. A documentation context analysis focusing on technical or physical aspects could, for example, target the relation between documentation technologies and conceptions of scientificness in archaeology. Such a study could trace the spread of novel documentation technologies in research service delivering organizations and inquire into how scientificness and scientific quality are (re-)negotiated as novel technologies gain ground.

A pertinent question in application of a context perspective is how the entities resources, contexts, and practices relate. My reading of practice theory is that none of these relate by themselves but become related through doings and non-doings (Pickering, 1992). In other words, resources become a context when a person, or possibly a non-human actor, draw on resources to perform actions. Based on the assumption that a context emerge as resources are drawn upon in practitioners' doings and non-doing I do not presume a relation between any of the resources I study.

Paper IV is a study tailored to investigate how contexts emerge as practitioners draw – and do not draw – on resources for report writing. Using this perspective, we can see which resources that are available but that practitioners for one reason or another does not draw on. This could be more difficult to notice if studying contexts from the perspective of the practical activity (e.g. analyzing policy only through practitioners' usage thereof). However, as a result of my priorities the practical report writing activities and the technical and physical aspects of reports are left to another study.

In Paper IV I bring up Pickering's term "disciplinary agency" (Pickering, 1995, p. 29; cf. Frohmann, 2004a) as a way to discuss why the interviewed DL archaeology practitioners draw on resources in particular ways. Disciplinary agency means habits, upheld by social agreements in a certain setting, for example in what I call the DL archaeology institution. The disciplinary agency concept can be used to understand human agency beyond individuals' intentional decision-making. One example of disciplinary agency in Swedish DL archaeology is the custom to predominately refer to sources from Sweden (Börjesson, 2015). Disciplinary agency can be more or less settled. In its most settled forms certain actions seem completely natural and correct although there would be other ways to achieve the goals, for example for archaeological report writing.

Pickering further describes research as characterized by a struggle between naturalized and emerging scripts for actions (Pickering, 1995). This phase is comparable to the phase of interpretative flexibility in the emergence of scientific facts (cf. Börjesson, 2016a; Pinch & Bijker, 1984). To exemplify, when an ideal for documentation becomes settled

practitioners may act on this ideal as if it were the only way to do documentation. The disciplinary agency concept can thus be used to interpret why a set of resources commonly is drawn upon in a certain way by a group of practitioners, although we do not find the answer in any one practitioner's individual rationality. In Paper IV I merely point to the concept to explain why it, in analyses of archaeological documentation contexts, is important treat DL archaeology as a unique institution governed by its own agency. The concept could be used in further analyses to clarify and problematize how practitioners draw on documentation resources (e.g. to probe deeper into PSO practitioners' resistance and accommodation to information policy for scholarly documentation).

Based on the four papers I can draw conclusions both about the character of the resources for report writing and how practitioners draw on these. Through these studies I offer a language (cf. Brunsson, 1980) for talking about contexts for scholarly documentation in DL archaeology. I argue such language make the institutional premises for DL archaeology scholarly documentation visible. Furthermore, I contribute to practice theory in IS and STS by operationalizing information related resources for scholarly documentation. I also attempt to integrate analysis abstract resources (of policy, ideals, frames of references in Paper I, II, and III) with analysis of local knowing (in the analysis of the interviews for Paper IV) (cf. Cox, 2012).

When talking about practices I do however want to emphasize that *practice* is a theoretical concept and perspective. To use the concepts *practice* and *context* is to engage what the sociologist Johan Asplund calls "aspect seeing" (Asplund, 1970). Crucial in engaging one aspect to interpret a social phenomenon is to remember that the aspect is not the phenomenon, i.e. even if we use the practice concept to interpret report writing, report writing will never be one practice.

Analyzed resources

I apply practice theory to frame the four sub-studies, rather than as a foundation of the entire dissertation research. I devote three out of four studies to analyses of what I in this dissertation introduction frame as resources. The choice of these particular resources is the result of an iterative process formed by two aspects. First I will describe the iterative process, and then explain the two aspects.

The process of studying resources began as I studied the information source use in archaeology reports to investigate report authors' frames of references and through these their relation to the rest of the archaeology discipline (Paper III, Börjesson, 2015). This first study also served as an entry point for me as an information studies researcher to the, for me previously unfamiliar, archaeology discipline. During the course of the study

of information source use I grew interested in the official requirements on reports, primarily how they ideally should relate to previous research but also in a wider sense what reports should contain and be like. As I delved into the formal policy (Paper II, Börjesson, Petersson, & Huvila, 2015) and discussed the emerging results with archaeologists and other knowledgeable of the topic at presentations and seminars, it soon became apparent that there by no means is a consensus on what the policy formulations imply. This insight led to the vetting of documentation ideals (Paper II, Börjesson, 2016a). With three resources investigated it was time to check in, in a systematic way, with archaeology practitioners how these resources play out in report writing. This led to the interview study concluding this dissertation (Paper IV, Börjesson, 2016b). The interview study also serves as grounds to discuss which further studies would be useful a) to probe deeper into contexts for scholarly documentation in DL archaeology, and b) to problematize other extra-academic contexts for scholarly documentation.

After conducting the first three studies I developed a model to illustrate how information policy, documentation ideals, and information source use and frames of references can be analyzed as resources in documentation contexts. The model has been developed with inspiration from the IS scholar Andrew Cox. Cox points out that a practice only can be understood in its "wider regulatory, infrastructural and institutional context" (Cox, 2012, p. 183).[23] I borrow these three descriptive terms, because they correspond with the resources I have studied, to frame and keep together my study of resources. I study *information policy* (regulatory), *documentation ideals* (institutional), and *frames of references* (infrastructural) resources:

Paper	Resource	Operationalized with the concept(s)	Empirical material
I	Regulative	Information policy	Legislation, regulations, and guidelines for DL archaeology documentation
II	Institutional	Documentation ideals	Experienced practitioners' opinions about DL archaeology documentation expressed in a debate in a research journal
III	Infrastructural	Information source use and Frames of references	Reference lists in DL archaeology reports

Table 3. Overview of Papers I-III

[23] Cox makes this statement with references to works applying practice theory in media studies and in industry and innovation studies. I selected resources to study in the above described iterative process. Therefore I do neither go further into Cox's rationale for bringing up these particular categories, nor into the works Cox refers to. Rather, I would like to emphasize the importance of choosing resources to analyze based on the research problem and the practice.

The first and most profound aspect forming the choice of resources is that, because of the interest in documentation underpinning the dissertation, all of the resources are documentation related. The second aspect shaping the choice of the particular resources (the regulative, institutional, and infrastructural) is based on the aim and research questions. As I aim to further the understanding of how the distribution of research duties to PSOs affects scholarly documentation in Swedish archaeology I have chosen to analyze shared resources. The shared resources are such resources that are present to all practitioners in Swedish DL archaeology organizations, rather tied to local settings. Thus, the analyzed resources are also present to all of the informants interviewed for Paper IV. This aspect enables the overarching analysis presented in Paper IV of how practitioners draw on each of the resources in their everyday report writing. In sum, the resources are such that, through the analyses, give us an understanding of documentation contexts in Swedish DL archaeology PSOs viewed as a type of organizations, rather than such that are tied to single organizations.

The takeaway from this design for further documentation context studies is the structure for operationalizing information related resources. For every analysis of a practice's context there is a large number of resources that could be taken into account. The particular resources studied should in other studies be exchanged for resources pertinent to the particular practice.

Because I apply practice theory to frame the four sub-studies, rather than as a foundation of the entire dissertation research the conceptualizations of each of the resources are made independent of practice theory, in the theoretical traditions of information policy analysis, STS controversy studies, and bibliometrics respectively. In the following, the theoretical underpinnings and analytical use of each of these resources will be described. For more extensive accounts, see each of the articles in part II.

Information policy

Information policy is the principles aiming to guide decisions about information. Governments and organizations utilize information policy to control information creation, processing, and use (Braman, 2006). Information policy analysis is the study of principles in legislation, formal regulations, and supporting guidelines, or the lack thereof, aiming to guide decisions about information. I use the information policy concept to analyze the regulative resources (cf. Cox, 2012) for report writing.

The information policy analysis in Paper I (Börjesson et al., 2015)is an investigation of state level policymakers' visions for archaeological documentation. In order to identify these visions, excerpts concerning "interactions with information" (Huvila, 2006; Talja & Hansen, 2006; cf. Cool & Belkin, 2002) were identified in policy documents. Furthermore, the agents whose interests influence the policy, e.g. land owners and archives,

were identified, as were the actors intended to execute the policy (Börjesson et al., 2015). This type of policy analysis does not give insight into how policies are interpreted or adopted by practitioners on organizational or individual levels. To understand the role of information policy for DL archaeology documentation we need to compare the policy analysis results with those from the analysis of documentation ideals, frames of references, and how practitioners draw on resources in report writing, as is done in Chapter 7, "Concluding discussion".

Documentation ideals

Documentation ideals refers to ideals about documentation, e.g. how it should be done, kept, and used. I coined the concept for the purpose of analysis of ideals about documentation flourishing in archaeology. The concept draws on the controversy studies tradition in STS (Collins & Evans, 2002; Pinch & Bijker, 1984; Sismondo, 2010). Controversy studies outline a framework for investigating controversial stages in the history of facts or artefacts preceding development of consensus on an issue, in this case how documentation should be done. Interpretative flexibility characterizes the stage before consensus is established (Pinch & Bijker, 1984). Within controversy studies, facts are assumed to be social constructs supported by social groups and structures of power, e.g. social positions, investments in infrastructures and skills, resources, and claims. The tradition entails a symmetric approach to positions, in my study replaced with the term *ideals*, in controversies. Proponents of both (or every) side in a conflict are assumed to have a rationality for their stance (Collins & Evans, 2002; Sismondo, 2010).

I align with the controversy studies tradition in my analysis of how ideals for documentation are negotiated by experienced professionals in a stage of interpretative flexibility. Documentation ideals are viewed as co-existing with formal policy in contexts for report writing. In the dissertation the documentation ideals analysis thus complements the formal information policy analysis by covering authoritative, yet less formally expressed, opinions (Börjesson, 2016a). In further analyses the documentation ideals concept could be used to engage more extensively with how documentation is a venue for power struggles and politics, questions outside the scope of this dissertation.

Documentation ideals are viewed as institutional resources for DL archaeology documentation. Documentation ideals analysis give, like the information policy analysis, no insight into how practitioners react and relate to these ideals. Once again, the results need to be compared with those from the analysis of frames of references and resources in report writing (cf. Chapter 7, "Concluding discussion").

Frames of references

Frames of references refers to the patterns (concentrations and scatters) in practitioners' information source use, in this case when writing DL archaeology reports. I study source use with a quantitative bibliometric approach (Leydesdorff, 1989; Tague-Sutcliffe, 1992) in order to understand which sources practitioners refer to, and the types of relations between the practitioners and their sources (e.g. Do practitioners often refer to their own works? Do practitioners refer to other practitioners' writing in the same genre?). The source use was interpreted through a correspondence and a cluster analysis to explore latent correspondences between categories in the data set (Hair, Black, Babin, & Anderson, 2010). The results were visualized in a two-dimensional map displaying concentrations and scatters of categories, suggesting clusters for me to interpret and name. *Clusters* is thus a methodological term while *frames of references* is the analytical term I use to discuss patterns in source use.

The information source use is analyzed on an aggregated level, as opposed to on the level of individual practitioners. Moreover, information source use is related to practitioners' organizational affiliations to DL archaeology organizations in the form of a) incorporated businesses and sole proprietorships, b) foundations and member associations, or c) government agency departments.[24] The aggregated level analysis enables discovery of patterns, and interpretation of frames of references, across the group of report writing DL archaeology practitioners. Through the analysis, the collective level rationale for source use in DL archaeology reports come into sight.

Referencing in reports is seen as a constitutive part of report writing, and report writing as constitutive part of DL archaeology activities (Börjesson, 2015). Practitioners' frames of references reflect both the infrastructural (which sources do practitioners have access to?) and the institutional (which sources do practitioners find relevant to refer to?) resources in report writing. Analysis of frames of references gives only partial insight into the contexts for DL archaeology report writing. Frames of references analyzed together with information policy, documentation ideals, and how practitioners draw on these resources give a fuller picture of contexts for research and documentation in extra-academic archaeology.

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[24] As Paper III (Börjesson, 2015) was written before the theoretical framework for the dissertation was developed I use the term "sphere" to discuss how frames of references relate to the social surrounding. In terms of the theoretical framework outlined in this chapter I would substitute the word "sphere" for context.

5. Methods and materials

This chapter explains the mixed methods approach which I have used to investigate the resources in documentation contexts. Further, I discuss the methodological implications of studying experts as well as the pertaining ethical considerations. The chapter also presents empirical limitations, clarifies author contributions in the dissertation papers, and declares how research data and papers are stored and made available.

A mixed methods approach

To study resources in contexts for report writing I use a mixed methods approach (Plano Clark, Creswell, O'Neil Green, & Shope, 2010). The mixed methods approach has previously been employed in IS, for example in studies of the potential of visual information and communication technologies for collaboration in emergency care (Maurin Söderholm, 2013). Maurin Söderholm explicitly refers to the mixed methods approach as a framing for her combination of interaction analysis based on video recordings, and interview and questionnaire data. However, combinations of different methods and materials, although primarily qualitative, without the explicit mixed methods framing are common in IS (e.g. Carlsson, 2013; Lindh, 2015; Lundh, 2011).

The three studies of resources are based on different materials. I analyze the different materials with methods tailored to the specific materials. Mixing methods thus becomes a way to encircle several different resources in order to develop an overall interpretation of contexts for DL archaeology documentation.[25] I combine qualitative and quantitative methods in an "embedded design" (Plano Clark et al., 2010, pp. 374–375). In this dissertation the embedded design implies that one quantitative sub-study (Paper III, Börjesson, 2015) is set in an otherwise qualitative design. In Paper III I use a quantitative bibliometric method to analyze practitioners' information source use and interpret their frames of references. Paper I (Börjesson et al., 2015), II (Börjesson, 2016a), and IV (Börjesson, 2016b)

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[25] I explain how I operationalize the resources in "Sensitizing contexts by identifying resources" in Chapter 4. The materials and methods used in each paper are described in the paper summaries in Chapter 6.

are all carried out with qualitative methods. The quantitative and qualitative data rests on different epistemological assumptions, I derive knowledge both from counting and interpreting frequencies in information source use and from analyzing and interpreting texts. Still, all of the studies contribute to the same epistemic goal, to analyze "contexts for information activities", which is a criteria for sound use of mixed methods in IS (Ma, 2012, p. 1865).

Studying experts

My perspective on the practitioners behind the material analyzed is largely based on ontological assumptions made in expert studies (e.g. Meuser & Nagel, 2009; Mosse, 2011). The most profound assumption is that there is expert work differing both from academic research and from less intellectual-knowledge intensive occupations. This perspective corresponds with the focus on experts rather than scientists as established by the third wave of science studies (cf. Chapter 4, "Theoretical framework").

The expert studies perspective further entails viewing individual and groups of practitioners as situated in their professions and in the organizations within which they work. Each of these settings (e.g. at government authorities, in academic research, in DL archaeology organizations) affects the practitioners' worldviews and professional objectives with downstream effects on matters such as how they view policy, which documentation ideals they hold, their frames of references, and their experiences of resources in every day work (cf. Mosse, 2011). Each practitioner holds expertise in their own profession and organization (Collins & Evans, 2002; Meuser & Nagel, 2009; Mosse, 2011). A discipline like archaeology, engaging different organizations and professions, is consequently characterized by multiple types of expertise, and in other words, by multiple esoteric circles (cf. Fleck, 1981). These multiple types of expertise need to be taken into account in interpretations of expressions from different individuals, belonging to different organizations.

The perspective on the practitioners, who are the originators behind the policy, the ideals, and the frames of references I analyze, as experts in a discipline which I had little prior knowledge about has had implications for the design of the study. Study III (of frames of references, Börjesson, 2015) was conducted first, followed by study I (of information policy, Börjesson et al., 2015) and study II (of documentation ideals, Börjesson, 2016a), before the interviews for Paper IV (Börjesson, 2016b) was undertaken. I chose the order to become familiar with the policies for, ideals about, and frames of references in DL archaeology report writing before the interviews. Such insights into a professional field are crucial for successful expert interviews (Meuser & Nagel, 2009). The interview study was both informed by the antecedent studies of resources and aimed at exploring the presence of these

resources in the daily report writing (i.e. How present are policy documents in DL archaeology practitioners' daily work? Which documentation ideals do the practitioners hold? How do the practitioners reason with regards to information source use?).

Ethical considerations

A few general ethical considerations are noteworthy (considerations specific to each sub-study are discussed in each of the dissertation papers). Although the analysis is focused on the regulative, institutional, and infrastructural resources and how they influence report writing, the materials I analyze are produced by policy makers, debaters, and archaeologists. The presence of individuals is most readily apparent in the interview material (Paper IV, Börjesson, 2016b), but individuals and groups of peoples are present as the originators of the materials also in the study of policy documents (Paper I, Börjesson et al., 2015), in the study of debate articles in a journal (Paper II, Börjesson, 2016a), and in the study of reference lists in reports (Paper III, Börjesson, 2015).

The study adheres to the ethical principles for humanities and social sciences research stipulated by the *Swedish Research Council* (Gustafsson, Hermerén, & Petterson, 2011). This means that informants interviewed for Paper IV (Börjesson, 2016b) were briefed of the research aim and the terms for their participation before the study. Their names and other personal information are treated with confidentiality in all presentations of the material. Moreover, following from the practice approach (cf. Chapter 4) the analytical focus is not on what individual policy makers, debaters, or archaeologists express. The focus is on the level of policy (Paper I, Börjesson et al., 2015), on (more or less) shared ideals (Paper II, Börjesson, 2016a), on aggregated frames of references (Paper III, Börjesson, 2015), and on report writing as an institutional practice (Paper IV, Börjesson, 2016b) rather than as an individual activity.

Empirical limitations

Four empirical limitations are significant to take into account in interpretations of the results. The first has to do with the focus on contexts and resources. Practice theory inspired scholars commonly emphasize observations of peoples' actions and interactions with other people and with technical or physical surroundings (e.g. Carlsson, 2013; Lindh, 2015). Moreover, in documentation studies it is common to for example foreground a certain documentation method or style (e.g. Østerlund, 2003), or to trace the historical development of a specific form of documentation (e.g. Siegler,

2010). Because of the focus on contexts and resources, being one aspect of a practice (cf. Nicolini, 2012), I do not include observations of the practical documentation work or analysis of the report documents in this study. The focus on documentation contexts does not provide insights into the practical report writing and the report documents. However, with the understanding of contexts provided by this dissertation, observations of practical documentation and documents could be a fruitful next step to further explore for example discrepancies between information policy, documentation ideals, and documentation activities. The interviews carried out for Paper IV, providing indications of how policies and ideals play out in everyday documentation work, can be used as grounds to develop such an observation study. In sum, documentation context analysis can complement documentation and document analysis approaches in analyzes and evaluations.

The second limitation has to do with the conceptualization of academic vis-a-vis extra-academic archaeology and its consequences for my perspective on the material. It is vital to note that demarcations between institutions within and outside academia commonly are less clear than they appear in this dissertation. What is considered as part of, or not part of, academia is repeatedly renegotiated. Also, the premises for conducting research varies outside academia just as they do within academia. Therefore, it is difficult to conceptualize the relation between academic and extra-academic archaeology (cf. paragraphs about local variations in the relation between academic and DL archaeology in "Swedish development-led archaeology", Chapter 2). Moreover, practitioners collaborate across and transcend boundaries between academia and other knowledge making institutions. Some practitioners make this transition several times during their career. An archaeologist can for example start out in DL archaeology, return to academia for Ph.D. research, and then re-enter DL archaeology. Other practitioners make the transition between academia and other knowledge making institutions daily. Transitions can for example occur when a DL archaeologist engage in article writing in collaboration with academic archaeologists. Furthermore, and not to overlook, in certain situations it can even be sensitive to make a distinction between academic and extra-academic archaeology. Some articulate and discuss challenges connected to institutional and organizational differences between academic and extra-academic archaeology (e.g. Kristiansen, 1998; Lucas, 2001b). Others, like an experienced archaeologist reacting to my dissertation work in an e-mail, stress that the division is a too far reaching simplification (e.g. Börjesson & N.N., 2015).

I do by highlighting extra-academic archaeology as an institution different from that of academic archaeology run the risk of re-stating the difference. The distinction I make between academic and extra-academic archaeology is justified partly by the high frequency of DL archaeology in relation to

archaeology as a whole (cf. "Swedish development-led archaeology" in Chapter 2). The distinction is also partly justified by the purpose of the analysis, to direct attention to scholarly documentation undertaken and communicated from positions outside academia. I argue that this distinction is important to make in order to enable comparisons to other extra-academic institutions where research is carried out. Examples of such institutions close to DL archaeology are museums and government bodies in the heritage sector. However, it is important to remember that this distinction articulates the character of extra-academic research as institutionally and organizationally set apart from academic research documentation. Thus, the distinction downplays features unifying research within and outside universities.

Thirdly the limitation to report writing inhibits too far-reaching conclusions about contexts for extra-academic research. Report writing is one form of documentation in archaeological extra-academic research. Many other documentation genres (in archaeology for example field documentation, heritage registry forms, ancillary documentation included in the archiving process, public communication, journal articles, monographs, etcetera), and aspects such as funding, management, professional identities and ethics, review procedures, etcetera, form contexts for research and scholarly documentation.

Fourthly, for those reading this dissertation with particular interest in archaeological documentation I want to emphasize that although DL archaeology is a major form of archaeology, it is but one among others (e.g. academic research investigations, museum initiated investigations, and heritage preservation investigation for curatorial purposes). The results are thus valid for DL archaeology but not for archaeology in general. Further, the empirical limitation to *Swedish* DL archaeology at the first half of the 2010s entails a focus on a semi-regulated form of DL archaeology and on scholarly documentation in PSOs. DL archaeology or corresponding activities in other countries differ from Swedish DL archaeology, for example in that it is more regulated like in France, or less regulated like in the UK (Carver, 2009). Also, as Swedish DL archaeology has gone through significant changes over time (cf. "Swedish development-led archaeology" in Chapter 2), the results are valid for the time frame which the material covers.

Author contributions

I am the sole author of Paper II-IV (Börjesson, 2015, 2016a, 2016b). Paper I is co-authored with Bodil Petersson (BP) and Isto Huvila (IH), a collaboration carried out within the ARKDIS project. I designed the study. I, BP, and IH collected, analyzed, and wrote about the material. Each had the

main responsibility for different sections of the analysis.[26] I wrote the introduction (section 1 and 2) and the concluding discussion (section 5) with input from BP and IH, and had the primary responsibility for the final content. All authors read and approved the final manuscript.

Archiving

Paper	Access to research data	Access to paper
I	Data for the sections on national level and DL archaeology available in DiVA[27]	Open access through the journal Internet Archaeology's web page[28]
II	Data available in DiVA[29]	Open access to post-print in DiVA[30]
III	Data available in DiVA[31]	Open access to post-print in DiVA[32]
IV	Interview transcripts and coding sheets stored at the department of ALM, Uppsala University	Open access through ASIS&T Proceeding's web page[33]

Table 4. Overview of access to research data and papers

The research data for Papers I-III (Börjesson, 2015, 2016a; Börjesson et al., 2015) are treated in accordance with the principle of public access to official documents as stated in Uppsala University Archive's archival manual (Universitetsarkivet, 2009) and the Swedish Research Councils' suggestions for forthcoming national guidelines for open access to research information (Vetenskapsrådet, 2015). The interview material for Paper IV (Börjesson, 2016b) is stored at the department and available for reviewers upon request. The papers are, as far as possible with regards to copyright, archived in Uppsala University's institutional repository Digitala Vetenskapliga Arkivet (DiVA).

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[26] Division of main responsibility for different sections: 3-3.2 (LB), 3.3 (BP), section 4-4.2 (LB), 4.3 (IH).
[27] urn:nbn:se:uu:diva-303764
[28] http://dx.doi.org/10.11141/ia.40.4
[29] urn:nbn:se:uu:diva-277192
[30] urn:nbn:se:uu:diva-277190
[31] urn:nbn:se:uu:diva-306124
[32] urn:nbn:se:uu:diva-246514
[33] https://www.asist.org/files/meetings/am16/proceedings/openpage16.html

6. Paper summaries

To fulfill the dissertation's aim, to further the understanding of how the distribution of research duties to PSOs affects scholarly documentation in Swedish archaeology, I have conducted four studies. The first study concerns information policy in archaeology, the second documentation ideals. The third concentrates on practitioners' frames of references and the fourth on how practitioners draw on these resources (policy, ideals, and frames of references) in report writing. The four studies together form an analysis of contexts for report writing.

Each of the studies is published in a paper. In the following I summarize the four papers. The summaries explicate how each study contributes to the overall aim and how the studies complement one another. I emphasize paper content responding to the dissertations' research questions (cf. "Aim and research questions", Chapter 1). Content outside of this scope may therefore be downplayed or omitted in the following summaries.

The linearity in the presentation, from policy via ideals and frames of references to resources in report writing, should be understood as a pragmatic way to present the studies rather than as reflecting a theoretical assumption about causality, e.g. between policy and everyday work. Policy, ideals, and frames of references are each studied as resources for report writing with no further assumptions about possible relations between these resources. The summaries make up the foundation for the discussion (in Chapter 7) of the resources for report writing in DL archaeology.

Paper I. Information policy for (digital) information in archaeology: current state and suggestions for development[34]

This paper concerns formal regulations of information practices and documentation produced as part of archaeology. One section of the paper specifically addresses the questions: how do authorities, through information policy (a regulative resource) in legislation, regulations, and guidelines,

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[34] Written by Lisa Börjesson, Bodil Petersson, and Isto Huvila (for author contributions, see "Author contributions", Chapter 5).

attempt to direct DL archaeology report writing? The background of the study is recent decades' substantial changes in archaeological documentation and the parallel development of the DL archaeology market. While standards and so called 'best practice' are discussed relatively often in archaeology, the information policy perspective has largely been omitted.

With the *information policy* concept (Braman, 2006) as analytical lens the paper presents a study of contemporary information policy in Swedish archaeology. For the interpretation of the state of the general policies for archaeology and related areas we analyze the heritage conservation legislation (Kulturmiljölag (1988:950), n.d.), the Ordinance (2007:1184) with instructions for the Swedish National Heritage Board (Regeringskansliet, 2007), and the memorandum 'Digital Heritage - A national strategy for work on digitization, digital preservation and digital access to cultural heritage materials and cultural heritage information' for 2012-2015 (Regeringskansliet, 2011). For the analysis of information policy for DL archaeology we also include the Guidelines for implementation of the Heritage Conservation Act: Contract archaeology (2nd chapter, 10-13 §§) (Riksantikvarieämbetet, 2012a).[35] Based on an analysis of overarching policies for archaeology and on an analysis of policy specific to two areas in or related to archaeology, DL archaeology and the museum sector, the paper compares the Swedish situation to that of other countries. In the paper we also discuss the implications of current policy for knowledge making and present recommendations for information policy development.

The analysis highlights both international variations between information policy for archaeology and national variations between areas in or related to archaeology. In an international comparative perspective Swedish policy is unique in the sense that DL archaeology documentation according to the policy should serve multiple purposes (as a basis for government decisions, as a basis for further research, and as education of the public). In a national perspective, comparing information policy for DL archaeology and the museum sector, DL archaeology interactions with information are significantly more regulated by legislation, formal regulations, and guidelines.

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[35] The titles of all of these documents were translated to English for the purpose of the paper. These policy documents have, since the paper was written, been replaced by a new heritage preservation legislation and a new ordinance for the Swedish NHB, both coming into force January 1, 2014 (Kulturmiljölag (1988:950), n.d.; Regeringskansliet, 2007). The National Heritage Board has revised its regulations and general advice about DL archaeology (Riksantikvarieämbetet, 2015a), and issued reworked and extended guidelines for reporting, dissemination, and archaeological documentation material (Riksantikvarieämbetet, 2015b). As the emphasis in the dissertation's concluding discussion is on how practitioners draw on the regulative resource and how this insight can support our understandings of reports (rather than on the policy content), I will not expand on how the policies have change. For an analysis of the policy changes see (Börjesson & Huvila, forthcoming).

The guidelines for DL archaeology contain policy statements concerning creation, dissemination, and preservation of documentation. Reports are the focal point of the regulations. The guidelines are issued to improve competition and focuses on the creation and dissemination, in the sense of delivery, of documentation, rather than on the preservation thereof. The guidelines state broad formulations of target groups: it directly mentions the general category 'stakeholders' and further indirectly refers to researchers searching for survey data and undertaking synthesizing analyses. The guidelines also operate on a meta-level, directing planning for and evaluation of documentation. CABs are described as the actor overseeing documentation quality. However, DL archaeology contractors are given a significant responsibility over planning and the iterative evaluation of documentation work. The control of documentation is thus allocated to the CABs and the practitioners while researchers are thought of as the foremost users of the documentation. The allocation of control over documentation to a different institution than where most of the assumed users (the researchers) work raise the question: How will this distribution of control affect how well the documentation meet the users' preferences?

The guideline text for DL archaeology documentation contains a mix of practical suggestions, reminders of legal requirements, and encouragements to use best practice. The encouragements are imprecise with regards to which actions that are expected from the DL archaeology practitioners. Instead the encouragements request, for example, that practitioners use the best materials and methods. My interpretation of these kind of imprecise encouragements is that the guideline originators call on the DL archaeology practitioners' professional judgement. These policy statements in the form of encouragements may entail challenges in practice since the DL archaeology practitioners work in organizations dependent on income from the DL archaeology market. They do presumably have to define best practice within relatively set budgets in comparison to practitioners being part of larger organization like museums or government departments.

The analysis of information policy offers insight into the regulative resource for DL archaeology report writing. The results provide a picture of policy statements practitioners could draw on, like the formulations of purpose of, target groups of, and responsibility for control of report writing. The analysis also highlights policy content which could cause challenges for report writing practitioners (e.g. the encouragement to use best practice) and impact the character of the reports (e.g. the allocation of responsibility for quality). How practitioners draw on information policies in report writing is studied in Paper IV.

Paper II. Beyond information policy: conflicting documentation ideals in extra-academic knowledge making practices

DL archaeology information policy (as analyzed in Paper I) express formal ideals for documentation. Parallel to these formal ideals persons in more or less influential position express how documentation should be done. These documentation ideals are often more contemporary and, I assume, thereby closer to the practitioners doing documentation than formal polices are. Paper II therefore addresses the question: which ideals (an institutional resource) for DL archaeology documentation do experienced professionals express?

I take the multitude of ideals concerning archaeological documentation as the starting point and analyze the situation in DL archaeology. The study presents an analysis of a debate in a Swedish archaeology research journal. Three senior advisors at the Swedish NHB are the authors of the main debate text. Five other authors respond to the main piece. One of the responding authors is Norwegian, two are French (co-authoring one text), and the remaining three are Swedes. Each write from their perspective but all respond to the main text which analyzes and discusses the Swedish situation. Therefore, albeit three authors are not active in Sweden, the analysis primarily concerns Swedish DL archaeology.

The theoretical framework draws on the STS controversy studies tradition to identify both ideals expressed in the debate and the range of interpretative flexibility in the debate (Pinch & Bijker, 1984; Sismondo, 2010). The analysis identifies three documentation ideals: *documentation as scientific*, *documentation as scientific but context-dependent* (dependent on the DL archaeology context), and *documentation as educational for society*. The first ideal frames documentation as dependent on a scientific approach and scientific methods, including scientific methods for critique and evaluation, and documentation as means for communication with peer researchers. The second ideal frames documentation as partly scientific but also as dependent on the context of DL archaeology. Proponents of this ideal refer to formal policy for definitions of scientific quality and rely on government agencies to monitor documentation quality. The third ideal depicts documentation as means for education of the public. Advocates of this ideal focus on the documentation as a product and its impact, rather than on approaches and methods in the creation of documentation.

In addition to the three ideals two means to reach documentation ideals emerged in the analysis: *documentation management* and *documentation governance*. The former emphasizes active management of documentation through regulations, guidelines, contracts, and quality control. The latter pictures DL archaeology documentation as qualitatively unique and

dependent on that practitioners balance scientific ideals with benefit for society. Quality is pictured as achieved by government authorities' continuous governance rather than by control systems.

The result about the three documentation ideals and the two means to reach these ideals add to the outcomes of the policy analysis. Through the analysis of ideals I can distinguish three different opinions about target groups compared to the broad and indirect descriptions of target groups in the policy texts. Also, and particularly interesting from this dissertation's perspective on DL archaeology as extra-academic research, the *scientific but context-dependent* documentation ideal corresponds with how control over planning for and evaluation of documentation are allocated by policy texts. I argue that the *scientific but context-dependent* documentation ideal serve as an ideological ground and justification for assigning the task to oversee DL archaeology reports' scientific quality to extra-academic institutions.

Paper III. Grey literature – grey sources? Nuancing the view on professional documentation. The case of Swedish archaeology

This study adds to the analyses of policy makers' statements and experienced professionals' ideals through an investigation of report authors' frames of references. The frames of references surface as the results of an analysis of patterns in report authors' information source uses. I treat report authors' frames of references as one entry point for understanding reports from the perspective of the contexts in which they are written. The paper answers the question: how do practitioners in DL archaeology use the infrastructural resource information sources in their report writing?

By means of a bibliometric analysis (Leydesdorff, 1989; Tague-Sutcliffe, 1992) the paper maps DL archaeology practitioners' information source use in reports. Parameters such as source originator, source age, source type, source format, and source language are analyzed. Additionally, the report authors' organizational affiliations, and the relation between the report authors and the source items' authors or publishers, are analyzed. The tool used to analyze source references is frequency distribution analysis. Multiple correspondence analysis and cluster analysis were used to explore source reference patterns. The former reveals latent correspondences between categories in the data set. These results are visualized through a two-dimensional map showing concentrations and scatters (Hair et al., 2010). A cluster analysis tests the strength of the correspondences in each concentration of categories and thus aids analytical distinctions between groups of categories.

The analysis[36] provides insight into the average number of sources and the most common types of sources referred to in DL archaeology reports: archaeological reports, professional literature, and maps. Reports from the 1980 to the present is the most common source type. Sources from the same country as the report author are by far more common than sources from other countries. The correspondence and cluster analyses reveal three source use patterns: an *administrative* pattern, a *professional/academic* pattern, and a *map* pattern. The administrative pattern includes foundations and member associations, government agencies, later sources (from the 1980s to present), administrative and other non-scholarly documents, archaeology reports, and sources from the same organization as the report author. The professional/academic pattern includes incorporated businesses and sole proprietorships, earlier sources, academic literature from Sweden and other countries, and professional literature from Sweden and other countries. The map pattern includes references to maps. The administrative and professional/academic source use patterns indicate that there is a variation between different report authors' frames of references which is relevant to incorporate in descriptions of Swedish DL archaeology reports.

The results presented in Paper III complements the analysis of information policy and documentation ideals for DL archaeology reports by indicating prominent frames of references in report writing. The study adds depth to the results from the first two papers in two ways. Firstly, by showing that administrative sources are significant to report authors. My interpretation of this result is that it is important for report authors to show how their reports relate to administrative documents and other reports. This source use indicates the presence of a kind of administrative quality demonstrated by the references to administrative sources, besides the scientific quality emphasized in the information policy and documentation ideals. Secondly the professional/academic pattern indicate that the professional and academic sources tend to be combined in reports. I interpret this source use as corresponding to and enabled by the documentation as *scientific but context-dependent* ideal. The combination of academic and professional sources is possible because report authors' view the combination as contributing to a quality which is similar to that promoted by the *scientific but context-dependent* ideal that emerged in Paper II.

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[36] All of the results presented in this paragraph are illustrated with tables and figures in Paper III (Börjesson, 2015), see the second part of the dissertation.

Paper IV. Research outside academia? - An analysis of resources in extra-academic report-writing practices

The fourth paper answers the question: how do practitioners in DL archaeology draw on the regulative, institutional, and infrastructural resources in their everyday report writing? By doing so the fourth paper reflects back on the resources analyzed in the first three papers, and presents an analysis of how practitioners draw on all of these in their report writing.

The material is 70-90-minute-long, semi-structured interviews with six practitioners in Swedish DL archaeology firms and field notes about the contact with the informants prior to and after the interviews. Theoretical criteria guided the sampling of informants: all hold a licentiate degree (two-year post-master's-level degree) or a Ph.D. degree in archaeology, all work in commercial companies (as opposed to in foundations, member associations, or at government departments), and all have been actively involved in fieldwork and written multiple reports during the last five years. These criteria aimed at locating practitioners trained in academic research but active outside academia (the commercial firms are the organizational form furthest adapted to the marketization of development-led archaeology compared to foundations and member associations).

I chose interviews as a method to access practitioners' narratives about report writing while at the same time learning about their professional backgrounds and identities, as well as about the organizational settings in which they work (Denscombe, 2009). In the analysis a summarizing transcription of the interviews was followed by a descriptive paraphrasing and coding. The coding was undertaken in two steps: an initial coding to identify passages concerning practitioners' professional biographies, the organizations within which they work, and different conditions for report writing (cf. a grounded theory approach Charmaz, 2010; Meuser & Nagel, 2009). The second step was coding of the practice-theory-inspired resource categories (Cox, 2012; Pickering, 1992). I used the three categories *regulatory*, *institutional*, and *infrastructural* from the first three studies to identify resources. I did however code all of the instances where practitioners draw on regulatory, institutional, and infrastructural resources, not only those corresponding to the results from study I-III. As a result, I could identify regulative resources, ideals, and frames of references in everyday report writing other than those appearing in formal policy, experienced practitioners' documentation ideals, and frames of references identified through the bibliographic analysis.

The analysis shows that the practitioners draw on regulative resources in an indirect way. They largely leave policy interpretation to the personnel at the regional authorities. The practitioners follow the regional authorities' directives by adapting their report templates, and by copy-pasting already accepted text passages between documents. The daily work is thus more

structured through intermediate documents like tender specifications than by the original information policy statements.

For the institutional resource documentation ideals, practitioners show both consensus and diverging views. There is a general consensus on which parts a report should contain and that easy navigation is an important value. Level of detail and target group contrarily divide the groups of informants. Notably, two target group emphasized by the majority of the practitioners in this study, but not as apparent in the policy texts or the documentation ideals analysis, is peer practitioners and the regional authorities.

Concerning the infrastructural resource information sources the practitioners rely heavily on their previous knowledge of the geographical area and on personal contacts, rather than on sources accessed through searching in databases and repositories. In cases when formal library and archival resources are used these are often approached through googling. A gap between desired and available scholarly sources leads to alternative paths of access to these sources.

The results on how practitioners draw on the regulative, institutional, and infrastructural resources give a picture of documentation contexts in Swedish DL archaeology. The contexts are characterized by mediated information policy, a certain interpretative flexibility with regards to documentation ideals, and frames of references built on previous knowledge of geographical area and on personal contacts. These are the contexts in which DL archaeology practitioners do documentation work and make knowledge under the auspices of "science" (Kulturmiljölag (1988:950), n.d.; Riksantikvarieämbetet, 2015a, 2015b).

In the discussion in Paper IV I investigate how the results contribute to IS with insights into extra-academic information practices. Furthermore, I present six suggestions based on the findings aiming at supporting report users' readings and uses of reports. The suggestions can also be read from the librarians' and archivists' perspectives and be used for information policy development. The main take-away for the purpose of the dissertation is the analysis of how practitioners' draw on resources, and the discussion of how these results open up for further questions about the information related premises for research in DL archaeology particularly and outside academia in general.

7. Concluding discussion

In this concluding discussion I first answer the research question encompassing Papers I-III: what characterizes the resources for Swedish DL archaeology report writing, with particular focus on regulative, institutional, and infrastructural resources? In the following section I respond to the second research question: how do DL archaeology practitioners draw on these resources in their everyday report writing? In the third section I return to the research problem concerning the resources for scholarly documentation in Swedish DL archaeology, and to the underlying expressed problem: that results produced by DL archaeology practitioners may receive little or no attention if presented in reports. I interpret the documentation contexts emerging in Paper IV in the light of the distribution of archaeological research duties to PSOs, and discuss how this understanding can contribute towards alleviating the expressed report problem. In the fourth section I summarize the dissertation's contribution to archaeological documentation research, as well as topical, conceptual, and theoretical contribution to IS research. I also reflect back on the theoretical approach, and outline questions for further research.

Resources for report writing

Regulative resources are one of the means by which institutions are governed. For Swedish DL archaeology, the regulative resources have been affected by the adaption of DL archaeology to market principles. As Swedish DL archaeology has been structured more like a market, the state is no longer the major executive organization and has thereby lost parts of its direct influence. As I and my co-authors argue in Paper IV (2015), state issued information policy has become one of the tools, in place of the direct involvement, for the state to govern the research and documentation done by Swedish DL archaeology PSOs. This role of the information policy is visible in that the policy (at the time of analysis) is focused on *creation* and *delivery* of documentation from DL archaeology organizations to state controlled repositories. Knowledge making is framed as a service to be delivered. Documentation, adapted to formal requirements and tailored to target groups and archives, is portrayed as the vehicle for knowledge delivery.

The state issued information policy did at the time of the analysis foreground quality and evaluation of the service, i.e. the report, rather than the principled aims of the DL archaeology institution as part of a wider research discipline (Börjesson et al., 2015). Based on this I argue that the policy intends to limit practitioners' leeway in research and documentation. Whatever practitioners do needs to fit into the stipulated document forms, and needs to meet document quality criteria established in information policy. Speaking in terms of sociology of professions, the information policy confines professionals' discretionary work, i.e. their flexibility to make independent decision based on their professional knowledge (Braman, 2006; Evetts, 2010; Sundin & Hedman, 2005; von Nordenflycht, 2010), to take place within the document delivery process. In the policy's framing, Swedish DL archaeology practitioners become *knowledge-service providers*. They trade in knowledge products, like practitioners in many other learning-and-researching organizations outside academia (Nowotny et al., 2001). In the knowledge-service delivery process, the function of reports as deliverables is accentuated. Thus, our results suggest that the function of reports for and in market transactions may overshadow role of reports for communication of results.

However, limitations of practitioners' leeway in documentation work may well be needed in service relations, for example due to economic reasons as in DL archaeology. The Swedish cultural heritage legislation instils that DL archaeology undertakings should be carried out, at the land owners' expense, to a cost that should not exceed what is "reasonable with regards to the circumstances" (Kulturmiljölag (1988:950), n.d., § 11, my translation). What a reasonable cost amounts to is up to the CABs and the competing DL archaeology organizations to negotiate in procurement processes.

In a wider perspective, the development in Swedish DL archaeology towards more extensive governance of documentation by policy mirrors the more widespread new public management trend in state governance (Christensen & Lægreid, 2001). A characteristic making the governance-by-policy relation particular in the case of DL archaeology is that the objects of the governance are the intertwined aspects of knowledge making and scholarly documentation. This way of governing extra-academic research may appear as a neutral and necessary premise to enable competition and efficiency at the Swedish DL archaeology research service market (cf. Riksantikvarieämbetet, 2014). However, the governance of research through information policy is de facto research politics. Since a significant part of the scholarly documentation is produced within the realms of the service market, the information policy in the heritage legislation and in the regulations has downstream effects on how the archaeology discipline's body of scholarly documentation is composed. Thus, in extension the information policy of the research service market affects the knowledge production system (cf. Nowotny et al., 2001). An alternative research political positioning would be

to use the the information policy in the heritage legislation and in the regulations to, for example, encourage approaches aligned with long-term research programs, demand peer review in extra-academic research, support academic-DL archaeology collaborations, and expand the leeway for professional decision making with regards to how each undertaking is reported.

If we turn to the institutional resource documentation ideals, the DL archaeology institution is surrounded both by those relatively extensive ideals formalized in the information policy, and by informal ideals expressed by authorities and practitioners in or close to the DL archaeology institution. In the case of DL archaeology this study reveals three ideals, each imposing slightly different demands on how documentation should be done and to whom it should be directed. The one ideal appearing as most distinctively different from the other two is the ideal for documentation to be *educational for society*. The *educational for society* ideal alludes to utility. According to this ideal DL archaeology documentation should be immediately useful for the state's education of the general public (Börjesson, 2016a; cf. Nowotny et al., 2001).

The two other ideals are more closely related as they both allude to scientificness. Yet they differ substantially in the approach to the idea of science. The *scientific* ideal on the one hand largely corresponds to a conventional conception of what scholarly documentation should be like and to whom it should be directed. The documentation should be scientific with regards to description of research objective, questions, methods, and finds, and it should be directed to the research community. The *scientific* ideal is at large consistent with what has been described as a Mode 1 setting for knowledge making (Gibbons et al., 1994; Nowotny et al., 2001).

The *scientific but context-dependent* ideal on the other hand is particularly interesting when we view DL archaeology as extra-academic research. As this ideal appeals to the uniqueness of the situation in which the research and documentation is undertaken, it stands for a different idea (nota bene, with support in the policy of the time, cf. Börjesson et al., 2015) of how research can be governed and of how knowledge can come into being. Proponents of the *scientific but context-dependent* documentation ideal do, so to say, suggest an alternative script for how research should be done (cf. Pickering, 1995). This alternative script is characterised by a different set of roles, with other responsibilities, than those in the conventional, Mode 1 script for research within university structures (cf. Gibbons et al., 1994). In Swedish DL archaeology the researchers are PSO employees, not university based. Science and scientific quality is defined by policy documents rather than by the academic community through interactions such as seminars and peer

review.[37] In the case of Swedish DL archaeology one may argue that science and scientific quality is mentioned but not elaborately defined in the policy. I do from my perspective contrarily view the opaque definitions of science and scientific quality as indications of how science and scientific quality are framed in the policy. Within the policy text the meaning of "science" and "scientific quality" appear as self-explanatory. The policy does not take the multiple meanings of science that flourish among the documentation ideals into account (Börjesson, 2016a). Further, authority to control research is allocated to government authorities, instead of to authorities in the academic community (Börjesson, 2016a). In sum, the *scientific but context-dependent* ideal can be viewed as a version of a Mode 2 setting for knowledge making (Hessels & van Lente, 2008; Nowotny et al., 2001). I cannot say how influential the *scientific but context-dependent* ideal is on the discipline. Yet, because of the quantitative significance of DL archaeology in the archaeology discipline, it is reasonable to assume that the *scientific but context-dependent* ideal contributes to, with support in information policy, shifting perceptions of where, i.e. in which institutions, archaeology research can take place and which the pre-requisites are for knowledge making (cf. Nowotny et al., 2001; Pinch & Bijker, 1984).

With regards to the infrastructural resource, information sources, Swedish DL archaeology practitioners in general gravitate toward using reports, sources from the 1980s' and on, and sources from the country where the DL archaeology undertaking was carried out. When the data on source use was tested in a correspondence and cluster analysis, the two patterns *administrative source use* and the combined *professional/academic source use* emerged. These source use patterns indicate, on a level closer to the actual report writing than policy and ideals, how important it is for practitioners in DL archaeology to use, and to show that they use by listing as references, administrative documents, other extra-academic documents related to DL archaeology, and professional literature, in addition to academic literature (Börjesson, 2015). The *administrative source use* and the *professional/academic source use* patterns, and the frames of references which these patterns point to, instil my interpretation that the resources for report writing potentially enable contexts for scholarly documentation specific to Swedish DL archaeology.

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[37] I do not assume that activities like academic peer review guarantee higher quality. However, I argue that peer review makes way for a different understanding of research quality, than research quality assessments made by government authorities, like those that CABs do in Swedish DL archaeology.

Development-led archaeology documentation contexts

To summarize the analysed resources, they enable documentation contexts particular to Swedish DL archaeology. The *regulative* resource information policy is formed to ensure document delivery on the knowledge service market (Börjesson et al., 2015). The *institutional* resource documentation ideals sanctions conceptualizations of scientific quality adjusted to the extra-academic institution and thereby, in extension, supports an emerging alternative organization of research through PSOs (Börjesson, 2016a). The analysis of the *infrastructural* resource information sources exhibits source use patterns which likely are specific to Swedish DL archaeology (Börjesson, 2015). Probing into how practitioners draw on these resources in their everyday report writing clarifies how the resources influence documentation work (cf. Pickering, 1992).

The results from Paper IV (Börjesson, 2016b) indicate that practitioners adhere to a greater degree to concrete demands formulated by the regional authorities in tender specifications, than to demands expressed in policies. The analysis does not provide evidence of any overt resistance to policy texts, but rather that the policy texts do not have a salient role in everyday documentation. This result partly corresponds with von Nordenflycht description that practitioners in PSFs prefer autonomy over external regulations (von Nordenflycht, 2010). The preference for autonomy follows, according to von Nordenflycht, from the particular type of knowledge base characterizing professionalized workforces. Yet, the autonomy is limited for Swedish DL archaeology practitioners. They still need to follow the CABs' demands in order to ensure their survival on the service market. The DL archaeology organizations' dependence on the CABs' policy interpretations thus strengthens the role of the regional authorities' policy interpretations in comparison the DL archaeology practitioners' own readings and interpretations of the national policy.

Nevertheless, the actual control over documentation is de facto largely allocated to report writing practitioners. They are the ones planning for, and doing the iterative follow-up of the planning for, report writing. Regional authorities appear, from the perspective of DL archaeology practitioners, to do but minor interventions. These results on how practitioners draw on information policy for documentation suggest that further investigations and measures to develop documentation should target how documentation is negotiated in the relation between regional authorities and practitioners.

With regards to documentation ideals, the ideals expressed by the interviewed DL archaeology practitioners differ from those expressed in the debate analysed for Paper II (Börjesson, 2016a). The interviewees working with report writing and using reports on a regular basis equated report quality with utility. Reports should be complete, easy to navigate, and results should be easily deciphered. The emphasis on utility corresponds with

general descriptions of Mode 2 settings for knowledge making (Hessels & van Lente, 2008; Nowotny et al., 2001). The focus of utility can also be understood as an indication of the hybridity of the DL archaeology setting for documentation (cf. Gulbrandsen, 2011). The preference for utility can be interpreted as a sign that values from heritage administration influence the DL archaeology practitioners' ideals. Yet, the idea of how results become easily accessed differ. While some practitioners prefer extensive accounts, others favour concise representations of data. The meta-perspective of how to achieve scientificness seems largely tacit. Ideas of scientific quality surface as a concern only when practitioners work outside their areas of expertise.

In the analysis of information source use, previous knowledge of the geographical area, personal contacts, and the habit of copying references from related documents, appear as pillars of the interviewed Swedish DL archaeology practitioners' frames of references. Formal information search is a secondary option. Formal information search does not in and by itself guarantee scientificness. However, when practitioners opt out of searches they would have liked to perform because they perceive themselves not to be paid to conduct the searches once the fieldwork is completed, I argue that the lack of formal information searches can impinge research quality.

Based on these results, documents containing information policy are important texts to go to in order to the read the Swedish state's intentions for the regulated research activities, and to analyze which forms of documentation that are connected to research activities (cf. Fleck, 1981). However, the analysis of how report writing practitioners draw on regulative, institutional, and infrastructural resources offers a modifying perspective on the resources analysed in Papers I-III (Börjesson, 2015, 2016a; Börjesson et al., 2015). Paper IV (Börjesson, 2016b) instills the need to read policy with one eye and keep the other on how practitioners draw on resources.

In sum, based on Paper IV (Börjesson, 2016b) I can conclude that DL archaeology practitioners draw on information directives issued by regional authorities rather than on nationwide information policy. The foremost ideal is that the report should be useful for DL archaeology practitioners' immediate peers and for the regional authorities. It would not be correct to say that scientificness does not matter, but scientificness is not at the forefront in daily report writing. The principle frame of reference is that consisting of prior knowledge of the geographical area, personal contacts, and sources used in related documents. In the following, I return to the research problem and the underlying expressed problem to discuss how the understanding of DL archaeology report writing contexts put forth in this dissertation may alleviate the expressed problem with lacking attention to results presented in reports.

Documentation contexts in one case of extra-academic research

The practical problem spurring my research interest is the Swedish NHB's concern that DL archaeology results may receive little or no attention if presented in reports (cf. "The report problem" in Chapter 1). I problematize the premises for the practical problem and put it in the perspective of the distribution and governance of research and scholarly documentation in today's society (Finnegan, 2005a; Nowotny et al., 2001). From this perspective I encircle the research problem concerning the resources for scholarly documentation in Swedish DL archaeology, an example of research outside academia. Through Papers I-III (Börjesson, 2015, 2016a; Börjesson et al., 2015) I analyze resources for report writing. In Paper IV (Börjesson, 2016b) I analyze how practitioners draw on resources and consequently how contexts for report writing take form. In this section I interpret the documentation contexts in the light of the distribution of archaeological research duties to PSOs. I discuss how this understanding, by highlighting the governance of research in the archaeology discipline, enables a redefinition of the expressed problem. I argue that the redefinition in extension can be employed to reduce the problem.

Much extra-academic research is initiated and set up more or less independently of the state, like corporate and industrial research (Nowotny et al., 2001). Yet, when a state requests and regulates research like in the case of Swedish DL archaeology, the state significantly influences the structure of the research discipline by mandating a certain research institution, special types of research organizations, and specific forms of scholarly documentation. In Swedish DL archaeology, the institution is governed to become a significantly different institution compared to the academic archaeology institution. The Swedish DL archaeology institution consists of different types of organizations, funded and led in a different way, than those in academic archaeology. Rather than being government research departments or independent research organizations, Swedish DL archaeology PSOs are an amalgamation of these previously distinguished settings for research (Nowotny et al., 2001). They are neither run by the government, nor would they exist if the government had not constructed the DL archaeology market. They are designed to solve problems defined by the state in consonance with heritage stakeholders (e.g. municipalities, heritage societies), but to do so as independent research service delivering organizations in the sense that they carry their own costs. The fact that they carry their own costs influence how the employed practitioners negotiate research ambitions in documentation, as is illustrated in Paper IV (Börjesson, 2016b). The emergence of PSOs has led to a distance between the state and Swedish DL archaeology knowledge making. Still, the non-governmental organizations at the DL archaeology market are dependent on

directives from state. Thus, albeit the distance, the Swedish government largely retain control over DL archaeology knowledge making (cf. Gibbons et al., 1994; Hessels & van Lente, 2008; Nowotny et al., 2001).

Of course, there is always the option to question if undertakings with the Swedish DL archaeology premises really qualifies as research. Since DL archaeology is directed to create knowledge through work of good scientific quality (cf. "Scholarly documentation in extra-academic archaeology" in Chapter 1) I argue that it is reasonable to view it as a kind of research. However, the results from the analysis of documentation resources and contexts underline that the PSO market makes way for a specific kind of research and scholarly documentation.

While the Swedish DL archaeology institution share the basic epistemic goal, to make knowledge about the past, with its academic counterpart the institution is also occupied with fulfilling institutional goals. DL archaeology practitioners primarily make knowledge geared toward use in decision-making about alterations of physical environments (cf. Gibbons et al., 1994; Hessels & van Lente, 2008; Nowotny et al., 2001). Document-wise, practitioners largely direct the documentation to peer DL archaeology practitioners and to the regional authority personnel. The focus on peer DL archaeology practitioners and on the regional authority personnel is an indication of which professionals that make up the esoteric circle of the DL archaeology institution (Fleck, 1981). Furthermore, practitioners conduct their documentation work in a mesh of documents. References to other reports and professional literature (Börjesson, 2015), copy-pasting of text passages and references from other reports (Börjesson, 2016b) make up threads of the mesh. The document mesh fulfills a purpose for those in esoteric position in the institution as I demonstrate in Paper IV (Börjesson, 2016b). The referencing to other reports and the copy-pasting has practical, time-saving reasons, but does also weaves meaning. Each single report document becomes meaningful through and by its links to other documents (cf. Frohmann, 2004a, 2004b). These links probably amplifies the meaning of the document for target groups in esoteric positions in the DL archaeology institutions, but likely has little relevance to those in exoteric positions like academic researchers or the general public (cf. Fleck, 1981).

Moreover, the introduction of PSOs in archaeology entails that extra-academic practitioners engaged in research no longer necessarily seek to belong to the same community as academic researchers, e.g. by visiting academic research seminars, collaborating with academic researchers, publishing in academic journals. Instead, PSO staff communities and expert networks, collaborations with personnel directly involved in the DL archaeology undertakings, and communication through reports and professional and popular channels are prioritized tasks (Börjesson, 2016b). In place of the academic community, the PSO community has thus emerged as an alternative research community. The DL archaeology PSO community

becomes visible through DL archaeologists' frames of references (Börjesson, 2015, 2016b). This DL archaeology community likely becomes a place where professional identities and priorities can take shape (cf. Evetts, 2010; Sundin & Hedman, 2005; von Nordenflycht, 2010). Thus, a consequence of the above described organization of DL archaeology is that the number of centers for research communities in the discipline multiplies. In other words, we see a multiplication of esoteric circles in the discipline, where boundaries between science and non-science, and between good and bad science, are negotiated (cf. Fleck, 1981; Nowotny et al., 2001). In Swedish DL archeology we see this in the development reflected in DL archaeology specific conceptions of scientific quality and views on how to control scientific quality (Paper II, cf. Nowotny et al., 2001; von Nordenflycht, 2010).[38] Thus, a significant ramification of the introduction of PSOs for the archaeology discipline as a whole is the reconfiguration of what scholarly documentation entails.

A concern that has been raised previously in archaeology (e.g. Seymour, 2010b), and which reflects a more widespread concern (Nowotny et al., 2001, p. 16; cf. Price, 2015), is the worry for compartmentalization of research. The idea is that extra-academic research becomes a sort of data factory[39], whereas the thorough processing and interpretation of data takes place in academic research. This stands in contrast to how I interpret the development in Swedish archaeology. I argue that this study shows an emergence of parallel research processes, each with its unique set of resources. The relation is thus not that of one institution feeding data off the other. Rather, each is engaged in knowledge making according to its own rationale and premises with occasional coinciding interests.

Even though this arrangement may be necessary from practical heritage management point of view – it would be unfeasible to have full scale academic research excavations at every land-development site and to await time consuming journal publications for each result – the partition of DL archaeology and academic research into two different institutions presents the discipline with a challenge with regards to the joint disciplinary knowledge making. Even if the expressed problem with lacking attention to results produced in Swedish DL archaeology is not a consequence of the creation of the research market, the market in its current iteration sustains the expressed problem. The quest of communicating DL archaeology results

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[38] Therefore, DL-archaeology and similar settings are particularly useful as cases to further investigate how conceptions of science, scholarly communication, and scholarly documentation are negotiated and take shape.

[39] Opinions diverge whether DL archaeology being a data factory is a problem or not. In personal communication, an archaeologist has drawn my attention to the fact that while DL archaeology as a data factory sometimes is portrayed as a problem, DL archaeologists do in other cases struggle to make the data they produce visible and available for other researchers to use.

becomes a matter of scholarly communication across boundaries between different knowledge making institutions within the same discipline, i.e. across *intra*disciplinary boundaries.[40]

Previous research demonstrates how archaeology reports function as boundary objects, moderating institutional boundaries (Huvila, 2011, 2016). The problem that results in reports may not receive attention, as expressed by the Swedish NHB, suggests that the function of reports as boundary objects at least in some sense is limited. I argue that my analysis of contexts for scholarly documentation in Swedish DL archaeology PSOs give one plausible explanation to why reports' capacity to bridge perceptual and practical differences between practitioners in different institutions under some circumstances may be limited. Reports shaped by information policy (Börjesson et al., 2015), documentation ideals (Börjesson, 2016a), and frames of references (Börjesson, 2015) in an institution like Swedish DL archaeology may become less open for negotiation for all potential stakeholders. In other words, "good" reports according to the service market principles may become less well functioning for those in exoteric positions (cf. Fleck, 1981) in relation to the service market. Based on this line of reasoning, I would advise against using metaphors such as "bridging the gap" (e.g. Lönn, 2006; Price, 2015) to describe the task of information systems, services, and users for the relation between DL and academic archaeology. As of now, the I argue that the pillars are built too far apart to support a solid span. Instead, based on my perspective and results I suggest that we move the focus and the responsibility away from individual researchers' and practitioners' abilities and efforts to share and appropriate information across the obstacles mounted by institutional differences (cf. Lönn, 2006; Riksantikvarieämbetet, 2015b; Seymour, 2010a, 2010b). For the expressed problem to be reduced it is the organization of research in the archaeology discipline that needs to be changed.

Assuming the goal is to solve the problem of lacking attention to results presented in reports and to improve joint disciplinary knowledge making, then the organization of archaeology research, through heritage policy *and* research policy, should model DL archaeology more in terms of research and less in terms of service production and delivery. A remodeling does not imply revoking the service market. Rather, adopting the perspective that Swedish DL archaeology *is* a service market, and that the practitioners on this market are experts delivering research services, uncover a path of actions on the level of governance of the market. The goal would be to as far as possible align the documentation at the service market with principles for and values in documentation in the academic counterpart. For example, for a

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[40] In further studies, to expand IS awareness about challenges in *intra*disciplinary scholarly communication, the phenomenon can be compared with, and delineated with help from studies of challenges in, *inter*disciplinary scholarly communication (cf. Gullbekk, 2016).

proposal like that DL archaeology practitioners should publish in research journals (Riksantikvarieämbetet, 2015b) to be realized, DL archaeologists need to be incentivized not only to write articles but to take part in the journal production system. Further, we cannot expect there to be publication venues for those not participating in the journal publishing system. DL archaeology tender specifications would need to make room for practitioners to contribute to work in editorial boards, to review articles, etcetera. We cannot expect practitioners in research PSOs to contribute to the journal publishing system on their spare time. It needs to be incentivized as part of professional work on the market. Moreover, the regional governance of DL archaeology should as far as possible be based on academic models for management and control. For documentation this implies that, rather than establishing extensive information policy framing reports as a service to be delivered, report quality should be attained by some version of peer-review, i.e. through negotiations of quality by potential report users.

To conclude, the dissertation furthers the understanding of how the distribution of research duties to PSOs affects scholarly documentation in Swedish archaeology. By demonstrating how the governance of the DL archaeology institution makes way for documentation contexts specific to DL archaeology, and thereby to institution specific understandings of scholarly documentation, I suggest a redefinition of the practical problem that results presented in reports receive little or no attention. Based on my results I argue that the problem with reports not only has to do with the report documents, but also with how research duties are distributed within the discipline. Thereby, I can suggest a partial solution to the expressed problem, to target the organization of research in the discipline and develop the resources for scholarly documentation in the extra-academic institution.

Concluding remarks

In sum, the introduction of a new research institution into a discipline by state governance is not a slight addition to the discipline, but affects the discipline's structure as a whole. The structuring of Swedish DL archaeology, resulting in multiplication of esoteric circles and the following re-configuration of what counts as scholarly documentation, is likely one cause of the lack of attention to results presented in reports. Following from this interpretation, the problem of reports cannot be viewed solely as depending on individuals' attitudes. Rather, the challenge needs to be viewed as an effect of the organization of the discipline. Consequently, the expressed problem of reports should be approached from on the level of organization of research. In this section I summarize the dissertation's contribution to research about archaeological documentation, as well as topical, conceptual, and theoretical contribution to IS research. Moreover, I

reflect back on the theoretical approach and outline questions for further research.

While the theoretical and methodological influences on archaeological documentation have been thoroughly analyzed previously (Lucas, 2012), my study contributes by exploring documentation contexts for report writing practices. My perspective on documentation as a practice (cf. Olsson, 2016), intrinsic to archaeological work (cf. Huvila, 2006) further develops the line of IS contribution to archaeological documentation studies. My explication of DL archaeology as expert work in PSOs on a research service market, and my subsequent focus on resources for scholarly documentation in the extra-academic market setting provides a novel framework for understanding the composition of the body of documentation in the archaeology discipline. The study adds empirical insight into the premises for doing documentation in Swedish DL archaeology. The results give crucial background to studies inquiring into and discussing the character and quality of report literature (e.g. Hodder, 1989; Roth, 2010; Seymour, 2010b). Thus, the results could also inform how report literature is presented in introductions to the archaeology discipline (e.g. Bahn, 2012) and in archaeology literature guides (e.g. Muckle, 2008a). Presentations of report literature should include an introduction to the institution in which it is produced, and to the resources available to practitioners in that institution.

The introduction and combination of terms, particularly *extra-academic research* and *PSO's*, for the purpose of studying research and scholarly documentation taking place in hybrid organization outside academia makes up a conceptual contribution to IS. We can use these terms to account for the complexity of knowledge making systems (cf. Nowotny et al., 2001) when deciding the unit of analysis in studies of scholarly communication (cf. Palmer & Cragin, 2008). As I demonstrate in Paper III (Börjesson, 2015), in order to analyze scholarly communication in extra-academic settings, there may be a need to tweak the conventional methods for analysis of scholarly communication. While I chose a manual approach to assemble data for a bibliometric analysis, there may well be automated alternatives based on machine-learning to develop. The topical contribution to IS is the delineation of scholarly documentation from the more general category of scholarly communication. The term scholarly documentation enables analyses of documentation practices as part of scholarly communication practices. The identification, operationalization, and analysis of the non-local regulative, institutional, and infrastructural resources contributing to documentation contexts is an addition to the application of practice theory in IS. My version of the documentation context approach complements analyses of local resources and contexts (cf. Cox, 2012; Knorr-Cetina, 1999).

The theoretical approach applied in this study, based on practice and document theory has served to inquire into one situation in which extra-academic scholarly documentation is created. Yet, while the empirical work

which this dissertation is based on concerns one specific example, report writing in Swedish DL archaeology PSOs, literature on extra-academic research (Finnegan, 2005b; Nowotny et al., 2001) manifest that Swedish DL archaeology report writing is but one example of the wider phenomenon of extra-academic research and consequent scholarly documentation. The results therefore prompt further studies to expand the field for IS which I introduce in this dissertation. Firstly, although the dissertation focuses on one type of documentation it illuminates the need to identify, analyze, and undertake critical studies of the various outcomes of extra-academic knowledge making. A topical example of such outcomes is the publication of datasets which presents users with a specific set of challenges yet to be further explored by IS researchers. This is especially relevant in situations where documentation meet wider audiences in 'out of context' forms, particularly notable in situations of online information seeking.

Secondly, further research should inquire into the information-related premises for scholarly documentation in other areas of extra-academic research, besides archaeology. Comparative studies to identify models for organizing extra-academic research in ways that support joint disciplinary knowledge making would be highly relevant. For Swedish DL archaeology, this line of research would be of immediate significance. As of 2017 it looks like Swedish DL archaeology will continue on its current direction, to be a knowledge making institution with "science" and "scientific quality" as key values. This deployment will be even further enforced if the new proposition for cultural heritage policy (Kulturdepartementet, 2017), stressing the importance of DL archaeology's contribution to scientific advances, is accepted.

8. Sammanfattning (Summary in Swedish)

Forskning och skapande av kunskap sker på olika platser i samhället. Universitet och högskolor är exempel på platser där forskning äger rum. Likaså är myndigheters forskningsavdelningar, idéburna organisationer som bransch-, folkrörelse-, och intresseorganisationer, och organisationer grundade särskilt för att sälja forskningstjänster (Finnegan, 2005b; Nowotny et al., 2001). En och samma forskare kan samtidigt, eller under olika perioder av sin karriär, arbeta inom flera av dessa organisationstyper. Resultaten av forskningen kan presenteras på vetenskapliga konferenser, i vetenskapliga artiklar eller böcker, eller i andra former av presentationer och publikationer. I denna avhandling görs en analytisk distinktion mellan akademisk och utomakademisk forskning för att belysa förutsättningar för dokumentation och kommunikation av resultat från forskning som sker utanför akademin.

I avhandlingen studerar jag resurser för vetenskaplig dokumentation utanför akademin. Fallet i fokus är svensk uppdragsarkeologi, det vill säga den typ av arkeologi som föregår markexploatering. Uppdragsarkeologi är i många länder, som exempelvis Storbritannien, USA och Frankrike, långt vanligare än arkeologiska undersökningar initierade av forskningsprojekt. Organisationen av uppdragsarkeologi skiljer sig något mellan olika länder (Bradley, Haselgrove, Linden, & Webley, 2012; Carver, 2009; Demoule, 2012). Svensk uppdragsarkeologi är en del av statens kulturarvsvård och regleras genom nationell lagstiftning, i nationella riktlinjer och i verkställighetsföreskrifter. Syftet är att tillse att fornlämningar undersöks och dokumenteras innan mark bearbetas eller bebyggs. Den svenska uppdragsarkeologin är vid 2010-talets mitt organiserad som en semireglerad marknad. På marknaden verkar professionella tjänsteorganisationer, det vill säga de statliga, regionala och lokala muséer, stiftelser, medlems-organisationer, aktie- och handelsbolag samt enskilda firmor som säljer uppdragsarkeologitjänster till markägare. Jag kategoriserar uppdrags-arkeologiska organisationer som professionella tjänsteorganisationer på grund av deras likheter med professionella tjänsteföretag. I likhet med tjänsteföretag (jfr. von Nordenflycht, 2010) är de uppdragsarkeologiska organisationerna präglade av hög kunskapsintensitet, låg kapitalintensitet och en professionell yrkeskår. Tjänsterna som uppdragsarkeologiska organisationer säljer är skapande av kunskap. De anställda är organisationer-nas främsta tillgångar, och den uppdragsarkeologiska yrkeskåren är

professionell. Professionell i detta sammanhang betyder att yrkeskåren delar en specifik kunskapsbas, själva är delaktiga i formandet och kontrollen över sitt kunskapsområde, och att kåren delar yrkesetiska riktlinjer (Svensson & Evetts, 2010; von Nordenflycht, 2010; jfr. Sundin & Hedman, 2005). Länsstyrelserna fungerar som mellanhand, de arrangerar det upphandlingslika förfarandet och fördelar uppdrag. De utförande organisationerna är ålagda att använda vetenskapliga metoder, att utföra arbete av god vetenskaplig kvalitet, och att skapa kunskap relevant för myndigheter, forskning och allmänheten (Kulturmiljölag (1988:950), n.d.; Riksantikvarieämbetet, 2015a).

Uppdragsarkeologer publicerar huvudsakligen sina resultat i rapporter. Rapporterna levereras till länsstyrelsen och markägaren vid avslutat uppdrag. Svenska uppdragsarkeologiska rapporter har arkiverats och tillgängliggjorts av kulturarvsmyndigheten Riksantikvarieämbetet samt av olika regionala och lokala arkiv och muséer. Rapporterna har dock historiskt sett inte ingått i samma system för informationssökning som vetenskapliga artiklar och böcker, och inte följt samma utveckling när det gäller digitalisering som vetenskapliga publikationer.

Inom arkeologidisciplinen uttrycks ett problem med rapporter. Problemet, att resultat som presenteras i uppdragsarkeologiska rapporter får lite eller ingen uppmärksamhet, har identifierats som en utmaning både i Sverige och i andra länder som Storbritannien och USA (e.g. Andersson et al., 2010a; Lönn, 2006; Muckle, 2008b; Riksantikvarieämbetet, 2015b; Roth, 2010; Seymour, 2010b). Risken att utomakademiskt producerad vetenskaplig dokumentation får lite eller ingen uppmärksamhet är därtill ett fenomen som förekommer inom flera vetenskapliga discipliner (Farace & Schöpfel, 2009). Utmaningen inom svensk uppdragsarkeologi har flera olika orsaker. Den praktiska tillgången till rapporterna och rapporternas kvalitet är två orsaker. Dessa två hanteras av Riksantikvarieämbetet genom förbättrad teknisk tillgänglighet till rapporterna och förtydligande av riktlinjer för rapportinnehåll. En annan orsak till utmaningen som har uppmärksammats inom arkeologin är något som kan kallas bristande kulturell tillgänglighet till rapporter (Seymour, 2010a). Bristande kulturell tillgänglighet antas bero på en uppdelning i arkeologiprofessionen mellan de som producerar rapporter och de arkeologer som arbetar mer eller mindre oberoende av resultat från uppdragsarkeologin. Förslag för att reducera effekten av bristande kulturell tillgänglighet innefattar åsikten att uppdragsarkeologer bör publicera viktiga resultat i vetenskapliga artiklar (Riksantikvarieämbetet, 2015b) samt att arkeologer utanför uppdragsarkeologin bör uppmärksamma och använda uppdragsarkeologiska rapporter (Seymour, 2010a).

Problemet med rapporter som uttrycks inom svensk uppdragsarkeologi väcker mitt informationsvetenskapliga forskningsintresse: hur kommer det sig att rapporter, en dokumentationsform som är central för uppgradsarkeologin, samtidigt uppfattas som ett hinder för kommunikationen av uppdragsarkeologiska resultat? Problemet med rapporter har givetvis många

dimensioner. Det har att göra med ambitionerna när det gäller vad rapporter ska åstadkomma, förväntningar på föreställda användare av rapporter, och idéer om hur uppdragsarkeologin ska bidra till skapande av arkeologisk kunskap. I denna avhandling tar jag avstamp i hur problemet med rapporter uttrycks och formulerar forskningsfrågan: vad är förutsättningarna för vetenskaplig dokumentation utanför akademin? Genom att analysera resurser för dokumentation och hur uppdragsarkeologer använder dessa i vardagligt rapportskrivande ger jag en bild av förutsättningarna för att producera rapporter i uppdragsarkeologin. Jag tolkar dessa förutsättningar som utslag av hur forskningen har organiserats i olika institutioner, som innehåller olika organisationstyper, inom arkeologidisciplinen. Med grund i analysen kan jag återvända till och diskutera det uttryckta problemet. Jag föreslår att utmaningen med bristande uppmärksamhet till resultat presenterade i uppdragsarkeologisk dokumentation kan förstås i ljuset av hur disciplinen är organiserad. Därav följer att det är organisationen av arkeologisk forskning som måste förändras för att de uppdragsarkeologiska rapporterna ska användas i större utsträckning.

Studiens teoretiska ramverk är hämtat dels från dokumentationsteori och dels från praktikteori. Dokumentationsteorin betonar vikten av att analysera och beskriva de praktiker i vilka dokument skapas och laddas med mening (Frohmann, 2004b; Wittgenstein & Hacker, 2009). Praktikteorin betonar vikten av att analysera förutsättningarna, till exempel de regulativa, institutionella och infrastrukturella förutsättningarna, för en viss praktik för att skapa förståelse för hur praktiken fungerar (Knorr-Cetina, 1999; Pickering, 1992; cf. Cox, 2012).

Syfte och frågeställningar

Avhandlingens syfte är att öka förståelsen av hur fördelningen av forskningsuppdrag till professionella tjänsteorganisationer påverkar vetenskaplig dokumentation i svensk arkeologi. Syftet uppfylls i och med att kontextuella resurser för svenska uppdragsarkeologiska rapportskrivande-praktiker identifieras och analyseras samt av en analys av hur uppdragsarkeologer förhåller sig till dessa resurser i sitt rapportskrivande.

Studiens första övergripande frågeställning besvaras genom artikel I-III:

- Vad karaktäriserar kontexterna, med särskilt fokus på regulativa, institutionella och infrastrukturella resurser, för rapportskrivande inom svensk uppdragsarkeologi?

Valet att analysera just dessa resurser är resultatet av en iterativ process som beskrivs närmare i kapitel 4, "Theoretical framework". Sammanfattningsvis började jag studera rapportförfattares användning av informationskällor (en infrastrukturell resurs). Därefter fortsatte jag tillsammans med två

medförfattare, Bodil Petersson och Isto Huvila, att studera informations-policy (en regulativ resurs). Därpå gick jag själv vidare med att studera informellt uttryckta dokumentationsideal (en institutionell resurs) som finns parallellt med den formella informationspolicyn. Varje resurs (de regulativa, institutionella och infrastrukturella) studeras således i en av artiklarna I-III, genom följande operationaliseringar:

Artikel	Resurs	Operationaliserat genom begreppet	Empiriskt material
I	Regulativ	Informationspolicy	Lagstiftning, föreskrifter, och riktlinjer för uppdragsarkeologisk dokumentation
II	Institutionell	Dokumentationsideal	Erfarna praktikers åsikter om uppdrags-arkeologisk dokumentation uttryckta i en debatt i en vetenskaplig arkeologisk tidskrift
III	Infrastrukturell	Användning av informationskällor och referensramar	Referenslistor i uppdragsarkeologiska rapporter

Tabell 5. Översikt artikel I-III

Resultaten från de första tre studierna utgör bakgrunden för besvarandet av avhandlingens andra övergripande frågeställning i artikel IV:

- Hur förhåller sig praktiker i svensk uppdragsarkeologi till de regulativa, institutionella och infrastrukturella resurserna i vardagligt rapportskrivande?

I den avslutande diskussionen tolkar jag uppdragsarkeologiskt rapportskri-vande som ett exempel på vetenskaplig dokumentation utförd utanför aka-demin, och mer specifikt i den del av utomakademisk forskning som sker i professionella tjänsteorganisationer på halvreglerade marknader (jfr. Kapitel 2). Avhandlingen undersöker således förutsättningarna för vetenskaplig dokumentation i utomakademisk arkeologi på två plan: dels på en empirisk nivå genom analysen av rapportskrivandepraktiker, och dels, genom att knyta resultaten till tidigare studier av organisering av forskning och av ve-tenskaplig och professionell dokumentation, på en nivå av de mer generella förutsättningarna för att forska och producera vetenskaplig dokumentation i utomakademiska miljöer, och specifikt i professionella tjänsteorganisationer på halvreglerade marknader. Det är dock viktigt att understryka att upp-dragsarkeologiska organisationer endast är ett exempel på professionella tjänsteorganisationer. För att kunna dra mer långtgående slutsatser om förut-sättningarna för vetenskaplig dokumentation i tjänsteorganisationer krävs vidare undersökningar av tjänsteorganisationer i fler branscher.

Avhandlingen består av fyra delstudier som var och en motsvaras av en artikel samt en kappa. I de tre första artiklarna analyseras tre olika resurser för rapportskrivande: informationspolicy, dokumentationsideal samt informationskällor. I den fjärde artikeln presenterar jag en analys av hur uppdragsarkeologer förhåller sig till dessa resurser i sitt rapportskrivande. Avhandlingen som helhet är utförd med en kombination av metoder och material för att uppnå inblick i förutsättningarna för vetenskaplig dokumentation i en utomakademisk verksamhet (Ma, 2012; Plano Clark et al., 2010). I nästa avsnitt presenteras de fyra delstudierna. Därpå följer en sammanfattning av resultaten och den avslutande diskussionen.

Delstudier

Artikel I. Informationspolicy för (digital) arkeologisk information: nuläge och utvecklingsförslag

Den första artikeln besvarar frågan: hur reglerar myndigheter, genom informationspolicy (som är en regulativ resurs), uppdragsarkeologiskt rapportskrivande i lagstiftning, verkställighetsföreskrifter och riktlinjer? Bakgrunden till studien är de senaste årens förändringar i arkeologisk dokumentation till följd av digitala dokumentationstekniker och den parallella utvecklingen av den uppdragsarkeologiska marknaden. Så kallade 'best practice' när det gäller bästa tillämpning av tillgänglig dokumentationsteknik diskuteras relativt mycket inom arkeologin, medan analysen av de regulativa förutsättningarna i stort sett har varit frånvarande. Artikeln syftar till att lyfta fram policyperspektivet i forskning om arkeologisk dokumentation.

Med informationspolicybegreppet som analytisk lins studeras hur arkeologisk dokumentation regleras både i kulturarvsövergripande policydokument och i reglerande dokument specifika för uppdragsarkeologin. Analysen belyser skillnader mellan hur arkeologisk dokumentation regleras inom de olika områdena museisektorn och uppdragsarkeologin samt jämför situationen i Sverige med den i andra länder. Policyn för svensk uppdragsarkeologisk dokumentation präglas av de många syften som den ska uppfylla: dokumentationen ska fungera som underlag för myndigheters beslut, som grund för vidare forskning och för att utbilda allmänheten.

Uppdragsarkeologisk dokumentation är, både i förhållande till arkeologisk dokumentation på andra områden och i andra nationella sammanhang, relativt hårt reglerad. Reglering betonar skapande och leverans av dokumentation och särskilt av rapporter med fastställda egenskaper snarare än varför dokumentationen ska göras och hur den ska bevaras. Regleringen av dokumentationen fungerar således som ett medel för att styra den uppdragsarkeologiska marknadens funktion. I artikeln förs också en diskussion om hur rådande informationspolicy skapar förutsättningar för skapande av kun-

skap inom arkeologin. Diskussionen mynnar i förslag för informationspoli-cyutveckling.

Artikel II. Bortom informationspolicy: konkurrerande dokumentationsideal i utomakademiska kunskapsskapandepraktiker

I andra artikeln behandlas frågan: vilka ideal angående uppdragsarkeologisk information uttrycker erfarna professionsutövare? Utgångspunkten för studien är mångfalden av ideal rörande arkeologisk information som finns parallellt med de ideal som uttrycks i formell informationspolicy (som analyseras i artikel I). De informellt men ändå officiellt uttryckta idealen är ofta mer aktuella. Jag antar i studien att idealen därför kan stå närmare de arkeologer som arbetar med dokumentation till vardags.

Materialet som analyseras i artikeln är en debatt om uppdragsarkeologisk kvalitet i en svensk forskningstidsskrift. Det teoretiska ramverket är hämtat från den vetenskapssociologiska traditionen av att studera de kontroverser som föregår vetenskaplig konsensus. Studiens syfte är att identifiera de ideal som uttrycks i debatten och spännvidden dem emellan. Jag identifierar tre dokumentationsideal i analysen: dokumentation som vetenskaplig, dokumentation som vetenskaplig men kontextberoende och dokumentation som utbildande för samhället. De två första idealen är baserade på två olika uppfattningar om vad vetenskaplighet är och olika uppfattningar om villkoren för att vetenskaplighet ska uppnås. Det andra idealet lyfter fram det uppdragsarkeologiska sammanhanget och de förutsättningar som där ges för vetenskaplighet. Det tredje idealet fokuserar på dokumentationen som produkt och dess utbildande påverkan på allmänheten snarare än på perspektiv och metoder i skapandet av dokumentation. De tre idealen visar på spännvidden i uppfattningar om hur uppdragsarkeologisk dokumentation bör vara. Analysen vidimerar också bilden av att det finns skilda uppfattningar i vad vetenskaplighet betyder.

Förutom de tre dokumentationsidealen framkommer i analysen två ideal som gäller hur dokumentationsprocessen ska styras: dokumentations-management och dokumentationsgovernance. Det första styrningsidealet, dokumentationsmanagement, betonar aktiv styrning av dokumentation genom riktlinjer, kontrakt och kvalitetskontroll. Det senare styrningsidealet, dokumentationsgovernance, karaktäriserar uppdragsarkeologisk dokumentation som kvalitativt sett unik och beroende av att uppdragsarkeologer balanserar vetenskapliga ideal och värden för samhället, det vill säga markägare och allmänhet företrädda av de regionala myndigheterna. Kvalitet uppnås genom myndigheternas kontinuerliga justeringar av den uppdragsarkeologiska processen snarare än genom kontrakt och system för kvalitetskontroll.

Artikel III. Grå litteratur – grå källor? Nyanserande av synen på professionell dokumentation. Fallet svensk uppdragsarkeologi.

Den tredje artikeln behandlar frågan: hur använder uppdragsarkeologer informationskällor i sitt rapportskrivande? Studien tar sin utgångspunkt i idén, influerad av vetenskapssociologisk och bibliometrisk forskning, att rapportförfattares referensramar är en ingång till att förstå sammanhanget i vilket rapporter skrivs. I en bibliometrisk studie analyseras rapportförfattares användning av källor. Parametrar som källornas upphovsmän, källornas datering, typ, format och språk analyseras med frekvensmått. Därtill analyseras rapportförfattarnas organisatoriska tillhörigheter och relationen mellan dessa och källornas upphovsmäns organisatoriska tillhörigheter. Med hjälp av multipel korrespondensanalys och klusteranalys utforskas mönster i användningen av källor.

Analysen ger en inblick i det genomsnittliga antalet källor och de vanligaste källtyperna som är listade i de arkeologiska rapporternas referenslistor (det vill säga arkeologiska rapporter, professionell litteratur och kartor). Analysen visar också att rapporter daterade från 1980 fram till 2013 är de vanligaste källorna. Källor från samma land som rapportförfattaren dominerar över källor från andra länder. Korrespondens- och klusteranalyserna visar tre mönster i källanvändningen: ett administrativt mönster, ett professionellt/akademiskt mönster och ett kartmönster. Det administrativa mönstret inkluderar rapportförfattare från stiftelser och medlemsorganisationer, senare källor (från 1980 och framåt), administrativa och andra icke-akademiska källor, arkeologiska rapporter och källor från samma organisation som rapportförfattaren. I det professionella/akademiska mönstret ingår företag, tidigare källor, akademisk litteratur från Sverige och andra länder, och professionell litteratur från Sverige och andra länder. Kartmönstret inkluderar referenser till kartor. De två första mönstren indikerar två trender i rapportlitteraturen: en där rapporter framförallt är administrativa produkter, och en där rapporter är professionella produkter i vilka akademiska källor är ett viktigt inslag.

Artikel IV. Forskning utanför akademin? En analys av resurser i utomakademiska rapportskrivandepraktiker

I den fjärde artikeln besvaras frågan: hur förhåller sig uppdragsarkeologer till regulativa, institutionella och infrastrukturella resurser i sitt vardagliga rapportskrivande? I och med denna frågeställning reflekterar den fjärde artikeln de resurser som analyseras i de tre första studierna. Den fjärde artikeln presenterar en analys av hur uppdragsarkeologer förhåller sig till dessa i vardagens dokumentationspraktiker.

Det huvudsakliga materialet är semistrukturerade intervjuer med sex uppdragsarkeologer. Samtliga har en licentiat- eller doktorsexamen i arkeologi

eller närliggande ämnen, alla arbetar i företag och har varit aktivt involverade i undersökningar och rapportskrivande under de senaste fem åren. Dessa kriterier syftade till att identifiera arkeologer som är skolade i akademisk forskning men som i huvudsak är verksamma utanför akademin. Intervjumetoden valdes för att nå arkeologernas berättelser om rapportskrivande och samtidigt få en inblick i deras yrkesmässiga bakgrunder och identiteter, liksom i de organisatoriska omständigheterna för arkeologernas arbete.

Analysen visar att uppdragsarkeologerna använder regulativa resurser på ett indirekt sätt. De lämnar i stort sett tolkning av policydokument till personalen på de regionala myndigheterna. Uppdragsarkeologerna följer sedan länsstyrelsepersonalens direktiv, bland annat genom att anpassa sina rapportmallar och genom att kopiera och klistra in redan accepterade textstycken mellan dokument. Det dagliga arbetet är således mer format av mellanliggande dokument som är författade av länsstyrelsepersonal, exempelvis upphandlingsspecifikationer, än av informationspolicy-formuleringar.

När det gäller den institutionella resursen dokumentationsideal visar praktikerna både med varandra överensstämmande och avvikande åsikter. Det finns en generell konsensus mellan informanterna angående vilka delar en rapport ska innehålla och om att enkel navigering inom rapporter är ett viktigt värde. När det gäller detaljnivå och målgrupp finns det dock olika åsikter. Anmärkningsvärt är att de två grupperna "andra uppdragsarkeologer" och "länsstyrelsernas personal" betonas som målgrupper av majoriteten av informanterna i denna intervjustudie. De målgrupperna är inte lika tydligt betonade i policytexter (jfr. Artikel I).

När det gäller den infrastrukturella resursen informationskällor förlitar sig de intervjuade uppdragsarkeologerna till stor del på deras egen tidigare kunskap om det geografiska området och på personliga kontakter snarare än på källor sökta i söksystem. I de fall som biblioteks- och arkivresurser används är dessa ofta funna genom googlande. Ett glapp mellan de önskade och de tillgängliga vetenskapliga källorna leder till alternativa vägar till dessa resurser.

Resultaten om rapportskrivande summeras i sex förslag för användning av rapporter: användare bör (i) känna till de konkreta kraven på och (ii) fördelningen av kontroll över rapporter, (iii) föredragsvis söka upp och läsa så många av dokumenten som möjligt som är relaterade till rapporten i fråga, (iv) undersöka rapportförfattarens professionella biografier och intressen, (v) söka efter innehåll som har hoppats över eller uteslutits på grund av omständigheter som till exempel tidsbrist eller väder, (vi) behandla rapporter som geografiskt förankrade informationskällor och kompensera genom att utöka informationssökning geografiskt. I artikeln översätts dessa förslag också till råd som är riktade till arkivarier och bibliotekarier som är involverade i den vetenskapliga kommunikationen av uppdragsarkeologiska rapporter. Artikeln bidrar till biblioteks- och informationsvetenskaplig forskning med inblick i en utomakademisk forskningspraktik, och som

inlägg i en vidare diskussion av de informationsrelaterade förutsättningarna för forskning utanför akademin.

Resultat och avslutande diskussion

Studien visar att regleringen av arkeologisk dokumentation genom informationspolicy är ett centralt medel i statens och kulturarvsmyndigheten RAÄ:s styrning av den uppdragsarkeologiska marknaden och formandet av uppdragsarkeologin som institution. I rådande informationspolicy (vid tiden för analysen) ramas skapande av kunskap in som en tjänst som levereras av uppdragsarkeologer till mottagarna myndigheter, forskning, och allmänheten. De i policyn fastslagna dokumentationsformerna blir kvittot på att tjänsten har levererats. Om man i stället ser till de dokumentationsideal som råder parallellt med den formella policyn, så finns det en mångfald av idéer om vad den uppdragsarkeologiska dokumentationen ska vara och vad den ska uppnå. Ett ideal, dokumentation som vetenskaplig men kontextbero-ende, följer relativt nära det som uttrycks i den formella informationspoli-cyn. Även idealet om dokumentation som utbildande av allmänheten har återklang i den formella policyn, medan idealet om dokumentation som vetenskaplig i en mer inomakademisk mening representerar ett avvikande synsätt i förhållande till policyperspektivet.

När dessa resultat om reglering av och ideal när det gäller rapporter ställs bredvid mönster i användningen av informationskällor förstärks bilden av att det finns en spännvidd när det gäller stil och innehåll inom rapportgenren. I skenet av det administrativa källanvändningsmönstret framstår rapporter som dokument med närmast band till sentida dokument kopplade till kulturarvs-vård och -administration. Det akademisk/professionella källanvändnings-mönstret däremot ger oss uppfattningen om rapporter som del av en till största delen nationell, akademisk och professionell diskurs som går längre tillbaka tidsmässigt än de administrativa källorna. Studien av hur dessa resurser nyttjas av praktiker i vardagligt rapportskrivande ger ytterligare djup till bilden av vad som påverkar dokumentationen.

Resultaten om hur uppdragsarkeologer använder regulativa, institutionella och infrastrukturella resurser ger en bild av dokumentationskontexter i svensk uppdragsarkeologi. Kontexterna präglas av att informationspolicy tolkas av ett mellanled, att det finns en viss flexilitet när det gäller ideal för dokumentationen, och att de rapportskrivande uppdragsarkeologernas referensramar baseras på praktikernas tidigare kunskap om det geografiska området och på personliga kontakter. Det är i dessa dokumentationskontex-ter som uppdragsarkeologer ska formulera och presentera kunskap av veten-skaplig kvalitet (Kulturmiljölag (1988:950), n.d.; Riksantikvarieämbetet, 2015a, 2015b).

Sammantaget ger avhandlingen en bild av rapporter producerade i professionella tjänsteorganisationer inom svensk arkeologi, det vill säga en viss typ av vetenskaplig dokumentation i en viss typ av organisation, i en specifik disciplin och ett nationellt sammanhang. Studien sätts i relation till tidigare analyser av spridningen av skapande av kunskap utanför akademin (Finnegan, 2005b; Nowotny et al., 2001). Den uppdragsarkeologiska institutionen karaktäriseras av professionella tjänsteorganisationer. De kan jämföras med professionella tjänstefirmor som levererar olika typer av tjänster (von Nordenflycht, 2010). Myndigheters användning av tjänsteorganisationer för leverans av forskning uppmärksammas som en forskningspolitisk handling som, bland annat genom att reglera förutsättningarna för den vetenskapliga dokumentationen för att passa i tjänsteleveransprocesser, påverkar förutsättningarna för forskningen inom en vetenskaplig disciplin som helhet.

Sammanfattningsvis visar avhandlingen hur uppdragsarkeologiska dokumentationskontexter är beroende av hur forskningsuppdraget har fördelats inom arkeologidisciplinen och hur den uppdragsarkeologiska institutionen har organiserats. Genom att se utmaningen, att resultat producerade inom uppdragsarkeologin riskerar att få lite eller ingen uppmärksamhet, från dokumentationskontextperspektivet riktas uppmärksamheten mot organisationen av institutionen och i ett vidare perspektiv organisationen av arkeologidisciplinen. Om vi antar att målet är att uppdragsarkeologiska resultat ska bli mer tillgängliga och komma till större användning krävs det en förändring av dokumentationskontexten i form av ett närmande till arbetsformer inom den akademiska arkeologiinstitutionen. Ett sådant närmande kan ske genom insatser av olika omfattning, men framförallt genom förändringar av hur disciplinen organiseras och hur uppdragsarkeologiinstitutionen styrs snarare än på nivå av enskildas ansträngningar. Förändringar kan innefatta till exempel en justering av den uppdragsarkeologiska marknaden till förmån för uppdragsarkeologers utrymme att delta i vetenskapliga kunskapsutbyten och en förändring av det uppdragsarkeologiska reviewförfarandet. Det speciellt utmanande vid formande av arkeologidisciplinens forskning är att den uppdragsarkeologiska institutionen framförallt formas av kulturarvspolitik, medan den akademiska institutionen till stor del lyder under forskningspolitiken. För en lösning i form av förändring av disciplinen som helhet krävs därför en samordning av styrning från dessa två politikområden.

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